PRINT ISSN : 2395-6011
ONLINE ISSN : 2395-602X






## CONFERENCE PROCEEDINGS

# 4th National Conference on Emerging Trends and Challenges in Biomedical Engineering

(24th and 25th May 2022)

Organised by
Department of Biomedical Engineering,
Adhiyamaan College of Engineering,
Dr. M. G. R.Nagar, Hosur, Tamil Nadu, India
In Association with
Biomedical Engineering Society of India (BMESI)

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN SCIENCE & TECHNOLOGY

VOLUME 9, ISSUE 10 MAY-2022

Email : editor@ijsrst.com Website : http://ijsrst.com

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Published By

International Journal of Scientific Research in Science and Technology

Print ISSN: 2395-6011 Online ISSN : 2395-602X

Volume 9, Issue 10, May-2022

International Peer Reviewed, Open Access Journal

Publisher

[ www. technoscienceacademy. com ]

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The Institution is spread over a sprawling campus with calm surroundings, creating fitting atmosphere for study. The Institute provides with clean and invigorating environment conducive for higher education.

Adhiyamaan College Of Engineeing is one of the educational Institutions developed by Adhiyamaan Educational and Research Institution - A Trust, which was started in the year 1987-98 to cater the needs of the nation in the development of technocrats and to provide facilities for educating and training men and women to meet the entrepreneurial and management needs. The management has created adequate infrastructural facilities and sufficient funds and is keen on developing the institution for higher education.

It is the first engineering college to be started in the most backward erstwhile Dharmapuri District of the state of Tamil Nadu to develop the people academically, socially, and economically. It was originally affiliated to University of Madras. When the Periyar University was carved out from the University of Madras; it was affiliated to it. Since the government of Tamil Nadu decided to bring all the Engineering and Technical Institutions in the state under one Technological University in the year 2001. Adhiyammaan College Of Engineering was affiliated to the Anna University, Chennai. The College is housed in Adhiyamaan Educational and Research Institutions campus, Dr.M.G.R. nagar, Hosur. The campus is spread over an area of 250 acres abutting National Highway NH-7.

The Institution is situated 6 kms from Hosur Bus Stand and Railway Station. The Institution is well connected to three major railway junctions viz., Hosur, Jolarpet , and Bangalore.

## ABOUT THE CONFERENCE

The Department of Biomedical Engineering, ACE is organizing Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering (NCETCBE2k22) in association with BMESI on deliberating with renowned experts in the field. This forum provides expression of innovative research ideas as paper presentation where there is freedom to discuss debate and defend their findings to benefit all concerned.

This National Conference has teamed up with International Journal of Scientific Research in Science and Technology (IJSRST).

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Li-Fi Technology Based Contactless Patient Health Monitoring System

**S. Akash[1], C.K. Hariharan[1], S. Jayasurya[1], N. Mohammed Ameenul Islam[2]**

[1]Students, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

This paper is about the patient monitoring system using Li-Fi technology. Due to Covid-19 doctors/healthcare employees want to work with infected patients. Li-Fi is a light weight fidelity which is employed in hospitals to reduce the challenges faced by medical professionals. Li-Fi is a bifaced high speed wireless optical communication helps to watch the multiple patients with in the hospital. Sensors like LM35, Heart beat sensor, employed to perform their respective functions. These sensors collect the heart rate and body temperature data is convert in to the digital form using the analog to digital converter. The microcontroller receives the output from the sensors. Output from a small controller is inserted into a Li- Fi module that transmits data in the form of light and the receiver end collects this data and also the touch sensor is used for if any emergency situation means the patient touch that sensor and the alert information send to doctor by using Li-Fi receiver module.

**Keywords:** Li- Fi, Wi-Fi, VLC, AVR.

## I. INTRODUCTION

In the age of emerging technologies, it is necessary to find the best solutions for all work. Today the cost of health care is increasing and to reduce these costs it is necessary to have technology-based health care systems. Patient monitoring can be done most effectively using Li-Fi technology. In the age of emerging technologies, it is necessary to find the best solutions for all work. Today the cost of health care is increasing and to reduce these costs it is necessary to have technology-based health care systems. Patient monitoring can be done most effectively using Li-Fi technology.Patient monitoring refers to “repeated or continuous monitoring or evaluation of the patient, his or her physical activity, and the function of the life-support equipment., for the purpose of directing administrative decisions, including when a medical intervention is performed, and evaluation of that intervention”. Wi-Fi patient monitoring is slower compared to Li-Fi and has lower bandwidth. Reliability is better on Li-Fi than on Wi-Fi. Since Wi-Fi data transmission uses RF waves, these frequencies are more likely to affect the human body. The identification of these symptoms may be carcinogenic and this is provided by the World Health Organization. To solve this problem, Li-Fi

technology (light reliability) is used in a healthy environment. Light fidelity is the transmission of information through an optical wireless medium. Heartbeat, temperature, and movement sensors are used with the Li-Fi module. Fast pulses are produced in the form of 0s and 1s. The image diode is used at the end of the receiver. Lightning strikes occur at hundreds of megabytes per second. Information obtained from mobile phones can be displayed on mobile phones through the app. Li-Fi technology range is 10m and secure connections are possible. Transmission of information through light telephony is called Transparent Visual Communication. The goal of Patient Monitoring is to provide early detection of any deterioration in health care honestly and accurately and to provide a warning or alarm.

Skipping radiation exposure data on Wi-Fi technology data seen in patients will be transmitted using Li-Fi.

## II. LITERATURE SURVEY

Harold Haas et.al [2016] explained that Li-Fi, called Light Fidelity, could be a revolutionary solution for prime speed data network. Li-Fi networks support the transmission of information through illumination of LED bulb, thereby it's also termed as light communications (VLC). the rationale for depending over wireless network in hospital is that the cables which are running over the patient's body interconnecting the devices may cause contamination. Dependency on wireless internet increases the burden on Wi-Fi technology which, in turn, creates an enormous demand for bandwidth and radio-frequency spectrum.

Tan YY et.al [2020] explained that because of radiation effect, Wi- Fi was restricted in hospitals. the matter in Li-Fi was, during transmission it's necessary to create sure that it ensures confidentiality. Hence, Elliptic Curve Differ Hellman and Secure Hash Algorithms were wont to provide security which use key and authentication to form it difficult to hack data in hospitals.

Van der R. Togt et.al [2008] explained that VLC has definite scope in many areas like Smart Stores, Consumer Electronics, Defense and Security, Vehicle and Transportation, Aviation, Hospital, Underwater Communication and dangerous Environment and it's spread across the regions of America, Europe and Asia-pacific. Since the technology involves visible radiation wavelength and not radio waves, it's less likely to own negative effect on human health. Experts often compare Li-Fi to Free.

Hyung J Chang [2016] explained that parallel working with various EMI devices is possible with Li-Fi and is additionally beneficial for robotic surgeries and automatic procedures. During surgery, Li-Fi system together with various sensors, is required to urge immediate guidance from experts within the therapy by sharing data, videos/live details about the patient for the best result.

## III. EXISTING SYSTEM

In existing method has Wi-Fi technology is very popular today and it can be seen almost everywhere. This high usage of the wireless spectrum has given way to many disadvantages like the maximum utility of the Radio Frequency causes blocking of the signals to the users, interference, the radiations are hazardous in the

sensitive environments. The Radio Frequency which cause any harmful effect on humans. In this method Wi-Fi is used for data transfer and the pulse sensor is to detect the patient heart rate condition only.

## IV. PROPOSED SYSTEM

In the proposed system lights can be used as a source to transmit information. Transmitting information through Li-Fi makes it faster and easier the concept of Li-Fi will make the communication faster and more effective in future in various spheres across the world. The Heart Beat Sensor is used to measure the pulse rate of the patient. The pulses are monitor and updated to the observation area abruptly to avoid any health problems relating to the patient The LM35 sensor plays a very significant role in hospitals were frequent monitoring of the body temperature of the patient. Here touch sensor is used for patient has any emergency condition means they press the sensor and automatically send buzzer sound notification to the control room. The Buzzer indication circuit is connected in transmitter and receiver side. In transmitter side when the temperature will be increase the buzzer will be activated. In receiver side the data will received from the transmitter side when emergency button is touched the buzzer will be activated.

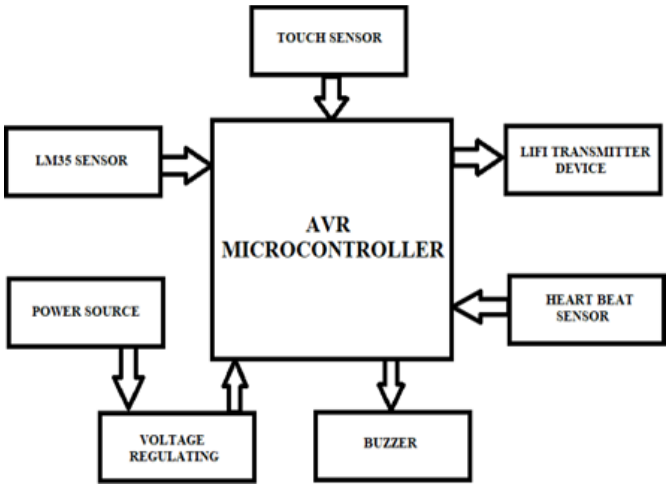


Fig. 1. Li-Fi transmitter side

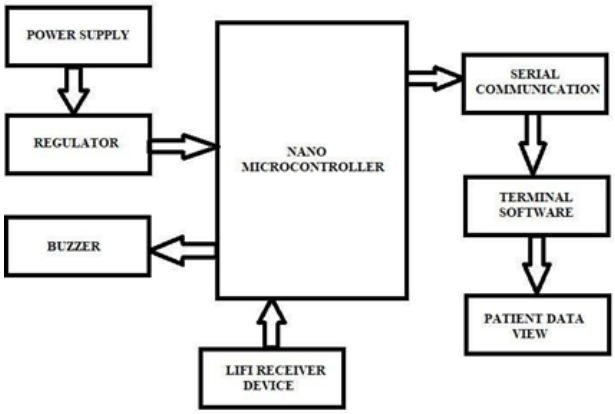


Fig. 2. Li-Fi receiver side

## V. SYSTEM FUNCTION

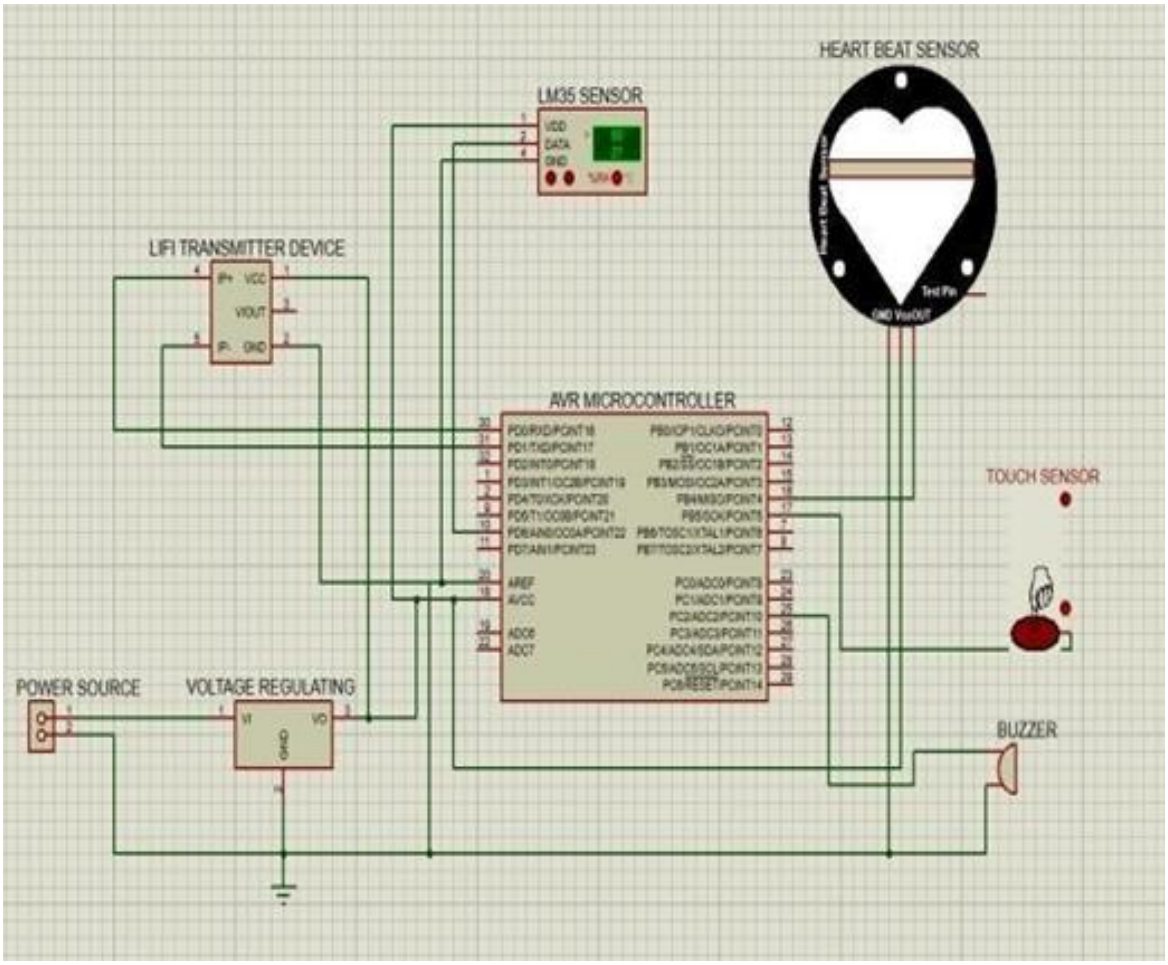


Fig. 3. Circuit diagram for transmitter side

The transmitter circuit diagram consists the components of AVR microcontroller, Nano microcontroller, LI-FI transmitter & receiver device, LM35 sensor, heart beat sensor, touch sensor, power source, buzzer and regulator. The input supply is given to regulator for voltage regulating 12v to 5v. Heat beat sensor has 3 pins VCC pin is connected to 5v, GND pin is connected to ground. D0 pin is connected to controller digital pin. LM35 sensor has 3 pins VCC pin is connected to 5v, GND pin is connected to ground. D0 pin is connected to controller digital pin. Touch sensor has 3 pins VCC pin is connected to 5v, GND pin is connected to ground. D0 pin is connected to controller digital pin. Li-Fi transmitter has 4 pins VCC pin is connected to 5v.GND pin is connected to ground. Two pins connected to controller TX and RX pin. In receiver circuit consist of Nano controller, LI-FI receiver device, power supply, regulator, max 232, and buzzer. Li-Fi receiver has 4 pins VCC pin is connected to 5v.GND pin is connected to ground. Two pins connected to controller TX and RX pin. Receiver is connected to controller for serial communication.

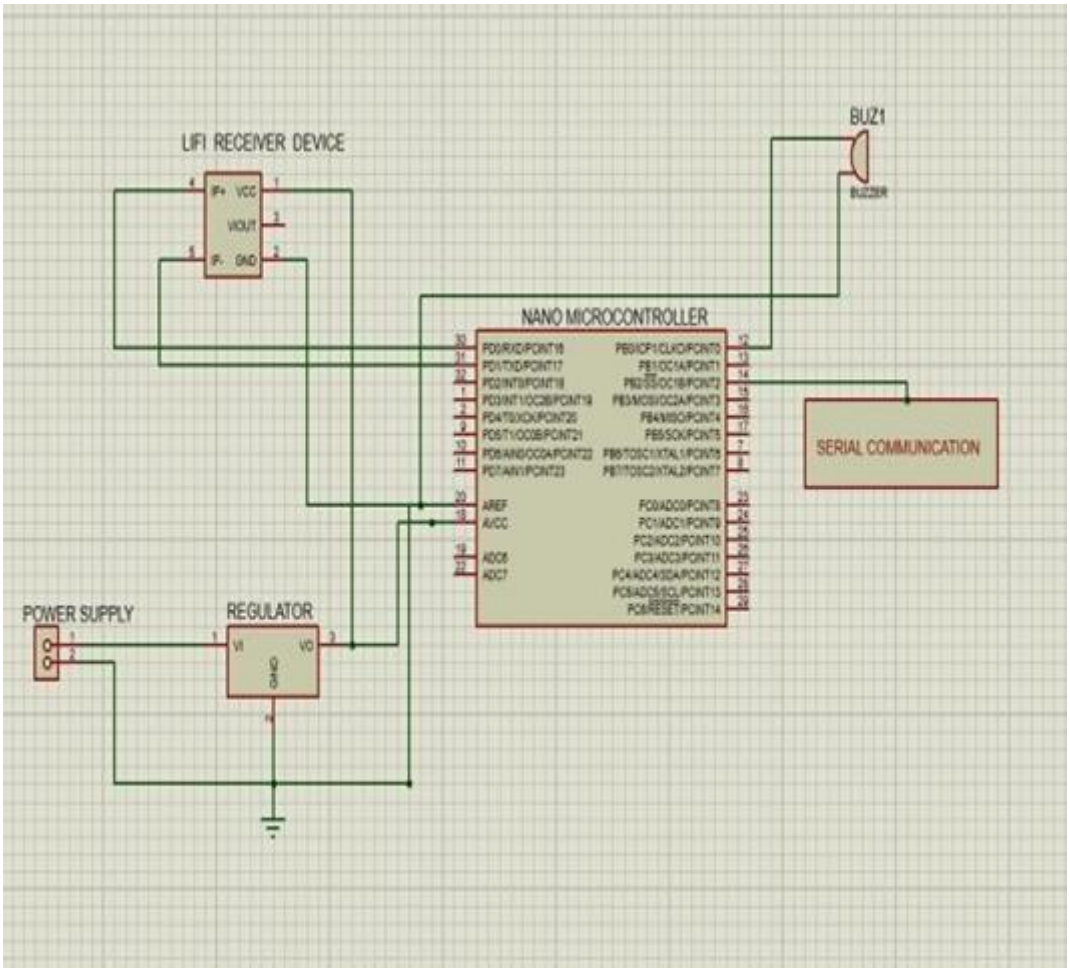


Fig. 4. Circuit diagram for receiver side

When patient is in emergency condition then nurse or attender behind the patient touch the touch sensor, immediately the data from touch sensor sent to microcontroller. The heart beat sensor and temperature sensor receives data from patient continuously and send data to microcontroller. In microcontroller the collected analog data is converted into digital data using analog to digital convertor. From the microcontroller the data sent to the Li-Fi transmitter device. Li- Fi receiver device receives data from Li-Fi transmitter then the data in the receiver is fed up to nano microcontroller. Power supply is given to the nano microcontroller and the data receivedto nano microcontroller is successfully sent to the serial communication port and buzzer. Result will be viewed through terminal software and LCD display.

### A. Power Supply

The current chapter introduces the function of power supply circuits using filters and power controls. Starting with an AC voltage, a constant DC voltage is obtained by adjusting the AC voltage, then filtered to a DC level, and finally, controlling to determine the desired DC voltage. The rule is usually found in the IC voltage control unit, which takes the DC voltage and provides a low DC voltage, which remains the same even if the DC input voltage varies, or the output load connected to the DC voltage changes.

Electrical controls form a class of widely used ICs. IC control units consist of reference source rotation, comparator magnifier, control device, and full overload protection all in one IC. Although the internal structure of the IC differs somewhat from that described in the electrical control circuits, the external performance is very similar. IC units provide fixed voltage control, fixed voltage, or adjustable voltage set. The power supply can be constructed using a transformer connected to an AC supply line to press the AC voltage to the desired amplitude, and adjust that AC voltage, filter the capacitor and the RC filter, if necessary, and finally control DC power using IC. administrator. The controls can be selected to operate with load waves ranging from hundreds of Milli ampere to tens of amplifiers, corresponding to power ratings from grinding watts to tens of watts.

Displays the basic connection of the voltage controller of three terminals IC in the load. The fixed power controller has an uncontrolled DC input voltage, VI, which is used in a single input terminal, a controlled outgoing DC voltage, VO, from the second terminal, and a third terminal connected to the ground. In the selected controller, the IC device specification is in the range of the voltage range at which the input voltage can vary to maintain a controlled output voltage over the current load range. The data also records the amount of power outgoing output due to the current load change (load control) or input voltage (line regulation).

78 series controls provide fixed voltages from 5 to 24 V showing how one such IC, 7812, is connected to provide output power output from this +12V Dec. The input voltage not controlled VI is filtered through capacitor C1 and connected to the IC's IN terminal. IC's OUT terminal provides + 12V control filtered by capacitor C2 (especially for any high-frequency sound). The third IC terminal is grounded (GND).

Although the input voltage may differ from the other allowable voltage, and the output voltage may differ from the acceptable one, the output voltage remains the same within the set voltage limits. These limitations are specified on the manufacturer's specification pages.

The AC voltage, usually 220V RMS, is connected to the converter, which presses the AC voltage down to the desired DC output level. The diode converter then supplies the voltage adjusted full wave initially filtered through a simple capacitor filter to produce a DC voltage. This resulting DC voltage usually has a specific ripple or AC switch.

The control circuit removes the ripples and retains the same DC value even if the DC input voltage varies, or the load connected to the DC output voltage changes. This power control is usually achieved using one of the IC units that control the power.

### B. Temperature sensor

The LM35 is a temperature measuring device with an analog output output in proportion to the temperature. Provides the output voltage at Centigrade (Celsius). It does not require any external measuring circuit. As the temperature rises, the output voltage also increases. Eg. 250 mV means 25 ° C. It is a 3-terminal sensor used to measure ambient temperature from -55 ° C to 150° C. The LM35 provides a more accurate temperature output than the thermistor output.

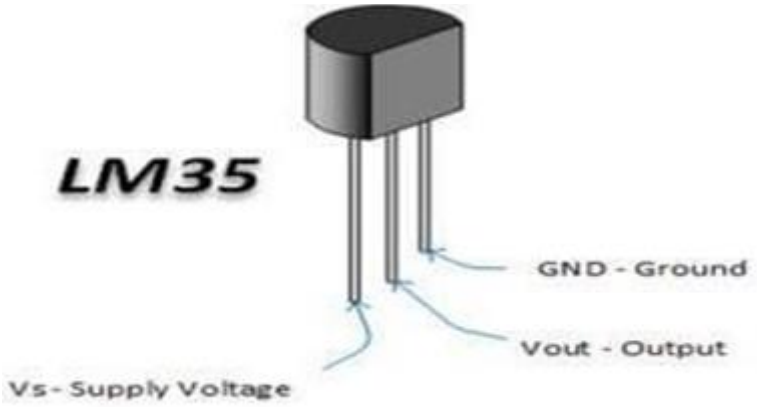


Fig. 5. Temperature sensor

### C. Heart beat sensor

Heartbeat sensor is an electronic device used to measure heart rate, which means heart rate. Monitoring of body temperature, heart rate and blood pressure are the basic steps we take to keep us healthy. To measure body temperature, we use a thermometer and to monitor arterial pressure or blood pressure. The heartbeat can be viewed in two ways: one by hand checking the beat of an object on the wrist or neck and the other by using the heartbeat sensor.

Fig. 6. Heart beat sensor

### D. Touch sensor

An electric sensor that is used to detect and record physical contact. Also known as sensitive sensors, a small, light, low-cost sensor designed to replace mechanical switches we have seen in the past.

The touch sensor acts as a switch, where in the event of a touch, touch or pressure in the sensor area, it opens up the electrical circuit and allows currents to flow through it.

Touch sensor in robots, a touch sensor is commonly used in robots, which allows basic movement and the ability to see touch in the surrounding environment (e.g. when a robot is running on something, the touch sensor may have to stop moving). Smartphones, automotive, industrial applications. Touch sensor in kitchen;

which allows you to control the flow of water without having to turn the button. Most other applications need to measure pressure / distance

Fig. 7. Touch sensor

### E. LI-FI Transmitter and Receiver

Li-Fi is a wireless communication technology that uses light to transfer data and position between devices. In technical terms, Li-Fi is a simple communication system capable of transmitting data at high speeds with visible light, ultraviolet, and infraredspectrum. In its current state, only LED lights can be used to transmit data to visible light. In terms of end use, technology is similar to Wi-Fi - the main technological difference is that Wi- Fi uses radio frequency to generate voltage in the socket to transmit data, while Li-Fi uses optical intensity of light to transmit data. Li-Fi can transfer visually at speeds of up to 100 Gbit / s. Li-Fi's ability to work safely in areas where it is not vulnerable to electrical shock (eg: aircraft cabinets, hospitals, military) is advantageous. The technology is being developed by a few organizations around the world.

### F. Software requirements and descript

AVR Studio is an Integrated Development Center (IDE) for write down and editing AVR applications. AVR Studio provides a project management tool, source file editor, template, and interface with C / C ++ front end, editing, copying and debugging on the chip. AVR Studio supports the full range of ATMEL AVR tools and each release will always contain the latest updates of both tools and support for new AVR devices.. AVR Studio 4 has a modular design, which allows for additional communication with third-party software vendors. GUI plugins and other modules can be written and linked to the system.

### G. Terminal software

Terminal simulation is the ability to make a given computer look like a real terminal or a client computer connected to a server or large frames. Today, this is usually done with software to access data or programs on a large server or frame, which are usually only available on a simulated terminal. Serial is a simple serial port (COM) simulation program. It can be used to communicate with various devices such as modems, routers . It is a very useful tool for debugging serial communication applications. Code Signed Exe's with the current installer Win 7,8,10. Serial ports, USB Serial and TCP / IP and Telnet. I2C Bus, SPI & 1-Wire chip control via

BL233B / I2C2PC. Binary is viewed as a hex, 8,16,32 bit, small / large endian, signed, unsigned, floating. Full screen, Minor Term, Screen Rate. Global Hotkeys (system wide) to send cables. Colored: RX and TX data have different colors

### H. Embedded C

When we look around, we find ourselves surrounded by a variety of embedded systems. Whether it is a digital camera or a cell phone or a washing machine, they all have some sort of processor working inside. Associated with each processor is embedded software. When computer systems form the body of an embedded system, the embedded processor acts as the brain, and the embedded software builds its own soul. Embedded software that primarily controls the performance of embedded systems.

During the teenage years of microprocessor-based systems, systems were developed using connectors and integrated into EPROMs. There was no way to find out what the program was doing. LEDs, switches, etc. used for test the effectiveness of the system. Some 'very lucky' developers had In-circuit Simulators (ICEs), but they were expensive and unreliable too.

As time goes on, the use of special microprocessor integration— only as system language is reduced and embedded systems move to C as the preferred embedded programming language. C is the programming language most commonly used forembedded processors / controls. Integration is also used but mainly for those parts of the code where high time accuracy, code size efficiency, etc. are used. are basic requirements. Initially C was developed by Kernighan and Ritchie to fit into the 8K space and write (portable) applications. It was originally used in UNIX operating systems. Since it was intended for app development, it can change memory addresses. Also, it allows programmers to write highly compact codes. This has earned it a reputation as a preferred language for hackers as well.

Since integrated programming languages are directly related to the processor, integration language does not provide functionality across all systems. To overcome this misconception, a few high-level languages, including C, emerged. Other languages such as PLM, Modula-2, Pascal, etc. they also arrived but could not gain widespread acceptance. Among those, C has gained widespread acceptance not only for embedded systems, but also for desktop applications. Although C may have lost its brightness as a standard language for normal applications, you are still actively involved in embedded programs. Due to the wide acceptance of C in embedded systems, various types of support tools such as connectors and cross-compilers, ICE, etc. emerged and all this facilitated the development of embedded systems using C.

The following sections will discuss what is embedded C, language features C, similarities and differences between C and embedded C, and features of the C-embed system.

## VI. EXPERIMENTS AND RESULTS

When a patient is at risk then the attender or nurse behind the patient touch the touch sensor, an alert message will be displayed on the LCD and message will be sent to the doctor system. The patient temperature

and heart rate are continuously monitored by LM35 sensor and heart sensor respectively and displayed on the LCD screen.

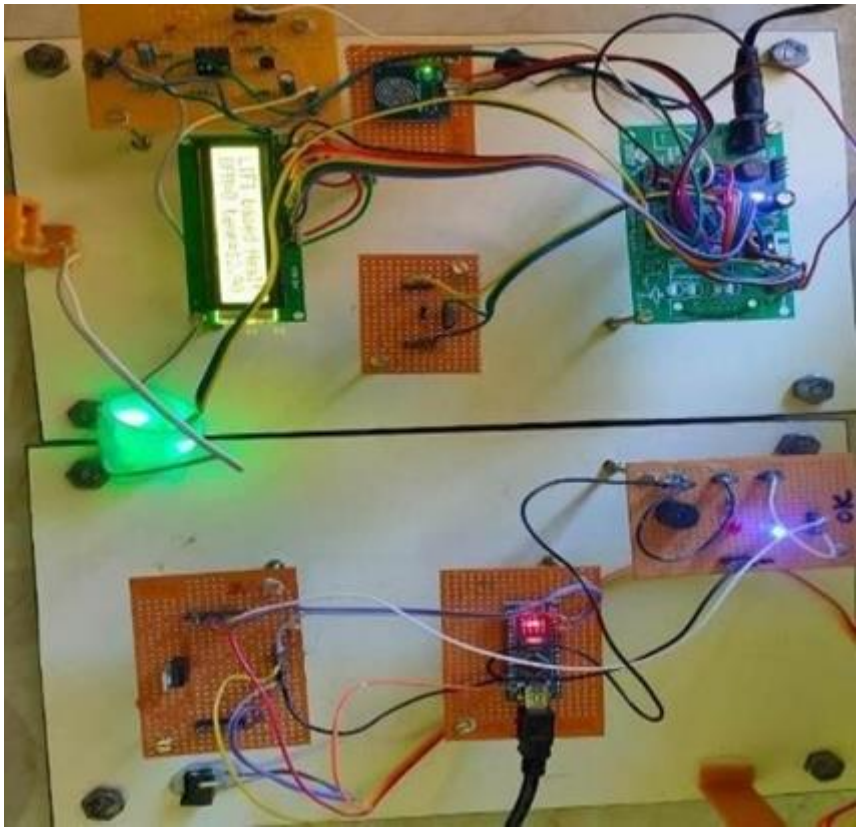

Fig .8 . Hardware Prototype Model of Patient Monitoring System


Fig. 9. Working Model of LM35 Sensor, Heart Sensor and Output

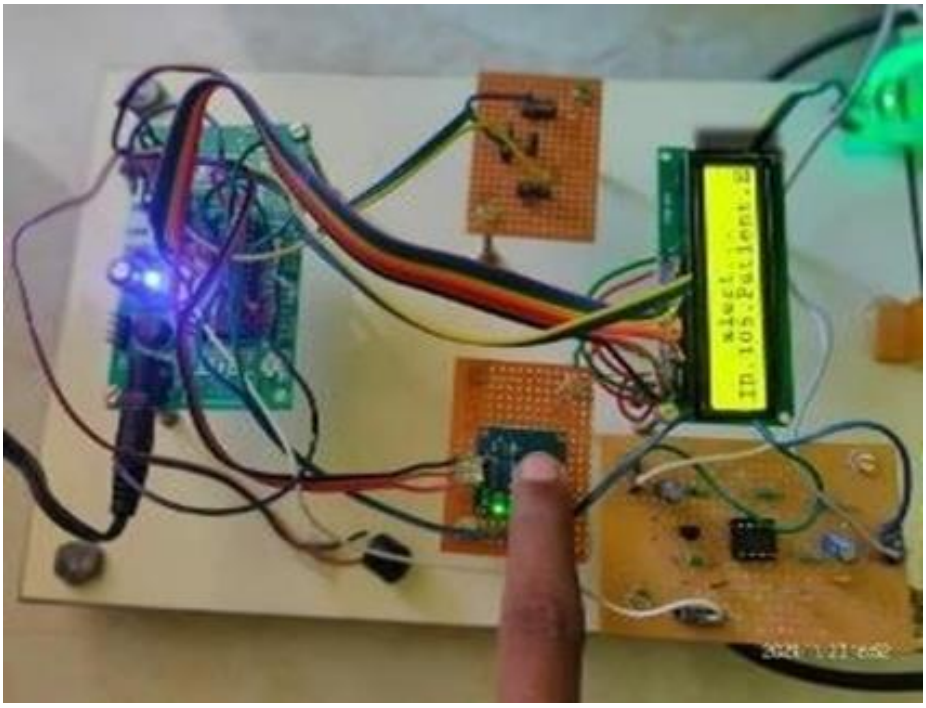

Fig. 10. Working Model of Touch Sensor and Output

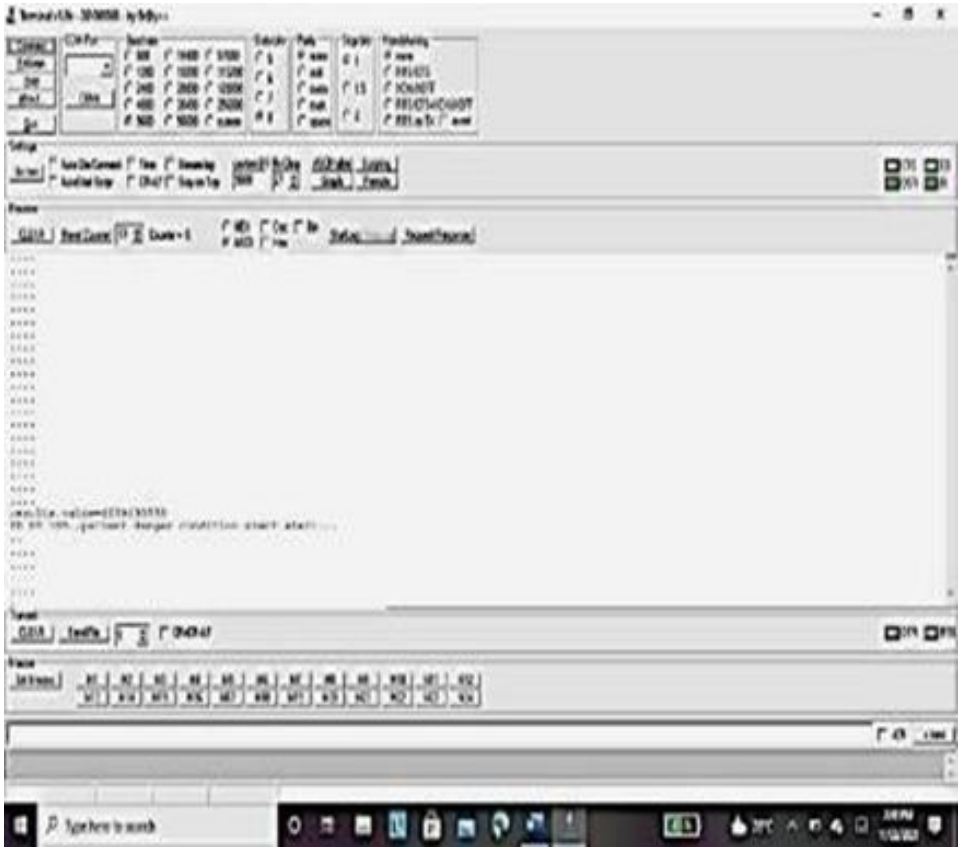

Fig. 11. Output in Terminal Softwar.

## VII. CONCLUSION

In this project, healthcare monitoring system using Li-Fi technology was proposed which has certain advantages over WiFi technology. These Li-Fi technology patient monitoring system monitor patients using sensors. Sensors such as LM35, heartbeat, are used in the model to perform its respective functions. These sensors collect the heart rate and body temperature data of patients continuously. When the patients heart rate and body temperature gone below the normal condition then successfully the message had sent to the doctors that the patient are in bad condition through Li-Fi module and doctor can view message through terminal software. Further the use of the touch sensor is used for if any emergency situation means the patient touch that sensor and the alert information send to doctor by using Li-Fi receiver module and they can view through the terminal software. This module can be designed based on early detection of patients risk condition and message send to doctors immediately. Thus our model successfully served the purpose of the design and satisfied the mentioned objectives.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Development of Intelligent Orthopaedic Vest

**Bagyalakshmi N[1], Akashragav K[2], Akhil P[2], Rajesh A[2], Prakash N[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Having a poor posture has been found to be a main cause of back pain as it affects the transverses abdominis muscle. Proper posture maintenance and changing the position often can pave the way for good health. In this paper solution for the above problem is implemented. Whenever the patient maintain a poor posture for a longtime the tactile sensor attached to the vest will record x,y,z axis of the patient. It will be transferred by Bluetooth communication to android mobile application and analysed. This vest can also monitor the pulse rate of the patient. This paper highlights the design, development and validation process of a compact wearable device that uses multiple sensors to examine the backbone posistion of an individual and notify them once after the occurance of deviation in normal physical state.

**Keywords** —Orthopaedic vest, Tactile sensor, Pulse sensor

## I. INTRODUCTION

With the cutting edges in the technology, mankind is technically developing day by day. The internet and terminals have developed rapidly in recent years, which ivariably initiated the identification of sensing concepts in the fields of artificial intelligence, and wearable devices. Traditional pressure sensors are usually hard in appearance, and has certain flaws which limit their usages. Therefore, in the past decade, a carbon copy of the old sensors with existing features has been developed. The tactile sensors, which are flexible, can convert tactile signals into electrical signals. It has huge application prospects in the fields of wearable electronic equipments, and other health sectors and in also the bioengineering.

Tactile sensors works on various methodology depending upon the usage. Further, piezo resistive tactile sensor portrays great frequency response, simple signal processing, simple structure, low cost, and whose resistivity changes with external pressure.

The prime aim of this orthopeadic vest is to give the patient posture details and assist them in therapy so also,ensuring continuous monitoring of posture using feedback signals to indicate to the patients.

## II. LITERATURE SURVEY

Gopalai A.A et.al [2020] proposed a monitoring system . The system provided the patients with the feedback signals of their poor spine posture in order to correct it. This miniature device can examine real time values of spinal cord without the need for cumbersome cables, thereby ensuring the normal function and movement.

O'Sullivan.K et.al [2011]. explained a model which are used for patients suffering from lumbar scoliosis, individuals with lower back pain and spinal fractures. There are many limitations caused by the external features. Due to the heavy weight the rehabilitation process became difficult. Hence the approach that we carried forward is to use the back abdominis muscles to keep the spine in the natural curvature form.

Shadi.D.A et.al [2020] focussed on the recent substantial development of greater resolution, tremendous sensitivity, high powered tactile sensing facilities. In this concept the introduction of piezoelectric nanomaterial and piezo-phototropic effects formulated a resolution that exceeds normal values of human skin that lead to the promotion of robotics in the field of medicine.

Zang.Y et.al [2015] proposed a system which focuses on the fundamentals of flexible pressure sensors, and also on several critical concepts for the exploration of functional materials and optimization of sensing devices toward practical applications. However it does not give full support for low power or battery operated system.

Dong.K et.al [2020] explained a concept that deals with the integration of advanced nanogenerator technology with conventional textile methods which fosters the emergence of textile-based nanogenerators (NGs), that has the ability to promote the rapid development and widespread applications of next- generation wearable electronics . However low durability and limited output current seems to be the disadvantage of this. Post stress conditions also considered as disadvantage here.

## III. PROPOSED METHODOLOGY

The Intelligent orthopaedic vest in this paper consists of a capacitive flexible tactile sensor which has good pressure detection ability and is suitable for pressure measurement of orthopedic vest. In order to judge the position and posture of the human body, the orthodontic vest is divided into several sensing areas. The number of sensors in each area can be adjusted according to different conditions such as human body shape and detection requirements.

The values of each tactile sensor are obtained in real time, and the difference between the values and the reference values is calculated. It also records the maximum change of pressure difference and the sensor to which it belongs. Here, pulse values can be monitored. The vibration sensor is used for therapy and controlled manually.

This paper consists the components of power supply, regulator, promini controller Device, Bluetooth, pulse sensor, ADC, tactile sensor, LCD display. A 12v Power Supply is given to a regulator for voltage regulating from 12v to 5v, then 5v supply is given to the controller.LCD display is connected to the controller digital pins and GND is connected to ground, supply is connected to 5v supply. Pulse sensor is connected to the

controller. It has three pins. VCC connected to positive, GND connected to negative and OUTPUT pin connected to analog pin for controller.

Tactile sensor 1 and tactile sensor 2 are connected to ADC and ADC connected to controller. In ADC, VCC connected to 5V supply, GND connected to negative. A bluetooth device is connected to the microcontroller. It has four pins. VCC, GND, TXD and RXD.

The microcontroller board comes with PRO MINI microcontroller incorporated inside the board.This board has 14 digital I/O out of which 6 pins are used for providing PWM output. In addition there are eightanalog pins in the main board.

Tactile sensors are data acquisition devices that gathers details through physical sensing. Tactile sensor designs are being employed for the research purpose due to its various striking features.

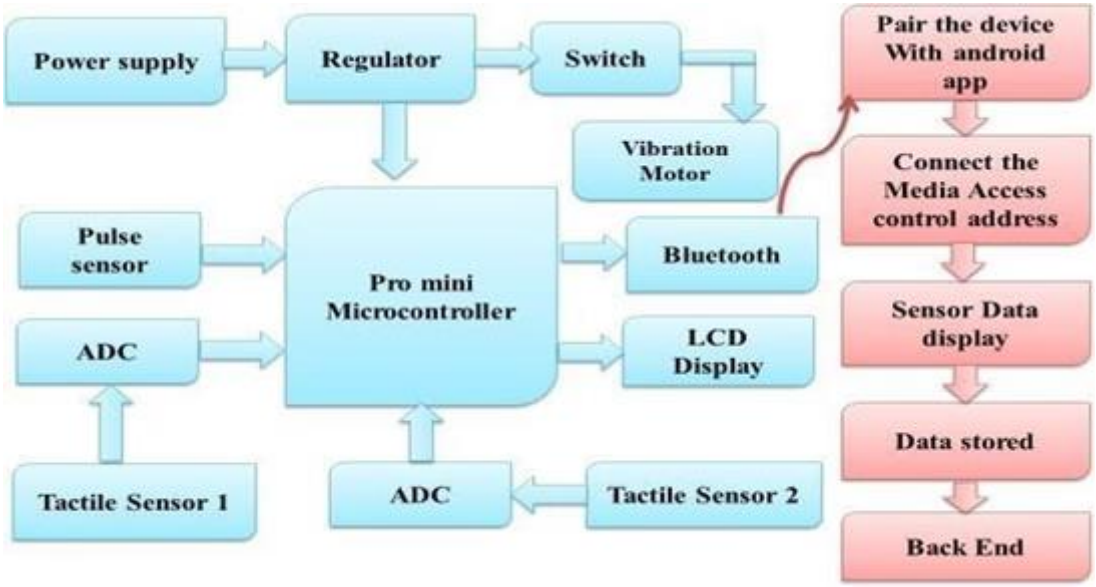


Fig 1: Block diagram for proposed system.

Heartbeat sensor is an electronic device used to measure heart rate. Monitoring of heart rate is the basic step taken to keep us healthy.

## IV. WORKING

ADC connected with the tactile sensors convert the analog signals into digital and sends it to the pro-mini microcontroller. Voltage regulator supply is given to each ADC board and pulse sensor for proper supply of the voltage. The pulse sensor senses the pulse rate and sends it to the micro controller. Values obtained are displayed in the small LCD monitor attached to the vest. The values obtained from the tactile sensor and pulse sensor are transferred to the android application via HC-05 bluetooth module connected to the vest. Vibration motor receive power supply via the voltage regulator and function by the manual (switch) method.

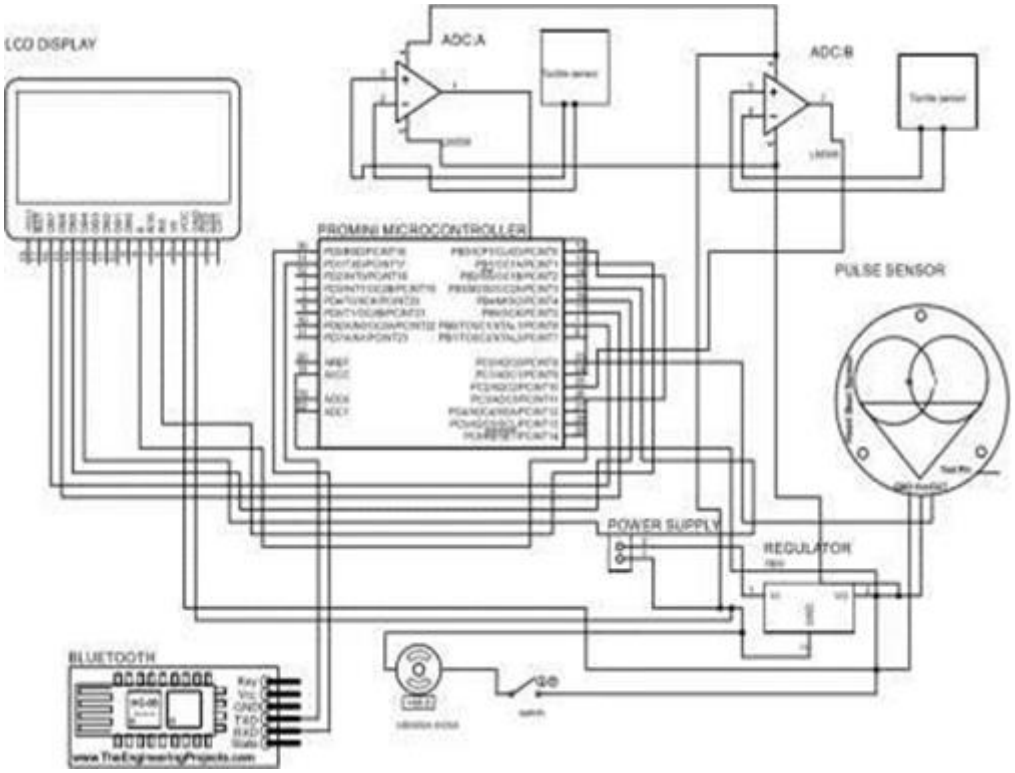


Fig 2: Circuit diagram

While wearing the orthopaedic vest, the tactile sensor attached to the vest measures the changes of posture and displays it in the LCD display. The values are then transferred to the android application via bluetooth device attached with the vest. The values are stored on the back end for the purpose of analysis. The pulse values are also measured and stored. The sensor values obtained are analysed by comparing the standard value.

## V. CONCLUSION AND FUTURE SCOPE

In this paper, an intelligent orthopaedic vest band using tactile sensors is implemented. While wearing the orthopaedic vest, the tactile sensor attached to the vest measures the changes of posture and display it on the LCD dislay. The values then transferred to the android application via bluetooth device attached with the vest. The values are stored in the back end for the purpose of analysis. The pulse values are also measured and stored. The sensor values obtained are analysed by comparing the standard value.

In the future this method can be used with more epoxy resin to submerge the hardware components which helps in water and sweat resistance. We can also use more tactile sensors for certain accuracy.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# IOT Based Real Time Beds and Oxygen Cylinder Availability Checks in Hospital for Covid-19 Affected Patients

**Mr. P. Ganesh Babu[1], Archana K[2], Bhuvaneswari N[2], Arthi M[2], Megha SR[2]**

[1]Assistant Professor, Department of BME, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]B.E Student, Department of BME, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Since the end of April 2021, a severe diffusion of COVID-19 has affected in India, and in particular its northern regions, resulting in a high demand of hospital were particular in the INTENSIVE CARE UNITS (ICUs). Hospitals were suffering the high degree of patients to be treated for respiratory diseases and the majorities of the health structures, especially in India, was at risk of saturation. Therefore, the controversy is to extent the reduction of hospital beds occurred in the past years has biased the management of the emergency has come to infront of the public debate. Therefore, the aim of this project is to analyze the availability of hospital beds and oxygen cylinder stocks across the country as well as to determine their management using IoT. The bed availability can be monitored using IR sensor and the information can be updated in cloud. The IR sensors are placed in the beds in hospital, this IR sensor will detect the beds are available or not and the available beds information can be stored in cloud database. If the beds are accessible, register the beds for covid-19 affected patients through this mobile application and it will send notification to hospital management by using the GCM communication. The online based mobile application is to find the beds and oxygen cylinder availability in hospital easily in emergency situation.

**Keywords –** GCM communication system, Patient Information System, Sensor, Iot

## I. INTRODUCTION

WHO has been convening it biomedical consortium partners in the beginning of pandemic. WHO has provided over 60 million dollars 'worth of medical equipment, including oxygen related devices to 122 countries. At the same time, with all its partners, so there are multiple agencies involved, that number has increased to 226 million, supplying over 148 countries. but, the most important pieces of work in addition to that, WHO has led, the technical advice and technical support to countries to make their own assessments of their oxygen systems in country, because the way to make investments in improving oxygen systems in that countries take the leadership, know where their gaps are.

They don't have enough oxygen generation or production in their country likely to get more investments into oxygen, meaning that the scale up plans get funded and not just get funded for COVID-19, but these things are maintained and sustained after the pandemic to strengthen the health system in general. Oxygen is

lifesaving, not just for severe COVID-19. It is life rescuing for that condition and it also a life saving for many other conditions thus; the investment in oxygen goes a very long way. While they get a severe COVID-19, the oxygen levels in the body can get low. So, in order to keep the oxygen levels at the normal range, it has to give medical oxygen. In every cell of the body requires oxygen for functions. If the oxygen levels are low, and if it's not treated, the cells themselves stops work well. Then, they stop working completely and cells can progressively die. So, then what they can see is that the organs start, patient organs once, patient know, patient brain, patient heart, patient lungs, patient kidneys all require oxygen. So, they'll stop working, in very extreme cases can cause death. Again, the lifesaving treatment here is been overcome by medical oxygen. So, medical oxygen is taking the oxygen from the air and compressing in to the oxygen they take in, let's say, for example, from a cylinder is that the patient is now breathing in almost, they know, pure oxygen and that is what it gives patients in order to keep oxygen levels at a normal level in the body. Medical oxygen requires technology. It means that patient have to be able to take the oxygen from the air, because it has oxygen in the air. About 21% of the air is oxygen. But it has to concentrate it into medical oxygen and that requires technology. So, that's one issue in some countries.

## II. LITERATURE SURVEY

GANDHI RT et.al (2020), Anecdotal reports in the lay press, social media, and free open-access medicine from the beginning of the corona virus disease (COVID-19) pandemic have highlighted a problem whereby patients are presenting for evaluation with clinically significant hypoxemia in the absence of dyspnea. Unofficially referred to as “silent hypoxemia,” this phenomenon poses significant risks to patients, as it may delay presentation to a point that their viral-mediated lung injury is far advanced, increasing the likelihood of complications such as unrecognized systemic organ dysfunction, severe per intubation hypoxemia, or cardiac arrest. One solution that has been proposed for avoiding this problem is having patients diagnosed with COVID-19 who are not sick enough to warrant hospital admission be discharged from the emergency department or clinician’s office to monitor pulse oximeter at home on a regular basis.

HODGSON CL, et.al (2014), explained that the purpose of this review is to consider these issues in greater detail. After reviewing the types of available devices and their principle of operation, will discuss the main tools for assessing the accuracy of monitoring devices and examine the available data on the performance of inexpensive pulse oximeter and smart phone–based systems. Then they review some potential pitfalls with pulse oximeter monitoring that could affect accuracy and implementation of a monitoring program and conclude by providing practical guidance for patients and medical providers who decide to use these devices for home monitoring.

SCHALLOM L, et.al (2000), proposed the system described above the estimate of oxygen saturation by shining two wavelengths of light (660 and 940 nm) from light- emitting diodes through a cetaceous vascular bed to a sensor on the other side of the tissue. Whereas in the hospital setting, the fingers and earlobes are the typical monitoring sites, the pocket oximeter and phone-based systems utilize only the fingers.

KELEPOURIS et.al (2018), research work lies mainly on the integration of different technologies to achieve the implementation of a versatile solution for managing, monitoring and trace of industrial processes such as the oxygen cylinder management presented in this paper as our pilot application of these technologies. This section will present different approaches of using IOT technologies such as RFID and Wireless Sensor Networks in industrial environments.

## III. PROPOSED METHODOLOGY

In this system, it will propose an IOT (internet of things) technology for real time beds and oxygen cylinder stock availability checks in hospitals for covid-19 affected patient. The beds availability can be checks by using IR sensor. The IR sensor is placed in- patient beds. Then the IR sensor will check the bed available or not and the bed available information can be stored in cloud database. Based on this sensor information the beds availability is conformed and it registers the beds through by clicking register mode and send the notification to hospital management by using GCM communication. The oxygen cylinder stock availability can be monitored by using ultrasonic sensor and the stock information can be updated in online database.

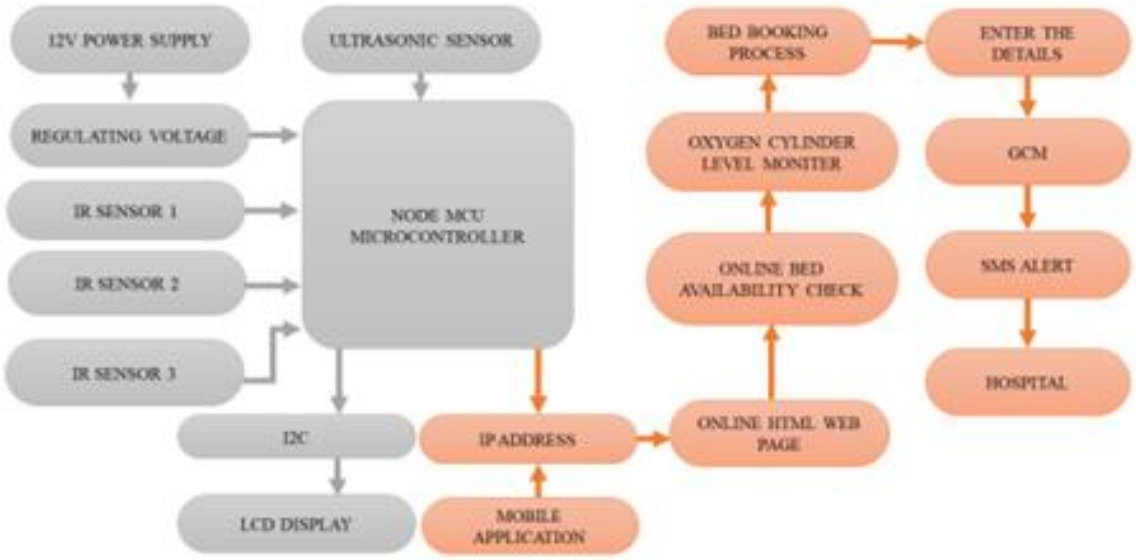


Fig 1: block diagram for proposed system

## IV. WORKING

The project is covid based patients bed and oxygen cylinder availability checks system that aims to avoid death rates, a IoT based system consist of IR and ultrasound sensor to detect the presence of bed and oxygen cylinder stocks with the help of GCM communication system.

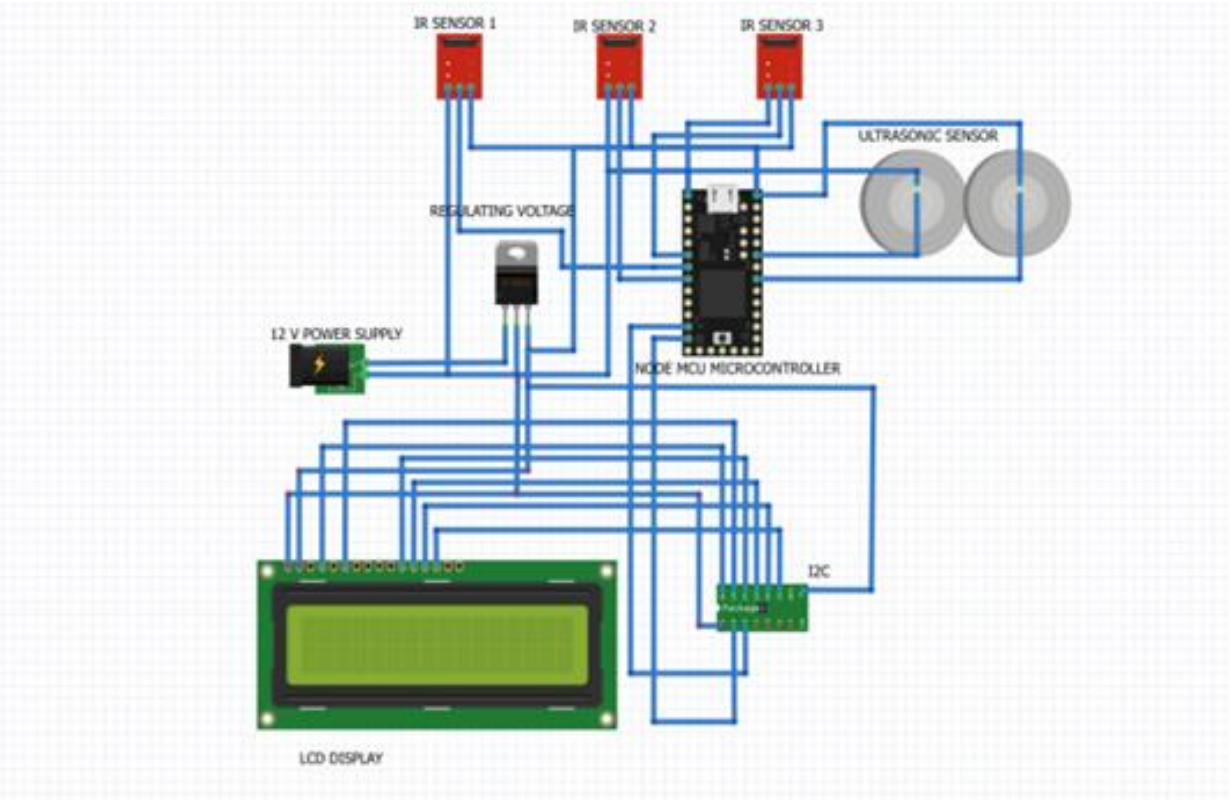


Fig 2: circuit diagram

The circuit diagram consists of the core components of Node MCU microcontroller, 5v regulator, power supply, IR sensor, ultrasonic sensor. 12v Power Supply is given to regulator. VCC and GND pins are connected to regulator.IR sensor connected to controller. It has three pins VCC connected to 5V power supply, GND connected to negative, output pins are connected to digital pin. Ultrasonic sensor connected to controller. It has four pins VCC connected to 5V power supply, GND connected to negative, output pins are connected to analog pin. LCD display connected to I2C. VCC are connected to positive and GND are connected to negative. Rs are connected to D2, E are connected to D3 and D4. D5, D6, D7 are connected to I2C. I2C have four pins. VCC are connected to power supply and GND will be connected to negative, output pins are connected to digital pins.

## V. CONCLUSION

To conclude, the model will be developing an application in online for beds and oxygen cylinder availability checks in real time for covid-19 affected people. By using this mobile application, the beds availability in hospital can be monitored and the information can be stored in cloud. If the beds are available, then register the beds for covid-19 affected patients through this mobile application and it will send notification to hospital management by using GCM communication.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Smart Wearable Device for Blood Leak Detection Using Optical Sensor in Haemodialysis Therapy

**C. Sathish Kumar[1], B. Aruna[2], V. Gayathri[2], R. Gowri[2], V. Madhumitha[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India.

[2]Students, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

During Hemodialysis therapy the blood leakage is a major problem. To avoid the blood leakage, a blood leakage monitoring system need to install. This monitoring system is use by the patients with kidney disorder. The aim of this project is to design a bracelet that can automatically detect the blood leakage occurrence on the arteriovenous fistula. This system consists of Nano Microcontroller, optical sensor, Bluetooth Module. The absorbent material is used to adsorb the blood due to venous needle dislodgement. As long as the patients wear this bracelet blood leakage can be detector at the junction of fistula. The light intensity of the absorbent material is detected by sensor and gives the output. By sensing red color only the system gives the result. When the blood leakage is occurred the signal transmitted to the Bluetooth module which is paired with GCM module. After the activation of GCM module SMS alert send to doctor or caretaker.

**Keywords—** Hemodialysis, blood leakage detector, photo interrupter, Bluetooth, GCM module.

## I. INTRODUCTION

According to the 2018's statistics, more than 90,000 patients with renal disease and kidney failure regularly received hemodialysis treatment. Venous needle dislodgement (VND) and blood leakage are frequently observed complications during therapy. According to the American Nephrology Nurses' Association VND survey reports, more than 50% of patients on dialysis were concerned about VND or serious blood leakage, indicating that they were concerned about VND events very often (>30%) or occasionally during dialysis therapy. More than 85% of the surveyed patients indicated that they had observed a VND event in the last 5 years. This event is life-threatening complication. At a dialysis flow rate of blood is 400–500 ml/min, an adult can lose more than 40% of blood volume. The risk level is expressed as the reaction time of (<2.5) min at a blood flow rate of (>200 ml/min). There are some available products which could be used for VND blood leakage detection. This product is based on the changes of the voltage signal in the sensor. It also includes a

detector with two spaced electrodes. Since the device is made up of plastic material, penetration of blood or other fluid would not damage it. It can be reused by cleaning with alcohol or disinfectant and the wire which is bent will be replaced. The VND Alarm made by Sweden's Red sense Medical Company uses an array sensor for optical fiber transmission and reception. When VND blood leakage occurs, blood blocks light transmission, by activating the warning device. This device is high cost proposing sensor-based blood leakage detection system and send SMS alert to care taker by using mobile application.

## II. LITERATURE SURVEY

D. Engvall, et.al explained that the commercial product for the detection of blood leakage is available from the red sense with a sensing sensitivity of approximately 1 ml of blood. The detection of a blood leakage is change by an electrical conductance in the circuit comprises the two metal wires separated by a slit. When the blood flows through the slit, it creates an electrical connection between the two wires. Then the blood leakage is detected. This device is a disposable leakage of the blood which cannot be reused.

Ramesh Wariar, et.al [2020] filed a patent on the needle dislodgement detection. The leakage of the blood is detected by a change in the capacitance via a capacitive sensor. When the patient's needle dislodgement is occurred, then the change in the wetness from the introduction of a blood can be detected by using the sensor.

H. Chaung et.al, [2015] explained that the blood leakage detector, HEMO dialert products, specific for the hemodialysis therapy which requires the sensing sensitivity of less than 1 ml of blood. The blood leaking condition is detected in 1 ~ 2 seconds. Thesensing method is based on the changes in the voltage signal. The device contains a detector having two spaced apart electrodes, each electrode is connected to a signal generating source via a lead. This device includes a signal processing unit which detects a change of the state across the electrodes. And it is produced by the introduction of a fluid and an alarm actuated by the change of state.

Sathiya Devi G.S. et.al, explained that the blood leakage and the bleeding detection sensors such as pad sensors, wetness sensors, and optical sensors which are being used to design warning detectors for dialysis therapy, intravenous therapy, and wound healing. Customized products are Red sense monitor and HEMO dialert have been applied for the dialysis therapy, high-risk patients and home dialysis treatment. Redsense monitor is based on an optical fiber, which transmits the light to an optical detector. When the blood leakage covers the sensing unit, the infrared (IR) light will be interrupted to identify the electrical changes. However, the IR light source is easily affected by the moisture and temperature, and then the intensity of the scattered IR light will be reduced. In addition, the IR light source is arranged as a single sensor or as an array of sensors. These optical sensors are continually monitored during dialysis therapy.

## III. PROPOSED METHODOLOGY

In this proposed method, the development of the blood leakage monitoring system is divided into two parts. The hardware contains a bracelet monitoring device for the detection of the blood leakage and the software contains the user operating interface on the monitoring android application.

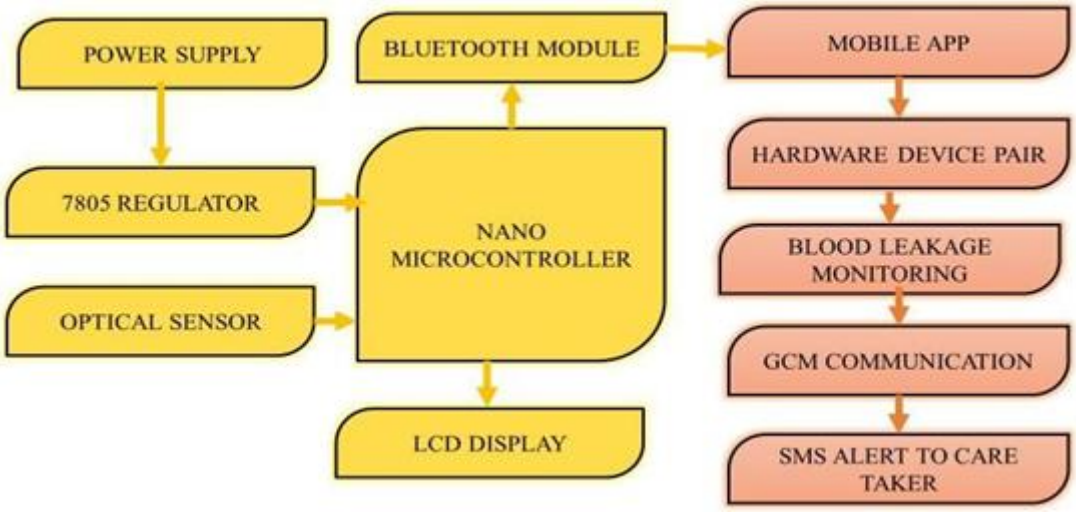


Fig. 1. BLOCK DIAGRAM

The Photo interrupter is an optical coupling (OC) element. And the photo interrupter is electrically insulated and optically coupled in the light emitting and receiving parts. The principle of the light – emitting unit(emitter) is to convert the input electrical signals into light, which emits an infrared light. The collector receives the infrared light and converts it into electrical signals. So, the light emitting portion and light receiving portion of the photo interrupter becomes conducted. Photo interrupter is used for sensing the blood leakage. If the blood leakage is detected then the Bluetooth module send signal to the android application, here GCM communication mode will be activated to send SMS notification to the caretaker, so that we can easily avoid the risks happen to the patient.

## IV. WORKING AND ARCHITECTURE

The circuit diagram consists of electronic components of NANO microcontroller, LCD display, power supply, regulator, optical sensor, Bluetooth module. The input 12v supply is given to 7805 regulators for voltage regulating 12v to 5v. Then the 5v supply is connected to Nano controller.

Optical sensor has three pins. VCC pin is connected to 3.3v supply, output pins are connected to controller analog pin and GND pin is connected to ground. LCD display 6 data pins are connected to NANO controller digital pins.

Bluetooth module has 4 pins VCC pin is connected to 5v supply, TX and RX pin is connected to NANO controller TX and RX pin

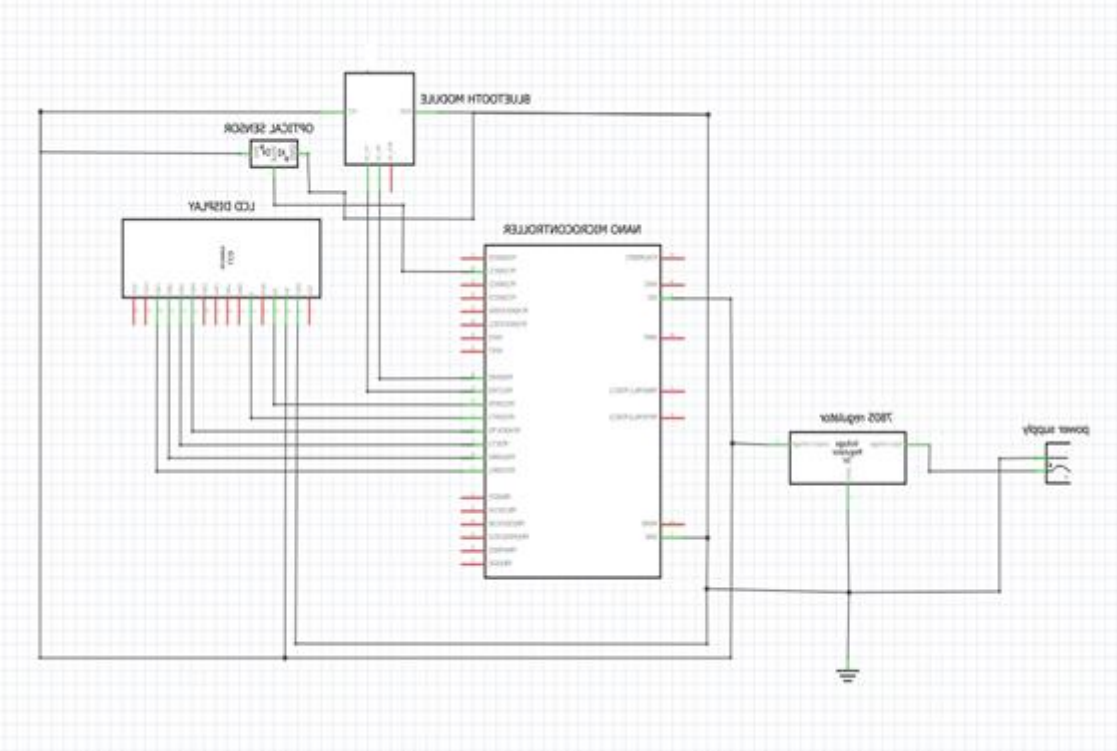

Fig. 2. CIRCUIT DIAGRAM

The optical sensor senses the blood leakage and it passes the signal to the microcontroller.


Fig.3. OPTICAL SENSOR

The three main types of equipment are required to detect the color of the material. A light source is to illuminate the material surface, whose color has to be detected and the receivers can measure the reflected wavelengths. Then the blood leak is displayed in the LCD. Through the Bluetooth module, alert notification is sent to the mobile application. Then through GCM the message is sent to the caretaker/ nurse.

## V. CONCLUSION

The project is concluded with the use of current hemodialysis equipment. The main characteristics of the blood leakage monitoring system is that when the blood leakage is detected, the alert signal will also be sent to the GCM module which is paired with a android app with the developed user interface software installed and the signal is transmitted to the Bluetooth wireless transmission method. Thus, the doctor/caretaker can take immediate action and prevent the patient from the risk.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Smart Pill Box for Medicine Monitoring and Ordering System Using IOT

**Selva Sherin T[1], Aswathy V[2], Madhura R S[2], Maha Lakshmi M[2]**

[1]Assistant Professor, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]UG scholars, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Today, a promising practice in health care is to deliver standard medical examinations and other health care services from the hospital to the home environment. As a result, patients have better access to health care, especially in emergencies. In addition, hospitals can reduce their workload by switching to more convenient and easier jobs. This project is based on IoT technology and an android app that aims to help forget takers and those who are busy remembering to stock up on their daily medication. Designed for users who need a little help tracking their drug stock. The app allows the user to monitor the quality of the tablets and alarms on those tablets. For older people, making sure they take the right medication at the right time is a big challenge. They are more likely to forget to order their medication on time. So, adherence to medication is a major problem for both the patient and the pharmacist. A modern IoT health care platform with a smart pill box and an HCSR04 health monitoring sensor. The Health Service that uses Internet of Things has great potential in the medical field. The main reason for this was incompatibility with appropriate medications. The patient does not even need to visit the shops once they are able to get the medicine. If the drug is empty, it means that the automatic order process will be opened with the help of IoT technology, and an SMS notification is sent to the medical store using GCM (Google cloud messaging). And the GPS location sends to the store to bring their medicine to the patient. android application, medical stock level monitor & SMS alert parameters are used.

**Keywords-**Android application,medical stock level monitor & SMS alert.

## I. INTRODUCTION

Now the advancement of Technology Day is reviving the way patients receive access to care services. Smartphones are no longer best used for telecommunications but can now be used as a combination of embedded sensors that allow new packages in a wide range of areas including health care, e-commerce, home care, health care, social networks, environmental monitoring, and protection. Today in health care systems, the use of mobile devices is becoming increasingly popular. In addition, the production of mobile gambling is critical to controlling chronic illness, empowering older and pregnant women, taking timely treatment,

extending service to underserved areas, and improving the health and performance of the scientific system. In everyday life most people need to take medication that was not available a few years ago and the reason for this is an increase in the number of diseases. So sooner or later most people get these diseases. Some diseases are temporary and many are life-threatening. Life-threatening diseases invade the human body in such a way that they can leave the body and grow rapidly. People's life expectancy has decreased as a result of such illnesses and in order to overcome or live a better life we need to take medication regularly and in large amounts. We need to have the advice of a doctor who tells us to take the pills we want the way we want so that patients can deal with problems such as forgetting to take their pills on time and when the Doctor changes a patient's prescription, they should keep in mind the new regimen. This problem of forgetting to take the pills at the right time, taking the wrong medicine and taking the expired medication in the wrong way causes problems for the patient's health and this leads to poor health. Our project is to create an Iobased pill box. The quality of the drug is monitored through a sensor. If the drug is empty, it means that the automatic order process will be opened with the help of IoT technology, and an SMS notification is sent to the medical store using GCM and GPS live locations are sent to the store to deliver their medication to the patient.

## II. LITERATURE SURVEY

It has launched a prototype program for the diagnosis of coronary heart disease (CVD) on smart phone windows. It is capable of real-time ECG detection as well as display, feature detection, and classification. They created two wire-based platforms for continuous monitoring and recording of the patient's ECG symptoms. The app successfully detects real-time CVD and generates personal heart health summary reports. [2] Smart phone app widget, to avoid medication mistakes. It can remind its users to take the right medication on time and keep a record of their future review for health care professionals. Built on Windows Mobile 6.0 with the help of the built-in calendar .NET framework. [5]

A mobile data mine has been established to support intelligent health care on the Nokia 95 phone to make it easier for hypertensive patients. A common SituationAware Adaptive Processing (SAAP) method of data sources that includes awareness of the situation in the analysis of data transmission using an abstract mind. Their prototype system can consider normal conditions, high blood pressure, hypotension, prehypertension and high blood pressure. The smartphone is already used for the provision of health care applications. In the case of the elderly community, we are introducing a daily life tracking app with android smart phone to improve independence and quality of life. [8]

Therefore, the program contains a Food and Water Page containing a list of additional foods. When the user presses thebutton, the program will display another page containing the type of meal, meal time, and note and alarm tone. The system will send a warning at a specified time for the main meal. It also sends a timely warning to remind the patient to drink water. According to the World Health Organization, the minimum age for such an adult is 60 years. [9] Many times a patient forgot to take medication as soon as they left the hospital and because of this negligence could be fatal. So, to avoid such a situation HSU CHUN-LIANG

developed such a system that reminds the tree in time. In this program you use local web-net, LCD Display, GSM communications, voiceDSP, and sensory methods to produce a medicine box and its related monitoring system suitable for both the hospital and the patient's house. [10]

## III. PROPOSED METHODOLOGY

The proposed system is based on IoT by Android app which will monitor the quality of the tablet box. The HC-SR04 sensor is used to monitor the quality of the medicine box, if the pill box becomes empty it means that it automatically sends an SMS notification to the user via the GCM (Google Cloud Messaging) connection.

In this application you can also order medicine automatically and send the GPS location information to the medical store.

so that they can easily deliver the medication to the user. So, in this way it is helpfull to the patients as well as the old age peoples. It plays a vital role and usefull to the peoples.

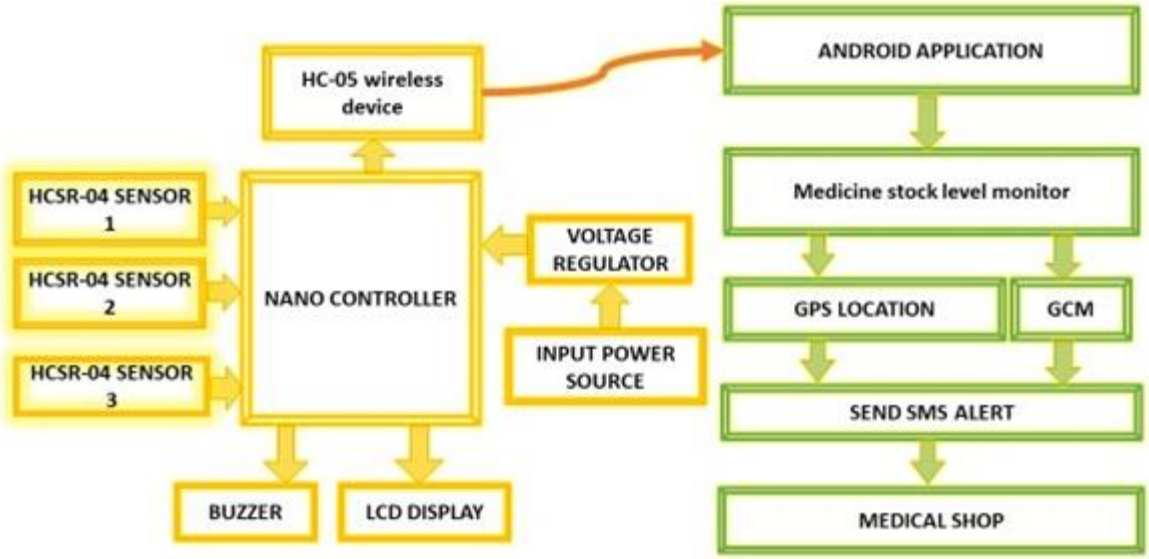


**Fig1: Block diagram**

*Nano Microcontroller*: The microcontroller used in the Arduino Nano is the Atmega328, similar to the one used in the Arduino UNO. It has a wide range of applications and is a great microcontroller board due to its small size and flexibility.

*HC-05 Wireless Device*: The HC-05 Bluetooth Module is an easy-to-use Bluetooth SPP (Serial Port Protocol) module, designed for transparent serial setting. Its connection is a serial connection that makes it easy to communicate with the controller or PC.HC-05 has a red LED indicating connection status, whether Bluetooth is connected or not. Before connecting to the HC-05 module the red LED flashes continuously. When connected to any other Bluetooth device, the blink of an eye drops to two seconds.

*Ultrasonic Sensor*:An ultrasonic sensor is an instrument that uses ultrasonic sound waves to calculate distance to an item. The ultrasonic sensor transmits and receives ultrasonic pulses that transfer information about the

vicinity of an item via a transducer. Ultrasonic sensors are active. Ultrasonic sensors operate by sending sound waves at a frequency greater than the human hearing range.

*Liquid Crystal Display(LCD)*: The LCD represents the Liquid Crystal Display. Components are special for use with small controls, which means they cannot be operated bt standard IC circuits. They are used to record different messages on a small LCD

*Embedded C*: Embedded C is the most popular programming Language in the field of electrical gadget development software. Embedded software is associated with each processor in the electronic system. When using a CPU to execute a specific purpose, the embedded system is crucial.

## IV. WORKING

In this project we have to check the quantity for medicines by using

- HC-SR04 Sensor in medicine box. We can set the different time period for different HC-SR04 sensors. Then controlled by using Nano microcontroller.
- When medicine box become empty then sensors data collected and send to controller at the same time buzzer will be activated as well as LCD displayed the data.
- HC-05 wireless device to be used transfer the data's by using android application and it automatically sends an SMS notification to the user via the GCM (Google Cloud Messaging) connection.
- In this application you can also order medicine automatically and send the GPS location information to the medical store, so that they can easily deliver the medication to the user.

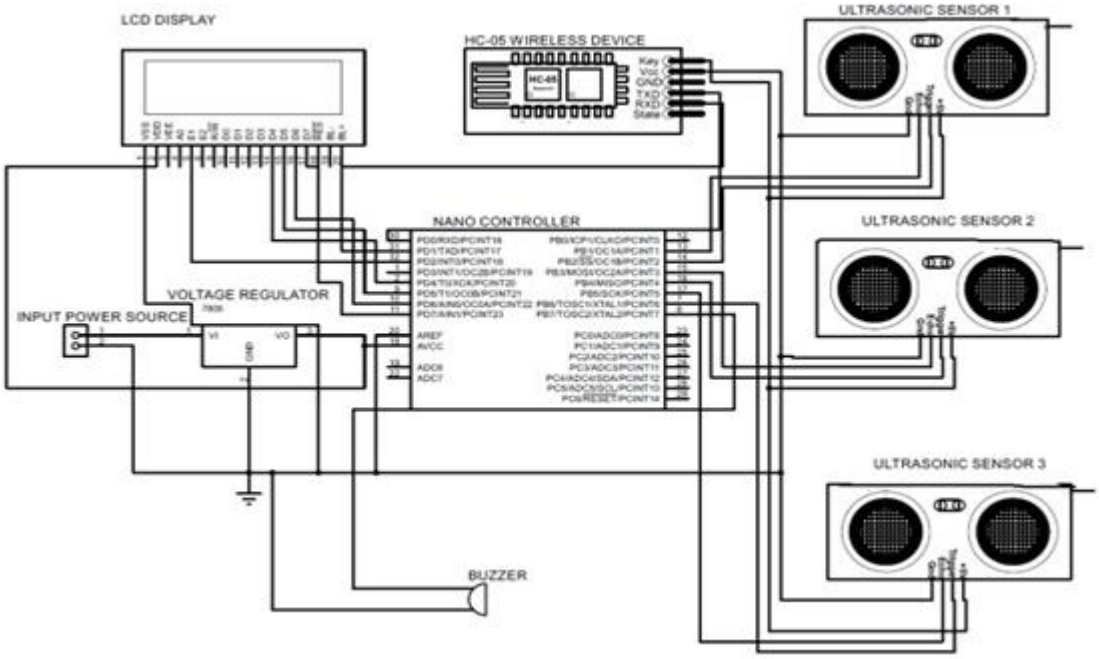


**Fig.2: Circuit Diagram**

## V. RESULTS

In this project IoT based Android app which would monitor the quantity of the tablet box. If the pill box becomes empty it means that it automatically sanded an SMS notification to the user via the GCM (Google Cloud Messaging) connection. In this application you can also order medicine automatically and send the GPS location information to the medical store, so that they can easily deliver the medication to the user and also successfully implemented hardware and android app setup.

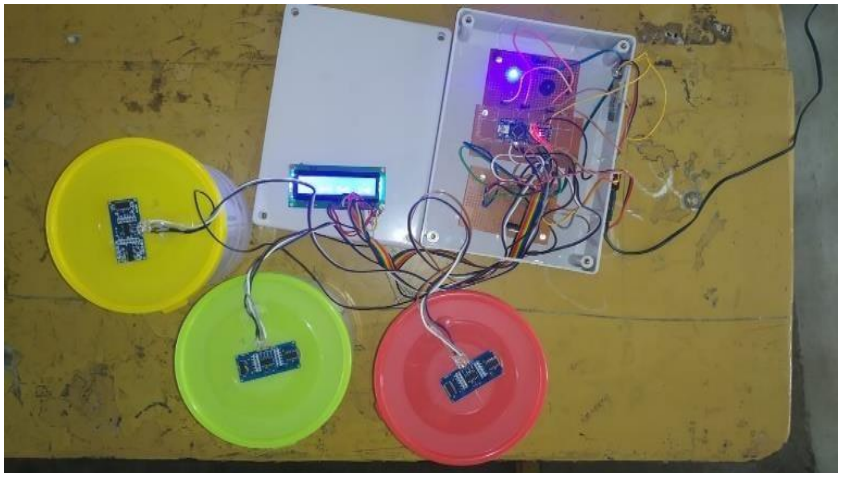

**Fig.3**: **Hardware implementation for overall setup of the project**

**Fig.4**: **LCD display shows the availability of the medicine**

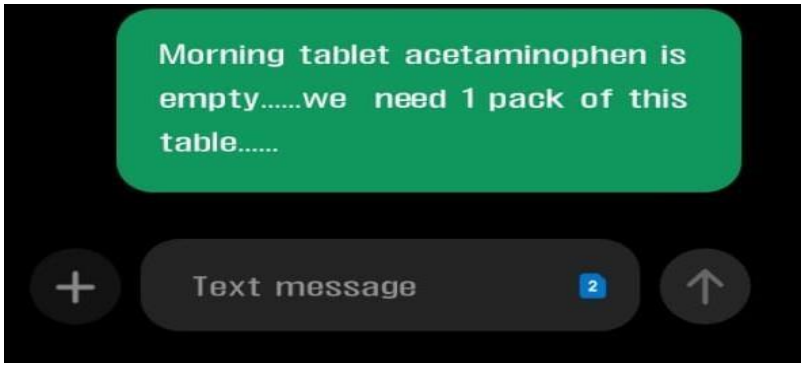


**Fig.5**: **Generated an SMS notification to the user**

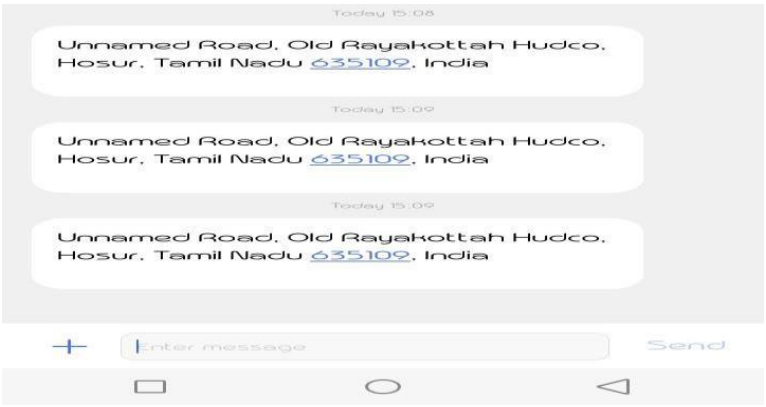


**Fig.6: GPS location for medicine orderingSMS notification to the medical shop.**


**Fig.7: Home page for medicine monitoring and ordering system in android**

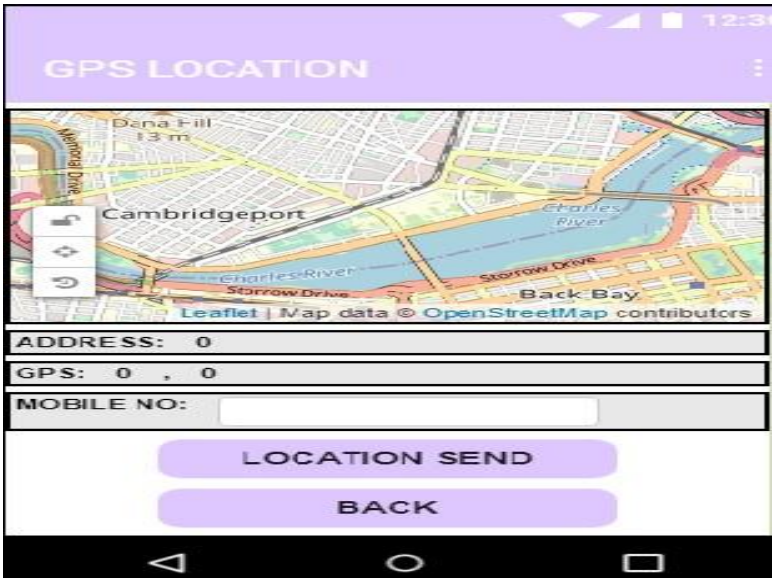


**Fig.8:The GPS location information to the medical store**


**Fig.9: Tablet checking for overall availability in this android page**

## VI. CONCLUSION

We have shown a mobile application that generates an SMS notification to the user. We focus on helping patients and developing a pill box monitoring system. The Medicare app is easily accessible. The combination of the nervous system and the android system helps us to measure daily medication in real time. The availability of sensors and other medical devices (IoT) gadgets is more effective when considering patients. Allows real-time monitoring. In this project user can easily monitor the medicine box continuously with the help of online technology tools. The automatic ordering process will be introduced here so that the person can always monitor the pill box.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Artificial Neural Networking (Ann)Based Lung Infection Segmentationfor Covid-19 Pneumonia on DetectionfromCt Images

**Deepan U[1], Gnanadeisigan G[1], Magesh R[1], Rajarajan C[1]**
[1]B.E Student, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Corona pandemic had affected the world with lots of deaths. The stylish strategy is to give early intervention to stop the spread of the complaint. In general, Computer Tomography (CT) is used to descry excrescences in pneumonia, lungs, tuberculosis, emphysema, or other pleura (the membrane covering the lungs) conditions. The end design is used to design an automatic tool for COVID-19 Lung Infection dimension using casket CT images. The expansive computer simulations show better effectiveness and inflexibility of this end-to- end literacy approach on CT image segmentation with image improvement comparing to the state of art segmentation approaches, videlicet Graph Cut, Medical Image Segmentation (MIS), and Watershed. Trials performed on COVID-CT-Dataset containing (275) CT reviews that are positive for COVID-19 and new data acquired.

**Keywords—**NODE MCU, CT scan, ANN, MIS, internetofthings.

## I. INTRODUCTION

The Covid-19 epidemic continues to have a big influence on the health and diurnal life of the global population. The most important step for stopping Covid-19 is to descry infected cases effectively and put immediate insulation. Cases infected by Covid-19 were plant to present abnormalities in CT images, which makes it possible to descry Covid-19 cases in clinical drug. Lately, a lot of deep literacy- grounded Covid19 case discovery styles have been proposed, some of which have been relatively successful. Still, the limited volume of training cases and reflections is still the main challenge for perfecting the bracket delicacy of Covid-19. Likewise, due to the low discrepancy of CT images, deep literacy- grounded bracket difficulty in processing uncertain and squishy information, similar as the pixels near to boundary and images pertaining tonon-Covid-19 cases. To break the below problems and thanks to the open-source Covid-19 dataset from the exploration community, it proposed a belief function- grounded bracket network to classify Covid-19 cases using semi-supervised literacy. The donation of this design can be epitomized as follows

1) It propose a new neural network armature for Covid-19 discovery from CT images composed of a convolutional network part for point birth and a belief function- grounded bracket module; 2) the

neuralnetworking concept identifies image features in larger form for bettered Covid-19 case treatment 3) a seperate algorithm is proposed to contibute modest approach of identifying the disease with CT images.

## II. LITERATURESURVEY

Yoo,et.al explained that the developed an automated CNN- grounded system for detecting prostate cancer using prolixity- ladened glamorous resonance imaging collected from 427 cases. First- order statistical features were uprooted from slice- position chances, which were used to collect slice- position bracket results into the patient position. The proposed system was tested on 108 cases and plant good results for both slice position and patient position.

Afzal,et.al explained lately, the (rear transcriptase-polymerase chain response) individual system is plant to be effective in detecting the contagion. Still, the system has some downsides, including longer discovery time and lower discovery rate of the contagion. Strict conditions in the laboratory and different characteristics of the testing could be attributed to the downsides. Experimenters are working on prostrating the limitations of RT – PCR testing to enhance diagnosing and discovery of the COVID-19

KoubaaA,et.al (2020) explained that this paper, the main challenges are the identification of Coronavirus cases in blurredX-ray images and the isolation of these cases of COVID-19 from other pneumonia cases, like MERS and SARS, bearing in mind that they've a high degree of similarity. Second, the COVID-19 contagion doesn't have a fixed shape, indirect, for illustration, inside the mortal towel. Third, the decision performing from the discovery process is veritably delicate and can put mortal beings at threat. False-Negative means, in our situation, a person infected by the contagion, who's declared by our process safe and sound, while the case may be at threat of death, and indeed worse before dying, he/ she may infect thousands of people. Therefore, the rate of False- Negatives should be literally zero.

Xu X,et.al (2020) explained that Xu et alfound that the characteristics of Reckoned Tomography) CT) imaging of COVID-19 are different from other types of viral pneumonia) similar as Influenza-A viral pneumonia). They used multiple CNN models to classify CT images, calculate the infection probability of COVID-19, and help in the early webbing of cases with COVID-19.

They collected a aggregate of 618 CT samples 219 from 110 cases with COVID-19; 224 CT samples from 224 cases with Influenza-A viral pneumonia; and 175 CT samples from healthy people. Also, theypre-processed the CT images to prize effective pulmonary regions. Also, they used a 3D CNN model grounded on ResNet18 to member multiple seeker image cells. They chose a 3D image bracket model to be suitable to classify all the image patches. The position attention bracket model uses the relative distance from- edge as redundant weight for the model. This bracket model aims to learn the relative position information of the patch on the pulmonary image.

Eventually, they used the Noisy or Bayesian function to calculate the infection type) COVID-19, Influenza-A-viralpneumonia, or no-infection- plant) and the total confidence score of the CT case. They only compared the average f1- score for the first two classes, which showed an improvement of4.7, with an overall bracket delicacy of86.7 for all three groups.

## III. PROPOSEDMETHODOLOGY

Our system has great eventuality to be applied in assessing the opinion,e.g., quantifying the infected regions, covering the longitudinal complaint changes, and mass webbing processing. Automated recognition of patterns in data by computers grounded on knowledge formerly attained is called pattern recognition.
It has operations in image analysis, information reclamation, signal processing, bioinformatics, data contraction, statistical data analysis, computer plates, and machine literacy. In machine literacy approaches and operations, the Artificial neural network (ANN) structures demonstrate a high capability to prize and classify some crucial features and bridging the gap between the capabilities of machines and humans.


Fig**4.1** Block DiagramoftheProposedSystem
The block diagram consists of geometric transformation, key point descriptor, gray scale imageconvertor, ANN algorithm, serial communication and NODE MCU.The input CT image is given to the geometric transformation and it assigns the input CT image.Then the output is fed to segmentation.These images are made in the gray scale converted format like 0.

## IV. CONCLUSION AND FUTURESCOPE

As the cases of COVID-19 epidemic are adding daily, numerous countries are facing deficit of coffers. During this health exigency, it's important that not indeed a single positive case goes unidentified. To overcome this we proposed a machine literacy approach to notarise COVID-19 cases from lung CT images.

The proposed system is artificial neural network designed to identify COVID-19 cases using lung CT images. The model has been trained and tested on a small dataset of many images prepared by carrying CT images of colorful pneumonia cases and COVID-19 cases from different public available database.

ANN algorithm is computationally less precious and achieved promising results on the set dataset. The performance can further be bettered formerly more training data becomes available. So that it can prognosticate lung infection fluently and shoot announcement to stoner or croaker. In the future the system can be developed for backup storehouse of information anddata.We can use this information for analysis and development.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Android Application Based Virtual Talk for Deaf, Mute and Normal Humans

**Dhanush Kumar K[1], MohamedRilwanaliA A[1], Mohamed Sheik Sameer K H[1], Pradeep M[1], Dr. T.S Udhaya Suriya[2]**

[1]Department of Bio Medical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India
[2]Head of the Department, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

According to World Health Organization (WHO), around 2.8% of people are dumb (who are not able to speak). They can communicate only through their hand gestures and expressions. This paper proposes a new technique which has a speaker (virtual talk) for deaf and dumb people which acts as a mediator to convey the messages to others. Some peoples can easily understand their motions or gestures but most of us cannot able to understand their way of conveying the message. In order to overcome this situation, the virtual talk is introduced for the deaf and dumb peoples. This system is based on android application. According to dumb people, for every motion they have a meaning. So that each action is related or assigned to wearable device. For every action get accelerated and give the signal to the microcontroller. Once the deaf and dumb people touch the sensor is in the wearable device, then the command is detected using touch sensor and send data to android application through wireless device and produces the speech signal. The output of the system is using the mobile speaker and LCD display. The system also includes the concept of wireless communication so that they can communicate with others easily.

## I. INTRODUCTION

Deaf and Dumb people use signing as a crucial and only method of communication. Signing may be a formal language and a system of communication using hand gestures and signs. TouchSensor plays the main role, which are placed on fingers, as fingersbends it changes resistance counting on the quantity of bend on the sensor. AVR microcontroller is employed to require input from Touch sensors then this analogue data is converted to digital form.

All the information from microcontroller is shipped to androidphone and accordingly. The android phone will speak the corresponding character which has been sensed. Also, in this paper that use special gestures for some daily used sentences like please give me water, please open the door etc. It also includes a panic condition gesture by which, if the user needs any kind of help oremergency while he is away from the known person, so by signing these special gestures the user can send a message through his mobile to the important

contact saved in his mobile. Using a Google voice assistant, sending some of the important voice messages to the caretaker with the help of Internet connection.

## II. LITERATURE SURVEY

Vaibhav Mehra et.al [2020] implemented a system embedded with flex sensors that measure the resistance across the fingers. Google text to speech library is used for text to speech conversion. This device needs to have an active internet connection for the conversion of text to speech. The drawback of this system is need internet to activate the conversion of text to speech.

S.K. Imam Basha and S. Ramasubba Reddy [2021] uses a method in which the camera captures the subjects' hand images. Those images are processed using different methods like colour splitting and feature extraction. Every image plays therespective pre-fed sound using the hardware. This system is the vision-based method of changing gestures to the audio system.

S. Reshna and M. Jayaraju [2020] performs skin segmentation using YCbCr colour space and the threshold value of the components on each value of Y, Cr and Cb are applied on spatial filter to the image. A (SVM) Support Vector Machine classifier is used to separate the data into input space and hyper planes to recognize the hand gestures based on the trained point features.

Akanksha Singh et.al [2020] approaching a novel involves classifying gesture into single or double handed subcategories which simplifies the overall problems that are associated with the gesture recognition and reduces the number of gestures in each subcategory. Morphological operation involves the process of dilation and closing operation for single and double handed gestures. Filtered binary images are used to extract the four geometric features: Solidity, Major to minor axis, eccentricity, bounding box ratio and equivalent diameter to minor axis ratio, the above obtained values are used to classify the single or double handed gestures. Histogram of Oriented Gradients (HOG) techniques are used to extract local orientations and intensity distribution for detecting the shapes of the object. Classification is done by applying K - Nearest Neighbouring (KNN) algorithm on the geometric feature extracted along with the HOG features. The comparison is also done with Support Vector Machine (SVM) to check for the better accuracy.

## III. PROPOSED METHOD

This project presents a system that can see sign language to help normal people with imparting even more suitably with the gathering or dumb people. This proposed system includes a microcontroller interfaced with touch sensor. By using touch sensor, it can convey need of that deaf and dumb people, for each touch in the wearable device coded a binary form. Despite it uses a wireless device. Each command binary coded will transmitted to android application. By using wireless device and Android application the speech signal is produced for that sensed information. The speech signal is heard with the help of mobile speaker by using google speech recognizer. When touch sensor is activated, and buzzer sound will be produced using GCM

communication (Google cloud message) the SMS and voice alert will be sent to caretaker. In addition to this the voice commands can be displayed in the LCD display for communicating with deaf people

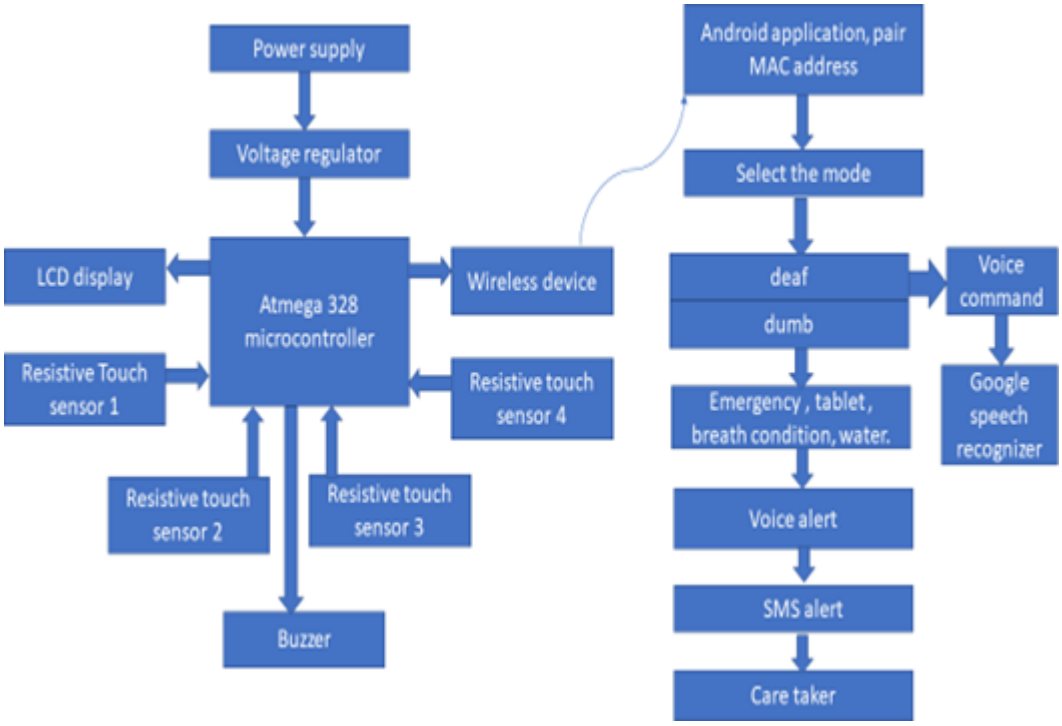


Fig.1 Block Diagram for Proposed System

## IV. WORKING

The above circuit diagram consists of the core components of At-mega 328 controller, LCD display, power supply, regulator, resistive touch sensors. The input power from power source is given to voltageregulator forregulating 12v to 5v. The 5vsupply is given to controller device. Touch Sensor plays the main role, which are placed on fingers, as fingers bends it changes resistance counting on the quantity of bend on the sensor. AVR microcontroller is employed to require input from Touch sensors then this analogue data is converted to digital form. All the information from microcontroller is shipped to android phone and accordingly. The android phone will speak the corresponding character which has been sensed. Also, in this paper that use special gestures for some daily used sentences like please give me water, please open the door etc.,It also includes a panic condition gesture by which, if the user needs any kind of help or emergency while he is away from the known person, so by signing these special gestures the user can send a message through his mobile to the important contact saved in his mobile. Using a Google voice assistant, sending some of the important voice messages to the caretaker with the help of Internet connection.

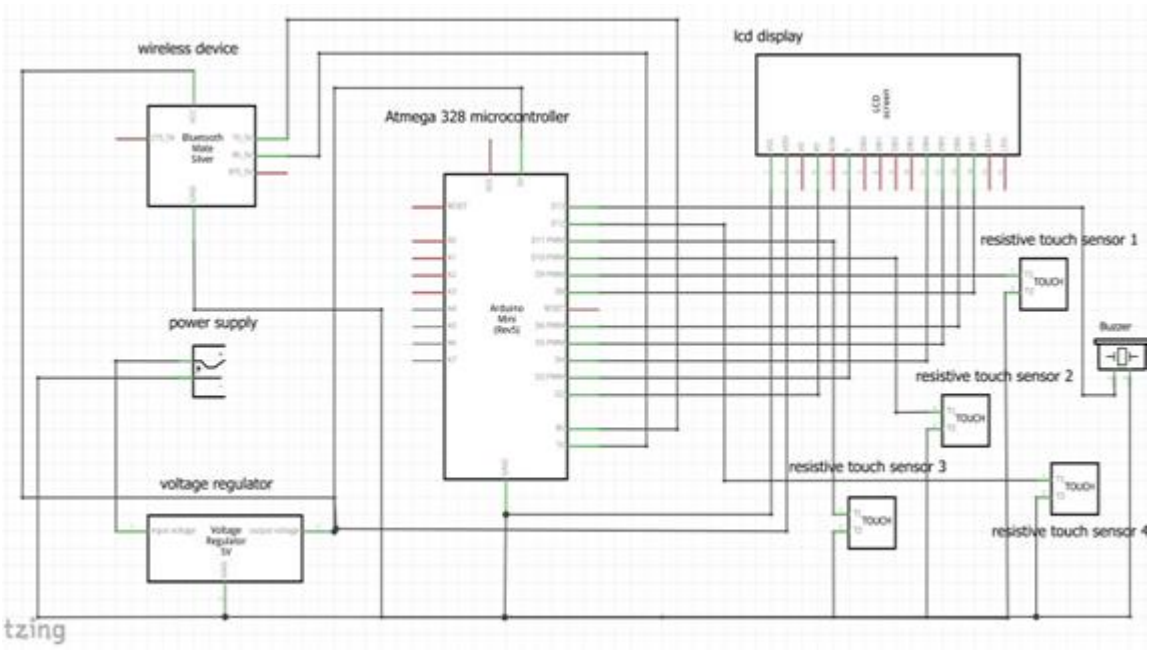


Fig.2 Circuit diagram for proposed system.

## V. RESULTS

Fig.3 Overall Hardware and Software Prototype

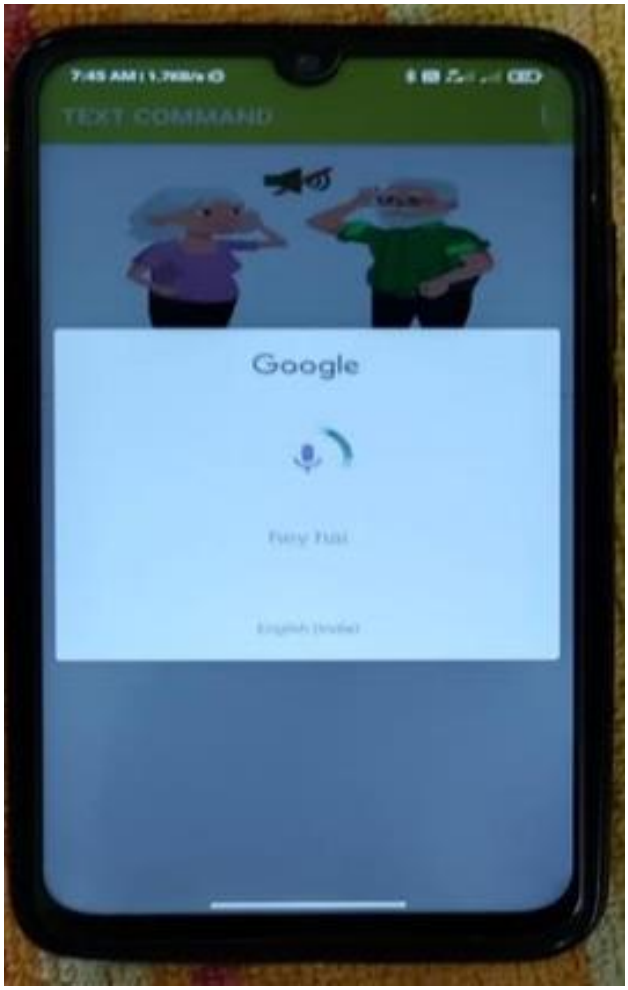


Fig.4 Google Speech Recognizer using GCM (Google Cloud Messages)

The project is designed in the way that helps the person who are unable to speak with the help of wireless technology and google voice assistant, through this technology the messages will be passed to the caretakers. Using the same android method, the gloves are made, and the resistive touch sensors are fixed to the gloves for alerting the messages to the caretakers with certain commands like I need help, I need water, etc.,

## VI. CONCLUSION AND FUTURE SCOPE

In this project Microcontroller was programmed such way that configuration settings can readily change without changing the entire program code. The deaf and dumb people command will be sensed by using touch sensor. The sensed data will be sent to android application by using wireless device. The android application will provide speech signal. This wearable device and voice conversion system will make a revolutionary change in the communication process of deaf and dumb people.
The future scope is using the google maps, lattitude and altitude one can find the location of the person.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# An IOT Solution for Surgical Patient Monitoring of Drugs in Human Serum Based on An Integrated Fluidic Bioelectronics System

**Bagyalakshmi N[1], Dhinesh Kumar G[2], Sundara Abishek V[2], Tamilselvan S[2], Gurumaninathan A[2]**

[1]Associate Professor, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

this paper includes implementation and the validation of a novel Internet of Things (IoT) drug monitoring system for the online continuous and simultaneous detection of two main anesthetics, e.g., propofol and paracetamol, in undiluted human serum. Continuous monitoring in anesthesia is essential to guarantee adequate sedation levels. The developed system allows the anesthesiologist to simultaneously monitor up to three drugs concentration in patients' anesthesia trough an Android application. Here the time interval-based milligram dosage automatically will be injected with prescript time. The IoT network is supported by a Cloud system, which allows the doctor to control and record the data of the patients, short action and reduced side effects in post-operative recovery.

**Keywords—**NODE MCU, centrifugal pump, drug injector, anesthetics, internet of things

## I. INTRODUCTION

General anesthesia is a drug-induced, reversible condition in which the patient is unconscious and unresponsive to painful surgical stimuli. This sedation status is achieved by intravenous administration of a cocktail of drugs; such as muscle relaxant, hypnotic, and analgesic. The correct balance of these medications is crucial to ensure a rapid onset and an accurate Depth of Anesthesia (DOA) during the induction phase, as well as to guarantee a pleasant and short recovery time after surgery. However, its administration causes pain or discomfort in 28%-90% of patients, this is known as Pain on Propofol Injection (POPI). TCI systems rely on advanced Pharmacokinetic models that quantitatively predict the plasma concentration of the drug and adjust the delivery rate accordingly. However, due to inter- and intra-patients' variability, these models can be affected by up to 30%-50% of inaccuracy and they cannot predict the direct relation between drug kinetics and its clinical effects. To improve the accuracy of the drug administration, the anesthesiologist constantly monitors the Electroencephalogram (EEG) signal and the Bispectrality Index (BIS), which can be related with the DOA. However, s these two clinical parameters are evaluated in an indirect manner,

therefore, they don't provide information with respect to actual drug concentration and moreover they might be affected by noise and artefacts.

## II. LITERATURE SURVEY

K.A.Desousa.et.al. [1] proposed that Pain on propofol injection (POPI) is a minor problem that all anesthetists face every day. Introduction of several new formulations and hundreds of clinical trials have failed to find its solution with just one intervention in all patients. This article highlights the causes of POPI and interventions that are used to remove this pain in current practice.

A.Costandi et.al. [2] proposed that Propofol is an intravenous agent used commonly for the induction and maintenance of anesthesia, procedural, and critical care sedation in children. The mechanisms of action on the central nervous system involve interactions at several neurotransmitter receptors, especially the gamma-aminobutyric acid A receptor

N. D. Schiff [3] proposed that It provided the complete set of voltammetry techniques with the possibility to perform different techniques simultaneously through channels. By our design simultaneous detection of drugs (up to three) via DPV, CV and CA as well as pH and temperature measurements can be achieved in a single platform.

G.Komninos et.al.[4] explained that the Raspberry Pi controls (master) the ATxmega32E5 micro-controller (slave) on the custom-built PCB via I 2C port. The wireless communication between the Raspberry Pi. and the Android-based cloud network enhances the Transmission Control Protocol/Internet.

Z. Al-Rifai and D. Mulvey et.al, [5] proposed that in the theory, any combination of hypnotic and opioid can be used and opioid-free techniques are described. This drug combination achieves equilibrium between adequate depth of anesthesia and rapid recovery. Intermittent boluses of agents or manually controlled infusions may produce an unpredictable effect.

B. Larsen, A. Seitz, and R. Larsen [6] proposed that therapeutic Drug Monitoring (TDM) systems measuring the actual drug concentration in patient's plasma are in huge demand since they would provide TCI pumps with the actual drug concentration to perform perfusion.

L. F. Prescott et.al, [7] proposed that to evaluate the disposition of paracetamol in renal allograft recipients. Eight fasting renal allograft patients were given 1 g soluble paracetamol orally.

## III. PROPOSED METHODOLOGY

This paper consists of two drug delivery compartment and those two are coupled with IoT architecture. This model is made using NODE microcontroller. In this paper, there is a dosage control system for total intravenous anesthesia *(*TIVA*)* in order to help anesthesiologists and enable to manage multiple operations remotely by one anesthesiologist.This information can be read by a microcontroller, usually over a serial

interface to facilitate the software performing functions that are time dependent. A centrifugal pump must be able to deliver liquid with an accuracy of anesthesia dosage proper. The delivery pressures it is possible to use a centrifugal pump to achieve.If surgery periods are extended, anesthetic effect should be balanced during surgery. From this point of view, here proposed an adaptive scheme of controlling the dosage and the dosing interval by model predictive control in order to satisfy such complicated requirements.

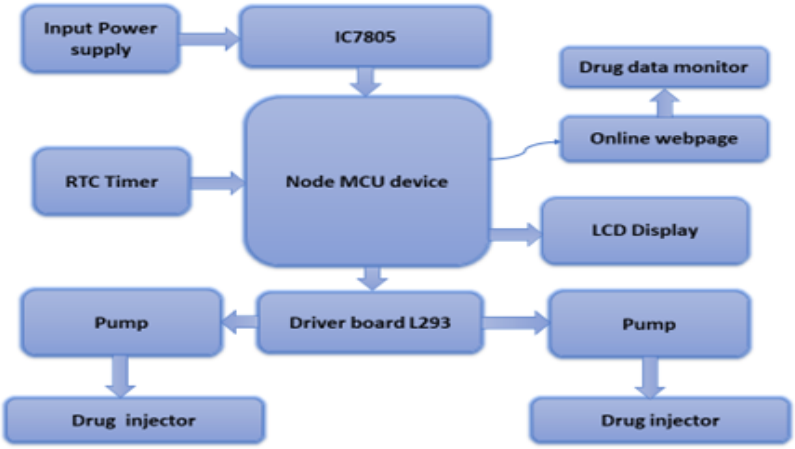


Fig 1 Block Diagram of Drug delivery system

The system is consisting of node microcontroller which get information for drug delivery process. When process is started the controller will provide the power to motor via driver board. The motor helps to inject the prescribed drug into patient at prescribed rate of flow rate. The current action of the system can be notified through LCD display. This also coupled with IoT modal so that it can be monitored remotely.

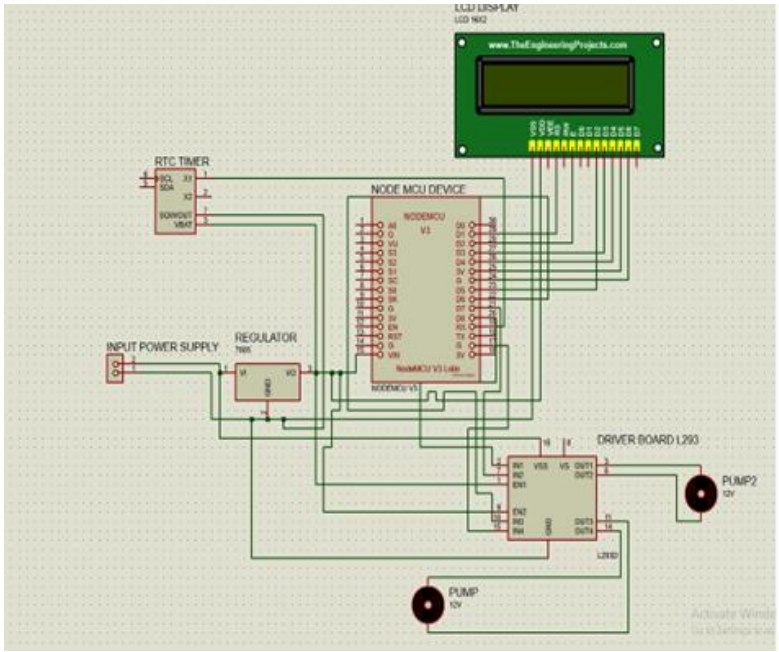


Fig 2 Circuit Diagram of Drug delivery system

The circuit diagram consists the components of core components of Node MCU device, pump, RTC, power supply, regulator, driver board L293, buzzer and LED indicator, LCD display. 12v Power Supply is given to regulator for voltage regulating 12v to 5v then 5v supply is given to controller. LCD display is connected to controller digital pins and GND is connected to ground, supply is connected to 5v supply. RTC connected to controller. It has three pins. VCC connected to positive, GND connected to negative and OUTPUT pin connected to analog pin for controller. Driver board connected to controller and activated the load for pump. It has five pins connected. Input side three pins and output side two pins. EN connected to 5V, IN 1, IN2 connected to digital pins and OUT 1& OUT 2connected to load. Buzzer connected to controller. It has two pins. Output connected to controller signal and GND connected to negative. Light connected to controller. It has two pins. Output connected to controller signal and GND connected to negative

## IV. CONCLUSION AND FUTURE SCOPE

In this work, a novel IoT drug monitoring system with electrochemical approach for the on-line continuous and simultaneous detection of propofol and paracetamol has been implemented. To reduce POPI effects in anesthesia infusion, paracetamol analgesic is often also administered in combination. In order to personalize and optimize the effects of these difficult-to dose drugs, TDM on-line systems able to measure the drug concentrations in patient's plasma are highly required.

In the future the system can be developed by inclusion of sensor for monitoring drug level in patient body. The system also developed by usage high performance microcontrollers


Fig 3 LED display output of process 1 completion


Fig 4 LED display output of process 2 completion

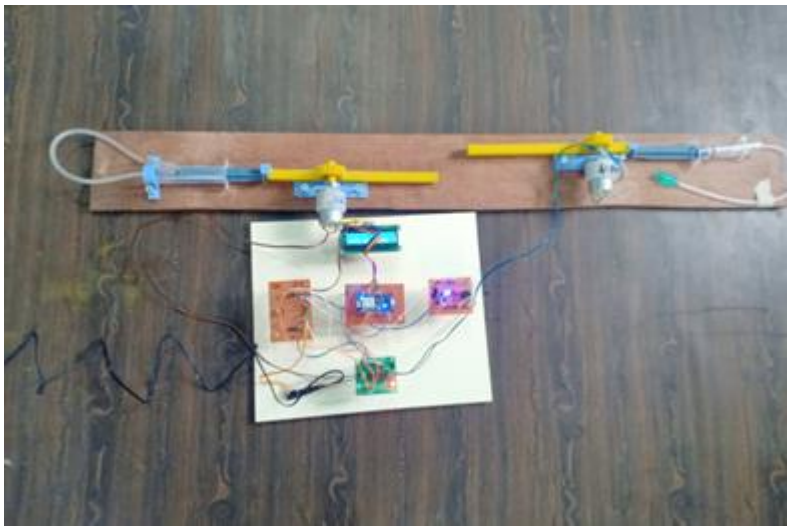

Fig 5 proposed model


Fig 6 IoT output of system

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# IOT Based Wearable Device for Glucose Detection System Using GSR Sensor and Automatic Alert System

**Mr. C. Satish Kumar[1], Dhivya G[2], Rasika B[2], Ramya M[2], Sowndarya S[2]**

[1]Assistant professor, Department of BME, Adhiyamaan College of Engineering, Hosur, Tamil Nādu, India

[2]Department of BME, Adhiyamaan College of Engineering, Hosur, Tamil Nādu, India

## ABSTRACT

Health monitoring systems based on Internet of Things (IoT) have been recently introduced to boost standard of health care services. Designed an IoT-based system architecture from a sensor device to a back-end system for presenting real-time glucose level data. The proposed method uses near infrared sensor for determination of blood sugar. The obtained glucose level is further transmitted to the Wi-Fi controller further analysis and storage of the data in cloud. It monitors the glucose level at regular interval. If the glucose level is critical level automatically insulin injector pump will be activated and the insulin will be injected to the patient. The insulin stock can be monitored by using ultrasound sensor. Finally, the work provides many advanced services at an online notification service for notifying patient and doctors in case of abnormal situations and insulin liquid level stock information. The results show that our system is able to achieve continuous glucose monitoring system and remotely in real-time and automatic alert system.

**keywords:** glucose detector, ultrasonic sensor

## I. INTRODUCTION

It is non-communicable disease. Diabetes people check blood glucose level quite two times per day. Hence, they're inconvenienced every time. They're suffering the danger of infection by pricking the finger. Also, expenses associated with strips and lancets are more because each test requires a brand-new test-strip. Internet of Things (IoT) can be viewed as a dynamic network where physical and virtual objects are interconnected together. As an example, IoT-based systems for health-care consisting of sensing, WSN, smart gateways, and Cloud provide a way to remote and real-time e-health monitoring. These are often combined to other health solutions such as fitness and wellness, chronic disease management and diet or nutrition monitoring applications. The new initiatives tend to be integrated into the patient information ecosystem instead of being separated into monitoring and decision processes which makes comfort to elder people. Among those apps rated into monitoring and decision processes Fully autonomous health monitoring wireless systems can have many useful applications. Among those applications is glucose level measurement for diabetics. Diabetes is a major health concern. According to a WHO report, the number of people with

diabetes has exceeded 422 million and in 2012, over 1.5 million people died because of diabetes. Unfortunately, there is still no known permanent cure for diabetes type 3. However, one solution to problem is to continuously measure blood glucose levels and close the loop with appropriate insulin delivery. However, one solution to this problem is to continuously measure blood glucose levels and close the loop with appropriate insulin delivery.

## II. LITERATURE SURVEY

Gayatri B et.al. in explains the use of near infrared used to measure blood glucose level without any harm to patient as it is used externally without finger pricking process. Through the concept is very innovative with good rate of efficiency but it has major drawbacks as some amount infrared is absorbed by soft human tissue which can disturb final readings.

Zhang Z et.al implemented RFID sensor tag toward continuous glucose monitoring proposed real time glucose monitoring for an electrochemical sensor based on wireless system. The sensor tag contains a potentiostat, a 13.56 MHz RFID front end, a 10-bit sigma-delta ADC, a winding ferrite core antenna, an on-chip temperature sensors and a digital baseband for protocol. The air interface was observed with the ISO15693 standard.4dBm was the sensitivity of entire system. The simple sensor tag with low power and low-cost solutions are contained in the implanted glucose monitoring application. The system provides the accurate result and used in the real time application were the advantages. The disadvantage of this system was improvement of system on chip performance.

Aswathi Anand P and Maya L Pai [2019] perform Artificial Neural Network Model for Identifying Early Readmission of Diabetic Patients. The diabetes patient needs to check their glucose daily. Glucose level will be changing. So, in order to check their glucose level, the patient need to take a drop of blood from their body by creating wound in their body. Some diabetes patients also need to take insulin. Since this all is a painful task most of the patients refuse to create wound, so necessary medicines cannot be taken.

Nina Korlina Madzhil et. al [2019] used Comparative Investigation Using GaAs(950nm), GaAIAs(940nm) and InGaAsP (1450nm) Sensors for Development of Non-Invasive Optical Blood Glucose Measurement System. The current method uses the self-monitoring glucose meter. These methods are invasive. The main disadvantage of such a method is that, it requires pricking the finger, extracting the blood from forearm and doing chemical analysis which uses test strips.

Also it gives pain and discomfort due to frequent finger pricks. Non-invasive techniques are more useful and user friendly. It reduces the healthcare cost and other difficulties involved in invasive method of glucose determination.

K A Unnikrishna Menon et al. [2019]perform Voltage Intensity based Non-Invasive Blood Glucose Monitoring. This paper describes the possible design and development for blood glucose monitoring system non-invasively. The proposed technique uses a near infrared sensor for transmission and reception of rays from forearm. By analyzing intensity variation in received signal by using photo detector at another side of

forearm, level of glucose can be predicted. Then the data can be transmitted to remote android device for further analysis. Subsequent section describes basic principle for measurement of glucose level in blood

## III. PROPOSED METHODOLOGY

In an existing method, the sensor systems are connected to the AT89S52 microcontroller where the voltage readings coming from the devices is converted into glucose level and displayed on the LCD connected thereto. During this system is additionally connected to present microcontroller to send the data wirelessly to the doctor or concerned person by using ZigBee transmitter device. In this existing system there is no real time data monitoring and storage system, it is also send data by using ZigBee it covers less distance range.

In this proposed system, the presented work to design a wearable system to monitoring the glucose level and automatic alert system using IoT. The proposed method uses near infrared sensor for determination of blood glucose. Near Infrared light is sent through the fingertip before and after blocking the blood flow. By analyzing the voltage variation received after transmission through fingertip, approximate glucose level is predicted. In other method for glucose level detection is GSR sensor. The GSR sensor is to measure glucose level from the patient sweat are connected and to the analogue input of the Wi-Fi device to process the readings and display it. The blood glucose data is generated and it will be displayed in LCD and mobiles application. When the abnormal events happen, like glucose level is high or low sensed by sensor and the insulin injector will be used to inject the insulin and send online notification to patient or doctor by using Wi-Fi device.

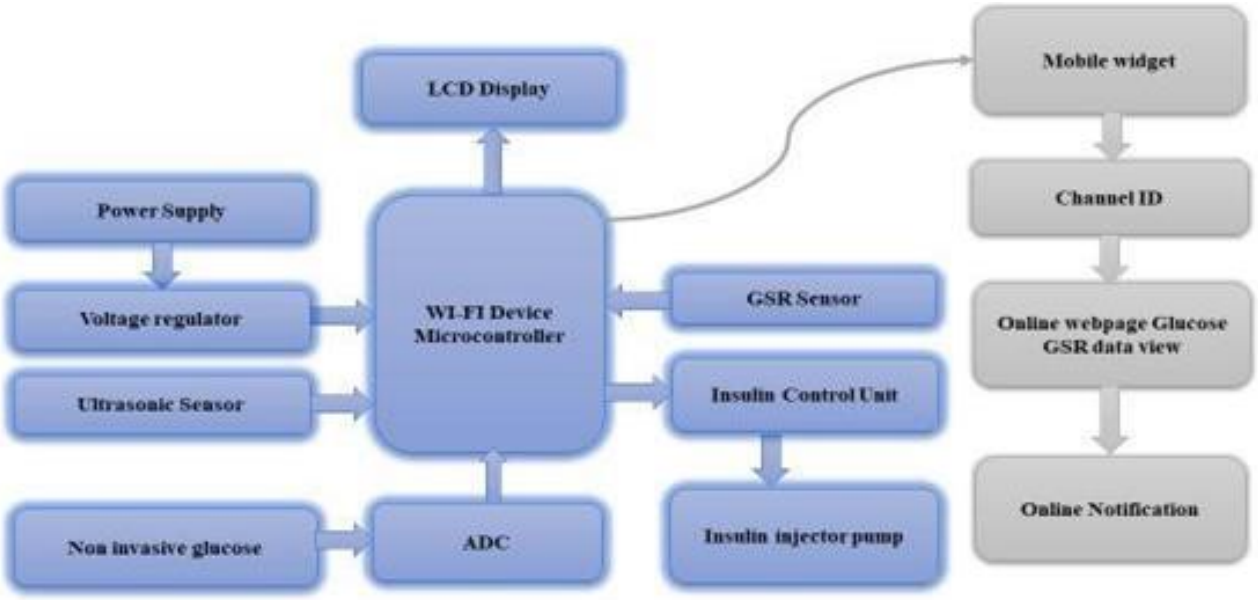
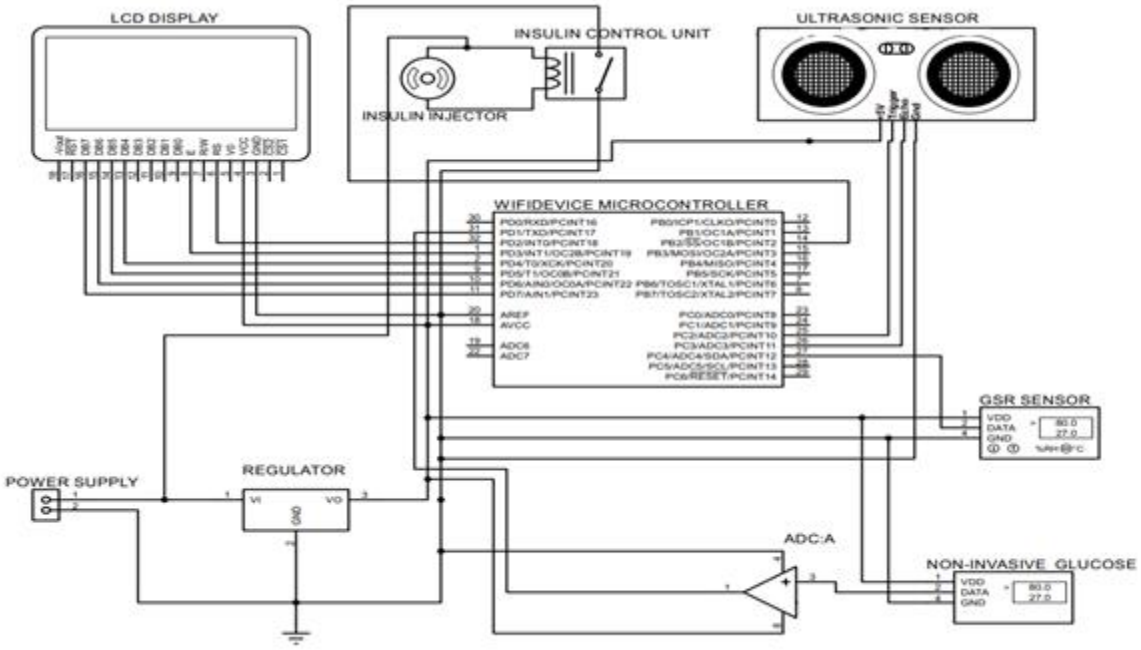



**Fig.1: Block Diagram of Glucose Monitoring System**

## IV. WORKING

In these project with the help of Photo diode (NIR) and Galvanic skin recorder (GSR)sensor used to detect the blood glucose level and the value display in the LCD display on the device. The index finger is chosen for the test of blood glucose level. GSR sensor allows recording of EDA (Electro dermal activity), after obtaining the glucose value it said to be high or low. If the measured glucose value is high, then insulin control unit automatically send insulin through insulin pump in hand or abdominal of then stomach. Automatic alert notification with the help of Internet of Things (IoT). The circuit diagram consists the components of core components of Wi-Fi microcontroller, GSR sensor, on invasive glucose sensor, ultrasonic sensor, insulin control unit, insulin pump, power supply, regulator. 12v Power Supply is given to regulator for voltage regulating 12v to 5v then 5v supply is given to controller. GSR sensor has 3 pins VCC pin is connected to 5v supply. GND pin is connected ground. Data pin is connected to controller pin. Ultrasonic sensor has 4pin 5v pin is connected to supply. GND pin is connected to ground. Echo and trigger pin is connected to controller pin. Insulin control unit for activate the insulin pump for inject the insulin to the patient. LCD display is connected to controller digital pins and GND is connected to ground, supply is connected to 5v supply. Noninvasive glucose sensor is connected to Wi-Fi controller analog pin.




## V. CONCLUSION & FUTURE SCOPE

In this paper, it represented a real-time remote IoT-based continuous glucose monitoring system. It implemented IoT-based architecture is complete system starting from sensor node to a back-end server.

Through the system monitoring the glucose level of the person at anytime, anywhere via an online or a mobile application. Sensor nodes of the system are able to obtain the data of blood glucose, and transmit the data wirelessly to the gateway efficiently in term of energy consumption.

In addition, the gateway with its application provides advanced services to users, such as an online notification service.

The result showed that it is feasible to remote monitor glucose continuously in real-time and the system can be made energy efficient.

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In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Implementation of Wireless Blood Bank Management System Using Android Application

**Selva Sherin T[1], Isika Adak[2], Rijitha P[2], Sneka R[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Hosur, Tamil Nadu, India

## ABSTRACT

Now a days we are ready to see the population of the country is increasing widely, even with our great efforts the hospitals and medical services for the rising population doesn't show more variance. There are still many places in our country where they don't seek proper medical help. Once a year 12,000 peoples die in India because of sheer lack of donated blood. India makes the gathering of 11 million units of blood but can't meet the requirements as India requires 15 million units of blood. The blood is extremely important assert in medical supplies so it should be managed well. because the bank management consists of more number of manual steps, therefore it'll become harder to provide a high level of accuracy, reliability, automation in blood storage and transfusion process. But, during some years, there has been a high rise within the net services, which has made many works remote and easy for proper health services. The proposed system is split into two segments, the first segment consists of Temperature sensor, IR sensor nodes installed in each rack of bank, and GCM Module for sending request of blood to the donors and blood banks of those are interfaced with microcontroller. The IR sensor are visiting be used for monitoring the blood bottles and temperature sensor will monitor the temperature of the refrigerator. The Second segment consists of wireless module for data transfer. All the important time status relates to the available blood stock of the bank is are displayed on android application, so as that the blood seeker can get the blood from their nearest bank. Further, the paper gives a model supported the blending of IoT with this technique to undertake and work remotely.

**Keywords—** IoT, RFID, IR, LCD, GCM

## I. INTRODUCTION

The design and implementation of wireless bank management system using android application is great project. The fundamental aim is to boost blood donation service. Blood Bank Management System could be a

browser-based system that's designed to retrieve, store, process and analyze information concerned with the executive and inventory management within a blood bank.
This project aims at maintaining all the knowledge per blood donors, different blood groups available in each blood bank and help this manage during a better way and supply transparency in this field, make the process of obtaining blood from a blood bank easy and mistake free and even make the system of blood bank management effective. The blood bank system project report contains information associated with blood like

- Blood type
- Date of Donation of blood
- Validity of Blood
- Available Blood type

Bank blood donation system in java is planned to gather blood from donors briefly from various sources and distribute that blood to needy flocks that require blood. To try and do all this it requires high quality software to manage those jobs. the govt spending every year a lot of cash to develop an efficient "Blood Bank management system project".

### Objective

- To simplify and automate the method of attempting to find blood in case of emergency and maintain the records of blood stocks within the bank.
- To reduce the discrepancies in blood management and tracking system.

## II. LIST OF SURVEY

Ming Jiang, et. al, (1) (2015) Proposed a RFID based blood information management system that adopts fingerprint sensor to spot donor and RFID is employed to extend the convenience of management. Moreover, GPRS is employed along with this system to transmit real time data between bloodmobile and blood centers.
Ali R. S, et. al, (3) (2017) develops a web- based application which runs on a centralizeddatabase to collect and manage data from all the sources that is blood donation centers and blood banks. It stores all the information related to blood donation, testing and storage of bags, and delivery to patients.
Anish Hamlin, et. al, (2) (2017) develops a mobile application to assist in donation of blood from a donor in emergency case. In need of blood the nearest potential blood donor will be tracked by GPS which has the same blood group as required. If potential blood donor accepts the request and OTP will be send to donor for verification. If request is not accepted, the app will automatically search the next potential blood donor."
Adsul A C, et. al, (4) (2020) aims to fulfill the requirement of blood bags using android application and raspberry pi. The participants data will be collected using android application and raspberry Pi via installing it at different locations.

## III. PROPOSED METHODOLOGY

The proposed system includes a embedded system which monitors the provision status of the blood and temperature of the refrigerator which is present inside the bank. The proposed system includes hardware part and android application. Hardware part has bank that has temperature sensor, sensing unit installed to that which has IR sensor and microcontroller as a gateway with wireless module using wireless protocol for wireless communication between bank and android application.

The hardware system of the project includes IR sensors, Temperature sensor, microcontroller, LCD, and wireless Module. The IR sensors are wont to provide information of the available blood stock, where if the blood bottle is placed at rack, then the LED rays of IR sensor gets reflected back from IR to microcontroller has been send. If the bottle isn't placed properly the Rays doesn't get reflect back and it show the bottle isn't present. For displaying the temperature of the refrigerator, the temperature sensor used is display the temperature on the LCD. If the blood stock isn't available in this condition the Request message is shipped for donating blood to the donor additionally on the closest bank to supply the blood if the provision of specific blood type of blood by usingGCM communication. additionally, to the current the if the person received the request message after the wish to donate the blood means send request message to hospitals.

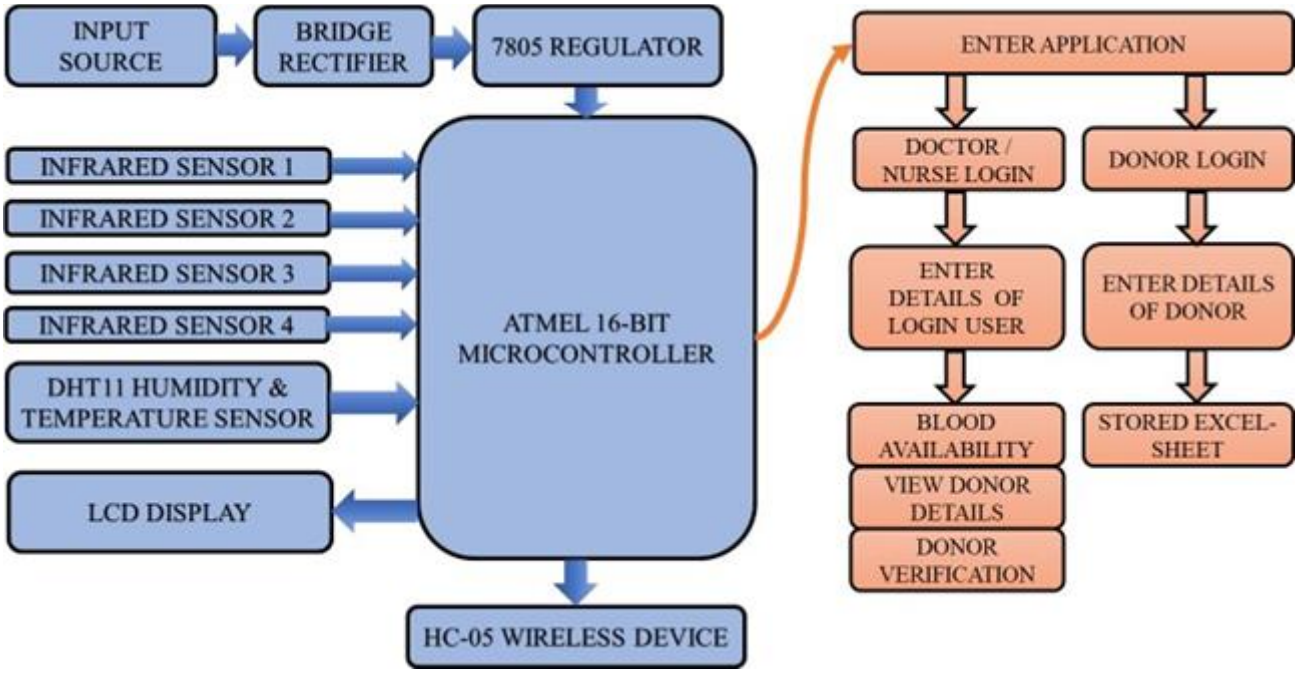


FIG 1. BLOCK DIAGRAM

Input power supply connected to regulator, then regulated voltage through Atmel 16-bit controller to activate.

IR sensor 1, IR sensor 2, IR sensor 3 connected to controller senses the Blood bags present on shelves and DHT11 humidity-temperature sensor are connected to controller to sense the humidity and temperature of the blood bag to preserve the blood from clot.

LCD display connected to microcontroller then displays the blood bags present on shelves and therefore the values of temperature and humidity.

HC-05 wireless device connected to controller makes the user to create the management of bank through an android application.

The android application gives the small print of donor and availability of blood bags of various groups, these also helps the new donor to register the main points through the applying.

In this circuit encompass power supply, 7805 regulator, ATMEL 16-bit microcontroller, IR sensors, DHT11 temperature sensor, LCD display, HC-05 wireless device.

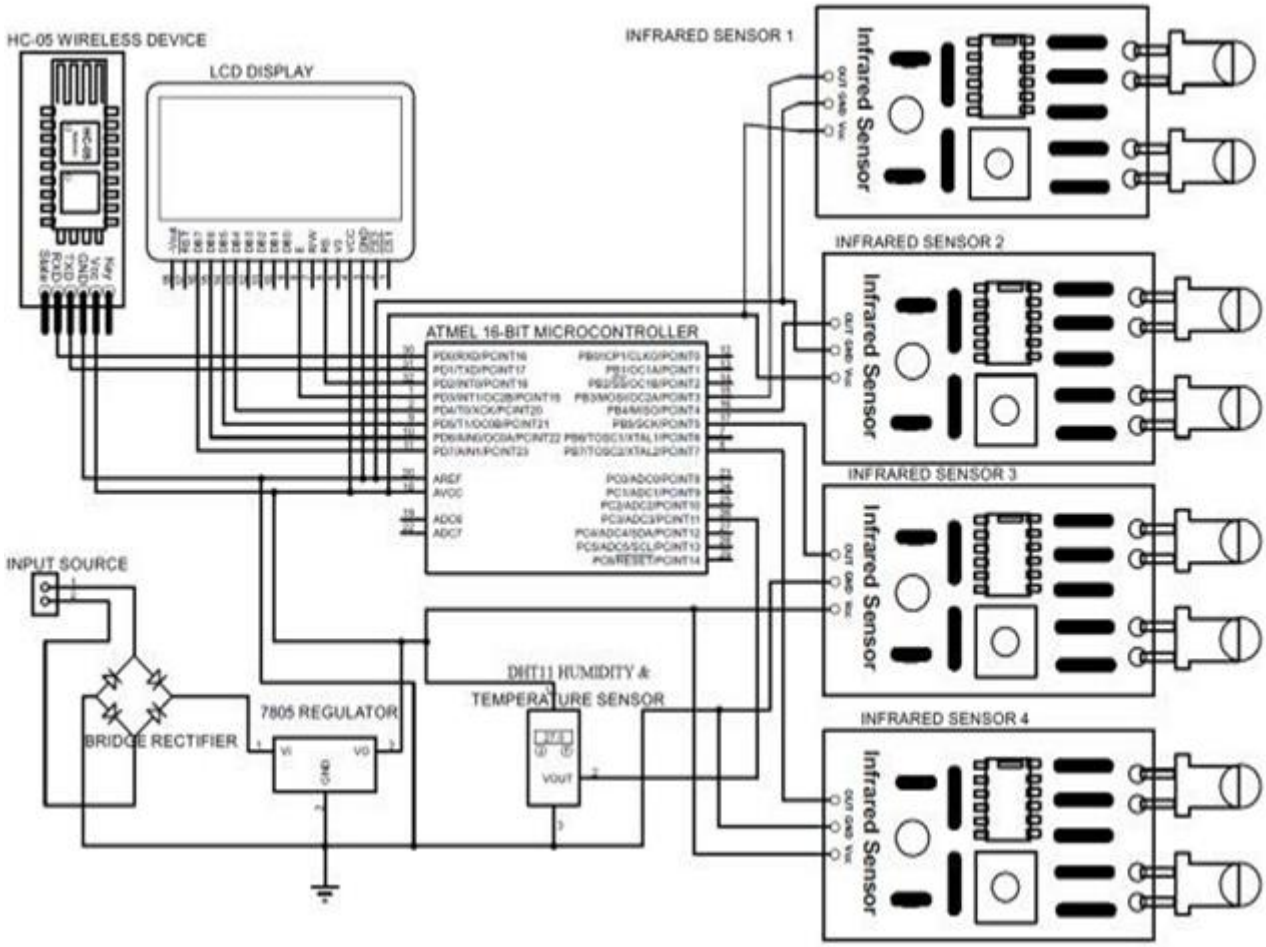


FIG 2. CIRCUIT DIAGRAM

In this circuit encompass power supply, 7805 regulator, ATMEL 16-bit microcontroller, IR sensors, DHT11 temperature sensor, LCD display, HC-05 wireless device.

Input power supply connected to regulator, then regulated voltage through Atmel 16-bit controller to activate.

IR sensor 1, IR sensor 2, IR sensor 3 connected to controller. it's three pins the are positive pin, negative pin and input pins is connected to controller.

The DHT11 temperature sensor are connected to controller it's 5v pin and GND pin and output pin is connected to controller.LCD display connected to microcontroller then display the values.

HC-05 wireless device connected to controller. it's four pins. VCC connected to positive and GND connected to negative and TXD and RXD connected to controller.

## IV. RESULT

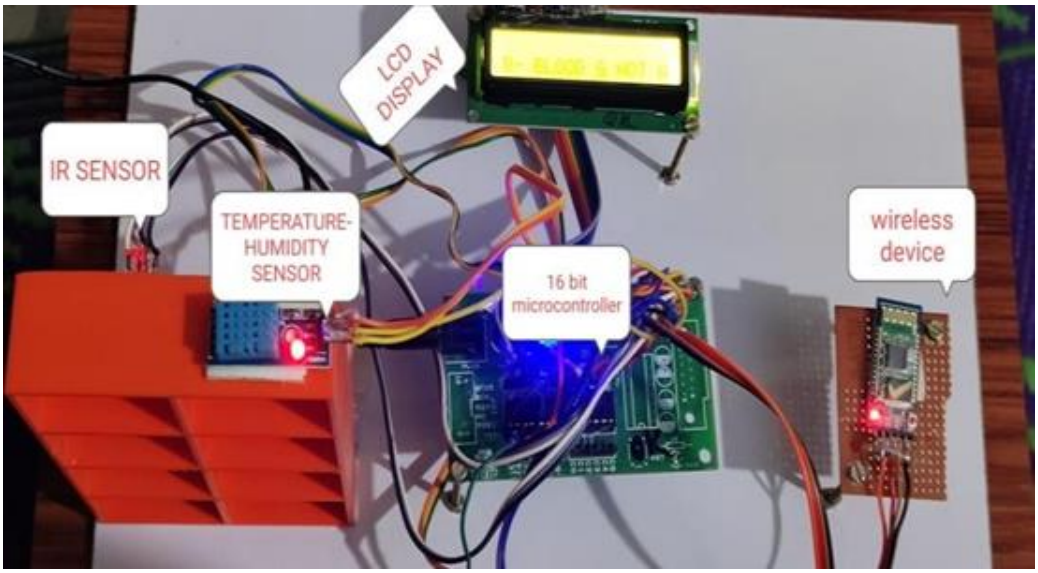


FIG 3. OVER VIEW OF HARDWARE COMPONENTS

The welcome page is the first page for the application, on clicking next. the next page comes “SELECT THE USER” where there is two options “DOCTOR/NURSE” and “DONOR”.

On selecting the “DOCTOR/NURSE”, login page for doctor comes where the doctor or nurse enters the user’s name and password for login.

On login, the three modes for “BLOOD AVAILABILITY”, “VIEW DONOR DETAILS” and “DONOR VERIFICATION”. on clicking the “VIEW DONOR DETAILS” shows a excel sheet where donor contact and date of donation is available.



FIG 4. WELCOME PAGEFIG 5. SELECT THE USER

On clicking the "BLOOD AVAILABILITY" shows the blood bags available on the shelves on connecting to the wireless device in the sensor

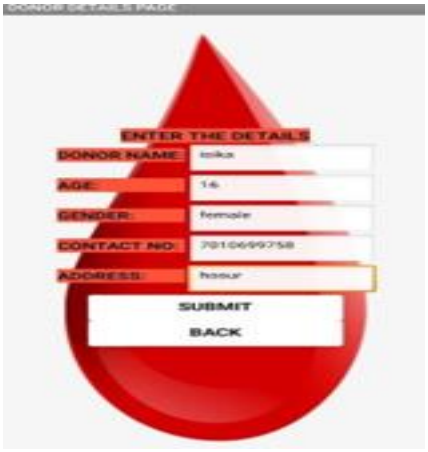


FIG 6. LOGIN PAGE FOR DOCTOR


FIG 7. SENSOR PAGE

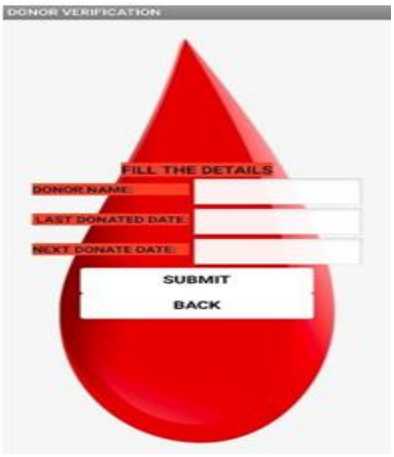


FIG 8. DONOR VERIFICATION

| Timestamp | DONOR NAME | AGE | GENDER | CONTACT NO | ADDRESS | DONOR NAME | LAST DONATED DATE | NEXT DONATE DATE |
|---|---|---|---|---|---|---|---|---|
| 20/10/2021 09:40:45 | nithya | 22 | female | 866784567 | hosur | | | |
| 20/10/2021 09:41:39 | | | | | | nithya | 3/3/21 | 5/9/21 |
| 25/10/2021 07:50:55 | nandhu | 24 | female | 123456789 | kgiri | | | |
| 25/10/2021 07:51:03 | nandhu | 24 | female | 123456789 | kgiri | | | |
| 25/10/2021 07:52:52 | | | | | | nandhu | 12-04-2021 | 14-05-2022 |
| 25/10/2021 09:36:26 | isika | 20 | female | 236360234 | hosur | | | |
| 25/10/2021 09:37:49 | | | | | | isika | 25-10-2021 | 25-12-2021 |
| 25/10/2021 09:51:57 | | | | | | | | |
| 25/10/2021 09:51:58 | | | | | | | | |
| 25/10/2021 09:51:58 | | | | | | | | |
| 25/10/2021 09:51:59 | | | | | | | | |
| 25/10/2021 09:53:02 | meke | 28 | male | 9488917854 | hosur | | | |
| 01/11/2021 08:38:13 | | | | | | | | |
| 01/11/2021 08:38:14 | | | | | | | | |
| 21/11/2021 16:35:53 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:35:55 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:42:13 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:42:14 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:42:19 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:42:28 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:43:10 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:43:12 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:07 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:08 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:12 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:13 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:20 | isika | 18 | female | 7010699758 | hosur | | | |
| 21/11/2021 16:47:21 | isika | 18 | female | 7010699758 | hosur | | | |

FIG 9. DONOR CONTACT AND DATE OF DONATION

## V. CONCLUSION

Growing population for various diseases has increased the requirement for the blood supply. In every two seconds, some person required intromission and currently India facing problem of the blood shortage. to handle the matter an efficient system is intended using the android application. The system fulfil the need of blood to the patients/victims without rushing to the bank to grasp the supply of the blood. All the four IR Sensors are connected to the microcontroller which continuously monitors the status of the available blood stock. it'll not only reduce the manual work required at the bank to update the info also reduces the efforts of blood seeker of searching blood stock at each bank. When blood stock reaches to zero system helps to send an invitation message to the donor and to the closest bank.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Developing Hydration Reminding Smart Bottle: IOT Experimentation and Prevention from Chronic Dehydration

**N. Bagyalakshmi N[1], Janakiraman V[2], Sam S[2], Subash A B[2], Yogavalli Prakash M[2]**

[1]Associate Professor, Department of Bio Medical Engineering, Adhiyamaan College of Engineering M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio Medical Engineering, Adhiyamaan College of Engineering M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

This project describes the experimentation architecture of Internet of Things (IoT) in real life. The experimentation architecture of the Internet of Things (IoT) in real life is described in this project. The goal of this project is to create water bottles that remind people to drink water on time to keep their body temperature in check. It's difficult for humans to remember to drink enough water because of their hectic schedules and many distractions. One of the health problems that people face is not drinking enough water in their daily lives. The water ultrasound sensor may be used to sense the amount of water in this case, and it not only assists users in measuring the level of water, but it also alerts humans to drink water when it is time to replenish their bodies. This is a project that is simple to use. This is a user-friendly project in which a water bottle or flask communicates with the user by sending commands as a reminder to drink enough water. The Internet of Things experiment facility described in this project is designed to provide a viable platform for large-scale experimentation and evaluation of IoT concepts in real-world settings.

**Keywords—**NODE MCU, Ultrasound Sensor, Internet of Things (IoT).

## I. INTRODUCTION

The rapid development of the Internet of Things (IoT) and small wearable biosensors has opened up new avenues for tailored eHealth and mHealth services. It presents a case study of an intelligent cap that can determine how much water is in a bottle. This project shows a proof-of-concept for a linked smart bottle that communicates metrics to an IoT platform. By 2024, the number of physical items connected to the Internet, often known as the Internet of Things or IoT, is predicted to have grown exponentially to 50 billion units. Smart homes, transportation, healthcare, and industrial automation are among the new applications. Smart items in our environment can provide context awareness, which is frequently lacking while monitoring regular activities. Proper hydration is one of the most crucial components for good health and wellness. It's difficult to remember to drink enough water in our hectic life. And most of the time, whether at home, at work, or on the go, we forget to drink enough water. Around 75% of Americans are chronically dehydrated

on a daily basis. Our bodies are 60% water, our brains are 75% water, and our blood is 83 percent water. Automatic, accurate, and dependable monitoring of fluid consumption can be provided by an intelligent hydration monitoring and management platform, as well as customizable suggestions for optimal individualized hydration management.

Smart water bottle can meet the demands of a number of people, including athletes who want to improve their performance, dieters who want to reach their weight goals, and elderly people who live in group homes or alone and are tends dehydrated frequently. While most people who want to enhance their health, drink too little water. So, they can't able to achieve the healthy lifestyle they want. Patients with renal illness and congestive heart failure (CHF) must follow prescribed water intake procedures. Users may get notifications and reminders when it's time to drink, set goals for how much to drink, can see current and previous consumption levels, and more with an integrated hydration management platform.

## II. LITERATURE SURVEY

Luca Catarinucci and Romina Torres [1] explain in their thesis 'An IOT Aware Architecture for Smart Healthcare Systems' that a variety of sensors are attached to the body of the patient to help doctors achieve different parameters such as blood pressure, temperature, ECG, motion, and so on, in order to improve the effectiveness of the health care. These are communicated to a device using a wireless protocol (RFID). This type of device then uses those metrics to continuously monitor patient health, assisting clinicians in better handling emergency circumstances.

Tea Hwa Lee.et.al [2] explains that smart water bottle is used to drink water, which is essential for good health and the proper functioning of the organs, especially for the old people. Because the aged ones are unaware of the importance of drinking enough water. This smart water bottle reminds users to drink enough water by using IoT technology to remind them of healthcare services.

S. Jatmikoo.et.al [3] explains that water level detecting system is utilized to assist humans in gathering water level data in real-time. The ping sensor is used as a distance sensor to detect the water level in surfaces by calculating the distance between the sensor and the water. The system is made up of two modules: the transmitter and the receiver. The transmitter detects the water level and transfers it to the receiver as data. The data can then be shown on the screen via the receiver module. This method can be utilized as part of a flood control system that requires the monitoring of water levels that can be collected remotely.

Andrea Zanella.et.al [4] explains the 'Internet of Things in Smart Cities', different sensors constantly monitor various parameters like structural stress of building, noise, pollution, parking, humidity, temperature in Celsius, etc. This architecture proposed by authors is implemented in Padova city located in Italy.

Jequier.et.al. [5] explains that the human body is made up of 3/4 th of water, just as the world is made up of 3/4 th of water. In the human body, water plays a vital role. Water balance regulation is a critical activity in the human body; a loss of 1% of water in the body should be replaced within 24 hours to avoid unnecessary intricacy. Dehydration is a significant risk for people. Dehydration can impair consciousness and cause speech to become slurred. Incoherence, weakness, hypertension, and other symptoms are common.

## III. PROPOSED METHODOLOGY

This model has ultrasound sensor which gives high accuracy when compared to transistor sensor. In this proposed system portable battery is used for power supply which is smaller in size. It has IOT page-based data storage about hydration level and alert. ESP8266 microcontroller is used for development of IoT (Internet of Things) embedded applications.

The sensors had been connected to micro controller and to the IOT page.

The sensor cables can relate to two main pins of named A0 among these 10 pins. These pins have been used for setting low level and high-level indication.

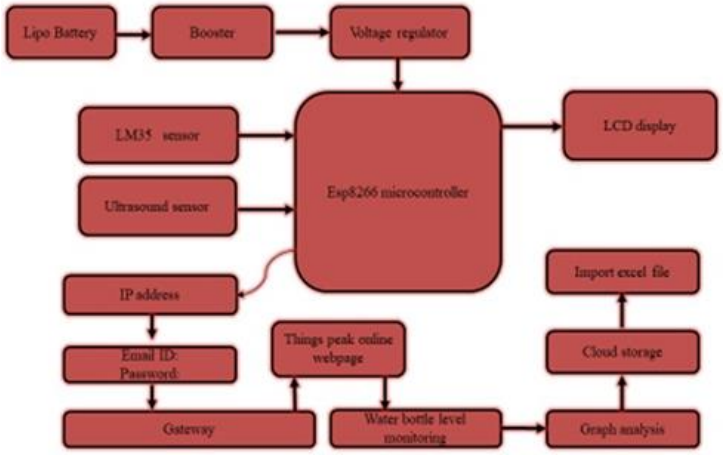


Fig:1 Block Diagram of proposed system

The esp8266 is a 28-pin chip with eight main pins and seven power supply and ground pins.

The LM35 sensor is used to measure environmental temperature. The 5v power supply used by the module sensors will be converted to mobile via an RS232 cable connected to the Microcontroller and IOT. On a cloud IOT website, daily drinking values can be saved.

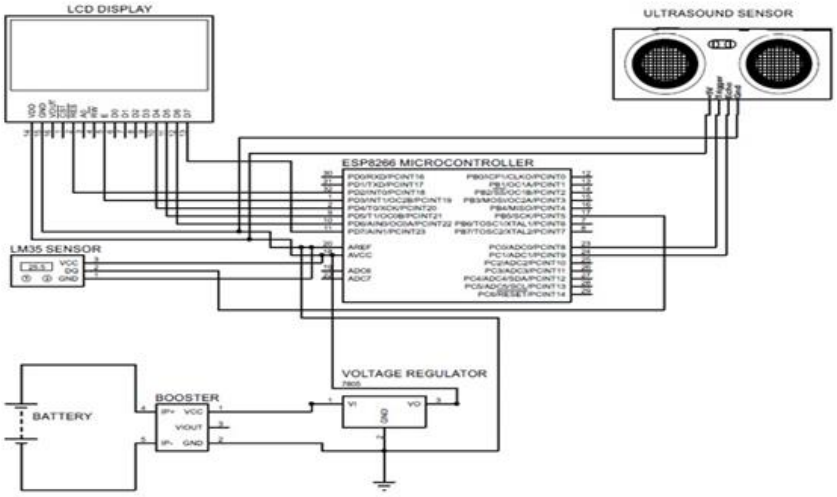


Fig:2 Circuit Diagram of proposed system

In circuit diagram consist of esp8266 Wi-Fi device, ultrasonic sensor, regulator, booster, LM35 sensor, LCD display and lipo battery. The input power supply from battery then boosted the voltage and given to the regulator is to covert 5v for controller power source. Here regulator has three pins that are input pin v1 ground pin and output pin v0. Esp8266 WI-FI device has nine digital pins and that are D0, D1, D2, D3, D4, D5, D6, D7, D8.

Ultrasound sensor has four pins that are vcc, gnd, echo and trigger. The echo pin1 is connected to D0 pin and trigger pin1 is connected to D1. LM35 sensor connected to controller. The controller has three pins. GND connected to negative and VCC connected to positive. Output pin connected to controller of analog pin. LCD display connected to controller and display the values.

## IV. CONCLUSION AND FUTURESCOPE

The rapid development of the Internet of Things (IoT) and small wearable biosensors has opened new avenues for tailored eHealth and mHealth services. This project presents a Proof-of-Concept implementation for such a connected smart bottle that sends measurements of water levels to the IoT Platform. In this project, the proposed model of smart bottle architecture for hydration reminder to remind the humans to intake the sufficient water on time to keep the body stable is successfully implemented. 5v is the maximum power consumption. Not only smart phones but also the basic mobile phones can also be used for verification and getting execution successfully. Further some possibilities for maintaining the record of daily usage of human sipping $H_2o$ are kept as records for future works and can also be used in another fields.

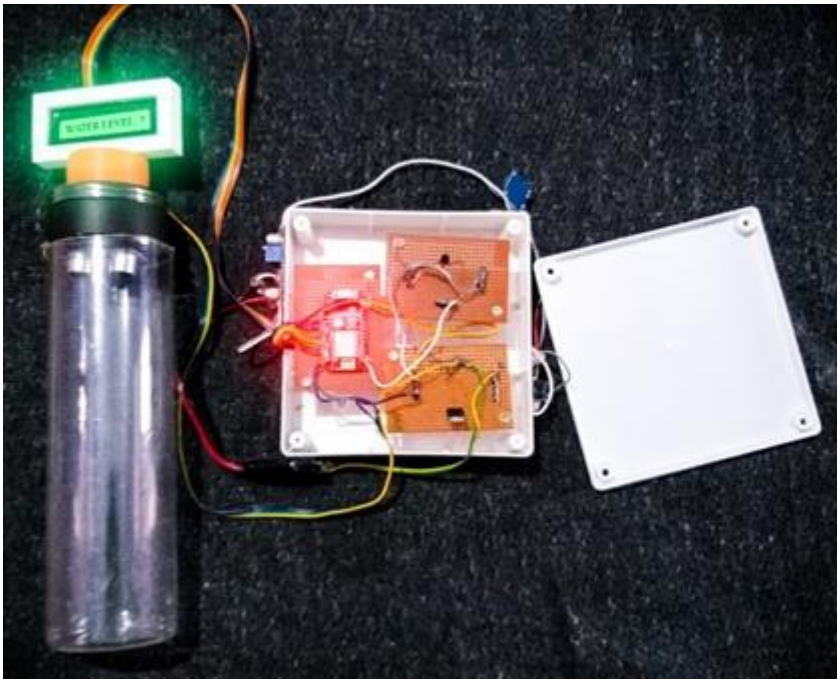

Fig:3 Proposed model

In future IOT and ultra-sound sensor technology can be used to create some innovative ideas like developing an instrument to measure the level of underground bore well's water level and automated saline monitor.

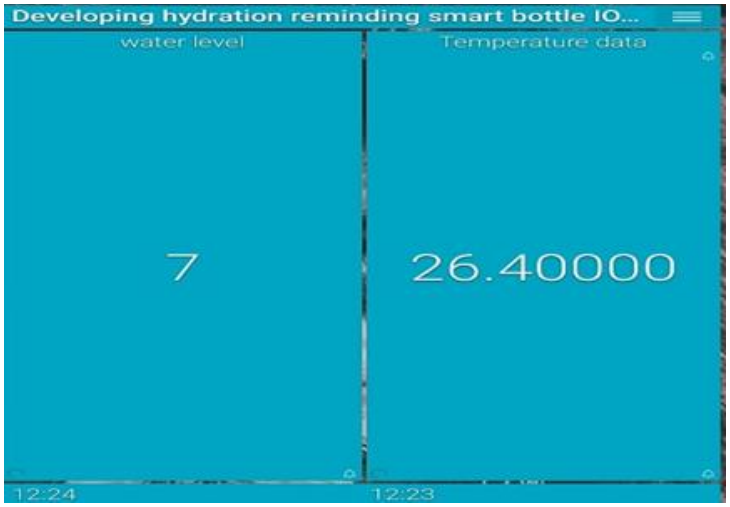


Fig:4 Water level and temperature data


Fig:5 Temperature data graph

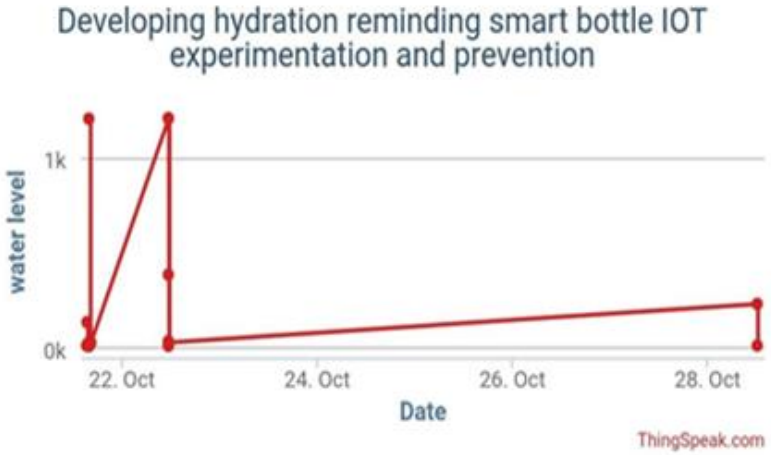


Fig:6 Water level graph

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Portable Oxygen Concentrated Delivery Using Hybrid Power Solar Energy and Pressure

**S. Kaniha[1], V.A. Yagnapreetha[1], C. Pooja[1], C. Sindhu[1], Dr. T.S. Udhayasuriya, M.E., PhD[2]**

[1]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

The unprecedented occurrence of the 2019 novel coronavirus, termed as COVID-19 by the globe Health Organization (WHO), has placed various governments round the world in an exceedingly precarious position. This project is covid based mostly patient gas level observance system aims to avoid deaths rates, a star based mostly hopped-up medical device designed to concentrate gas from close air. want to deliver gas at the side, usually through associate degree hooked up nasal tubing, to a patient requiring gas medical aid. The meant use or clinical purpose is that the delivery of low-flow, continuous, clean and targeted gas. The earliest attainable stage, if vulnerable, the relay gets activated and provide the gas through gas pump to person in peril to present him immediate life support and conjointly the system sends signals from the wearable device hooked up to the neck of the victim. So, they will begin to malfunction in terribly extreme cases will cause death. So, again, the rescue treatment here then is medical gas. So, medical gas is taking the gas from the air and compression it in order that the gas that soak up. that's that they're currently inhaling virtually, pure gas. which is what we have a tendency to provide patients so as to stay gas levels at a traditional level within the body. Here, introduced moveable model in designed battery offer and advantage of it continues power offer by exploitation hybrid facility exploitation solar power and body pressure energy to form power resource to battery and therefore the battery are charged by exploitation these 2 resources.

**Keywords: -** Oxygen concentrator, Portable device, Piezoelectric plate, solar panel

## I. INTRODUCTION

Anecdotal reports within the lay press, social media, and free open-access medication from the start of the coronavirus unwellness (COVID-19) pandemic have highlighted a retardant whereby patients are presenting for analysis with clinically vital hypoxemia within the absence of symptom. Component element gas could be a substantial element within the sustenance of human life. exchange of physiological gases. prescribed, oxygen is a drug. Oxygen therapy is an established treatment, and it continues to be one of the most important measures in the management patients with progressing chronic respiratory disease.

Inoxygenatioand to correct the severe hypoxemia that these patients usually present with in the advanced stages of the disease. The goal is to maintain oxygenation levels above the range of respiratory failure, defined by an O2 blood partial pressure [PaO2] > 60 mmHg, and an oxygen saturation measured by pulse oximetry [SpO2] > 90%. Currently, clinical applications for the use of oxygen have extended beyond the hospital setting. When patients receive oxygen supplementation at home, the therapy is referred to as home oxygen therapy (HOT). HOT provided as long-term oxygen therapy (LTOT), that is, used on a daily basis and at least by 15 h per day, is recommended by current treatment guidelines since it has been shown to be effective in increasing survival in patients with chronic obstructive pulmonary disease (COPD) and respiratory failure. In addition, 3 ambulatory oxygen therapy improves physical performance in patients with COPD. Despite all these benefits of HOT for patients with respiratory failure, evidence that supports the prescription of HOT in other chronic conditions associated with hypoxemia is limited. While supplemental oxygen is valuable in clinical situations such as those aforementioned, the inappropriate use of this therapy can be detrimental. Hypoxemia is defined as the decrease in PaO2 below the normal limits, variable for the subject's age normal PaO2 ranges from 80 to 100 mmHg. There is evidence that both hypoxemia and hyperoxemia, which results from exposure to excessive O2 flows for a prolonged period of time, can have serious consequences for patients with acute and chronic respiratory failure. Medical oxygen therapy, which has been used in clinical practice for over a century, is an essential part of obstetric, surgical, and anaesthesia care. It is also critical for the effective management of many diseases including severe sepsis and malaria, and several lung illnesses including pneumonia, which is the leading cause of death in children under 5 worldwide.

In this case, the most objective of element medical care is to enhance tissue activity and to correct the severe hypoxemia that these patients typically gift with within the advanced stages of the unwellness. The goal is to keep up activity levels on top of the vary of metastasis failure, outlined by An $O_2$ blood partial pressure [$PaO_2$] > sixty mmHg, And an element saturation measured by pulse oximetry [$SpO_2$] > ninetieth. Currently, clinical applications for the utilization of element have extended on the far side the hospital setting. once patients receive element supplementation reception, the medical care is remarked as home element medical care that's, used on each day and a minimum of by fifteen hours per day, is usually recommended by current treatment pointers since it's been shown to be effective in increasing survival in patients with chronic clogging pulmonic unwellness and metastasis failure. Despite of these edges of HOT for patients with metastasis failure, proof that supports the prescription of HOT in different chronic conditions related to hypoxemia is proscribed. whereas supplemental element is effective in clinical things like those said, the inappropriate use of this medical care is harmful. Hypoxemia is outlined because the decrease in $PaO_2$ below the traditional limits, variable for the subject's age traditional $PaO_2$ ranges from eighty to a hundred mmHg.

## II. LITERATURE SURVEY

Gandhi RT et.al [2020] approaching a report within the lay press, social media, and free open-access drugs from the start of the coronavirus sickness (COVID-19) pandemic have highlighted a retardant whereby patients area unit presenting for analysis with clinically important hypoxemia within the absence of symptom

observed as “silent hypoxemia,” this development poses important risks to patients, because it might delay presentation to a degree that their viral-mediated respiratory organ injury is way advanced, increasing the probability of complications like unrecognized general organ pathology, severe per introduction hypoxemia, One answer that has been planned for avoiding this drawback has patients diagnosed with COVID-19 admission be discharged from the emergency department to watch pulse oximetry.

Hodgson CL et.al [2019] proposed this review to consider these issues in greater detail. After reviewing the types of available devices and their principles of operation, the main tools for assessing the accuracy of monitoring devices and examine the available data on the performance of inexpensive pulse oximeters and smart phone–based systems and review some potential pitfalls with pulse oximetry monitoring that could affect accuracy and implementation of a monitoring program and conclude by providing practical guidance for patients and medical providers who decide to use these devices for home monitoring. McSweeney M et.al [2019] The systems described above estimate the oxygen saturation by shining two wavelengths of light (660 and 940 nm) from light-emitting diodes through a cutaneous vascular bed to a sensor on the other side of the tissue. Whereas in the hospital setting, the fingers and earlobes are the typical monitoring sites, the pocket oximeters and phone-based systems utilize only the fingers. 6 Because hemoglobin absorbs these wavelengths of light to different degrees depending on the extent to which binding sites are occupied, varying amounts of light make it through the cutaneous bed to a detector located opposite the emitter. Mazuski J et.al [2020] A second category is the increasing number of systems that rely on reflected light, in which light reflects off hemoglobin and is detected by a sensor on the same surface as the emitter. This is the approach used by smart phone applications, such as Pulse Oximeter (digiDoc Technologies). On the surface, this category of systems is appealing for the purposes of home monitoring given the ubiquity of smart phones among the general population, but, as will be discussed below, significant concerns persist regarding their accuracy. Forehead reflectance oximeters, such as the Nellcor SpO2 Forehead Sensor (Medtronic), operate on the same principle and have a degree of accuracy comparable to traditional pulse oximeters, particularly in patients with poor digital perfusion. Shauna Mullally et.al [2019] The use of oxygen concentrators for the supply of medical oxygen in developing countries is increasingly becoming an alternative to conventional compressed gas cylinders, which are expensive to refill and logistically challenging to transport

Hodgson CL et.al [2019] planned this review to contemplate these problems in bigger detail. once reviewing the kinds of accessible devices and their principles of operation, the most tools for assessing the accuracy of watching devices and examine the accessible knowledge on the performance of cheap pulse oximeters and sensible phone–based systems and review some potential pitfalls with pulse oximetry watching that would have an effect on accuracy and implementation of a program and conclude by providing sensible steerage for patients and medical suppliers WHO arrange to use these devices for home watching.

McSweeney M et.al [2019] The systems delineated higher than estimate the chemical element saturation by shining 2 wavelengths of sunshine (660 and 940 nm) from light-emitting diodes through a body covering tube bed to a detector on the opposite facet of the tissue. Whereas within the hospital setting, the fingers and earlobes square measure the everyday watching sites, the pocket oximeters and phone-based systems utilize solely the fingers. vi as a result of Hb absorbs these wavelengths of sunshine to totally different degrees

looking on the extent to that binding sites square measure occupied, varied amounts of sunshine build it through the body covering bed to a detector set opposite the electrode.

Mazursky J et.al [2020] A second class is that the increasing variety of systems that consider mirrored lightweight, within which lightweight reflects off Hb and is detected by a detector on an equivalent surface because the electrode. this can be the approach employed by sensible phone applications, like Pulse measuring device. On the surface, this class of systems is appealing for the needs of home watching given the omnipresence of sensible phones among the overall population, but, as are going to be mentioned below, vital issues persist relating to their accuracy.

Shauna Mullaly et.al [2019] The use of oxygen concentrators for the supply of medical oxygen in developing countries is increasingly becoming an alternative to conventional compressed gas cylinders, which are expensive to refill and logistically challenging to transport.

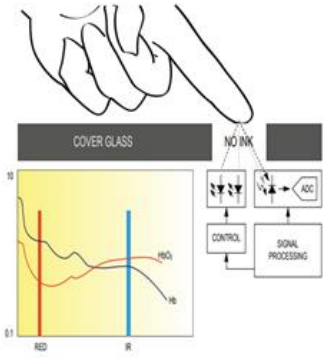


**Fig 1. Pulse oximeter and Heartrate sensor**

## III. PROPOSED METHODOLOGY

In this projected system it's been designed transportable element provide device to patients. the heartbeat measuring device is to watch the patient element level and send info to controller. during this the relay gets activated the one hundred and five supersonic mist vibrators for element provide to patient. If the emergency scenario the patient by clicking the emergency button the supersonic mist vibrator can moisturize the contemporary air to the emergency patient to save lots of life. this can be transportable device victimization the ability supply from solar array and electricity plate.

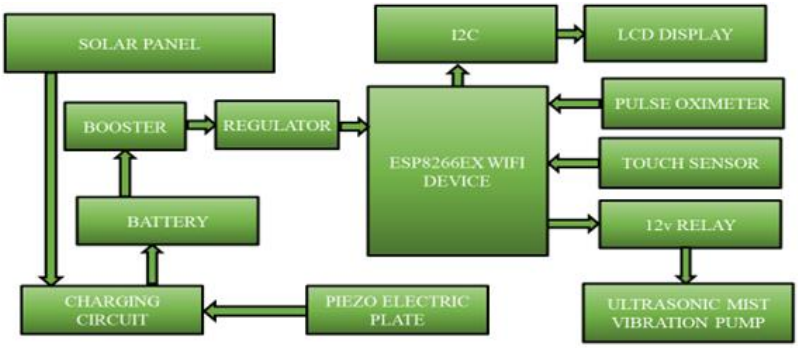


**Fig 2. Block diagram for Proposed system**

In the moveable gas Concentrator, there area unit 2 ways that of charging the circuit. One is by solar battery and also the different is thru the electricity plate. These 2 sources can charge the circuit and also the battery can send the charge to the Booster.

Pulse oximetry could be a non-invasive check that measures the gas saturation level of your blood. It will chop-chop discover even tiny changes in gas levels. These levels show however with efficiency blood is carrying gas to the extremities furthest from the center, as well as arms and legs.

unhear able mist Vibrator produces the gas and also the relay circuit incessantly sends the pure gas to the patient once the emergency alarm turned on.

liquid crystal display[LCD] digital display alphanumeric display shows the gas level and also the necessary readings of the concentrator.

## IV. WORKING

The project is covid based mostly patient gas level observation system aims to avoid deaths rates, a star based mostly hopped-up medical device designed to concentrate gas from close air. accustomed deliver gas at the side, generally through associate degree connected nasal tube, to a patient requiring gas medical aid. The supposed use or clinical purpose is that the delivery of low-flow, continuous, clean and focused gas. The earliest potential stage, if vulnerable, the relay gets activated and provide the gas through gas pump to person in peril to administer him immediate life support and additionally the system sends signals from the wearable device is connected to the neck of the victim.

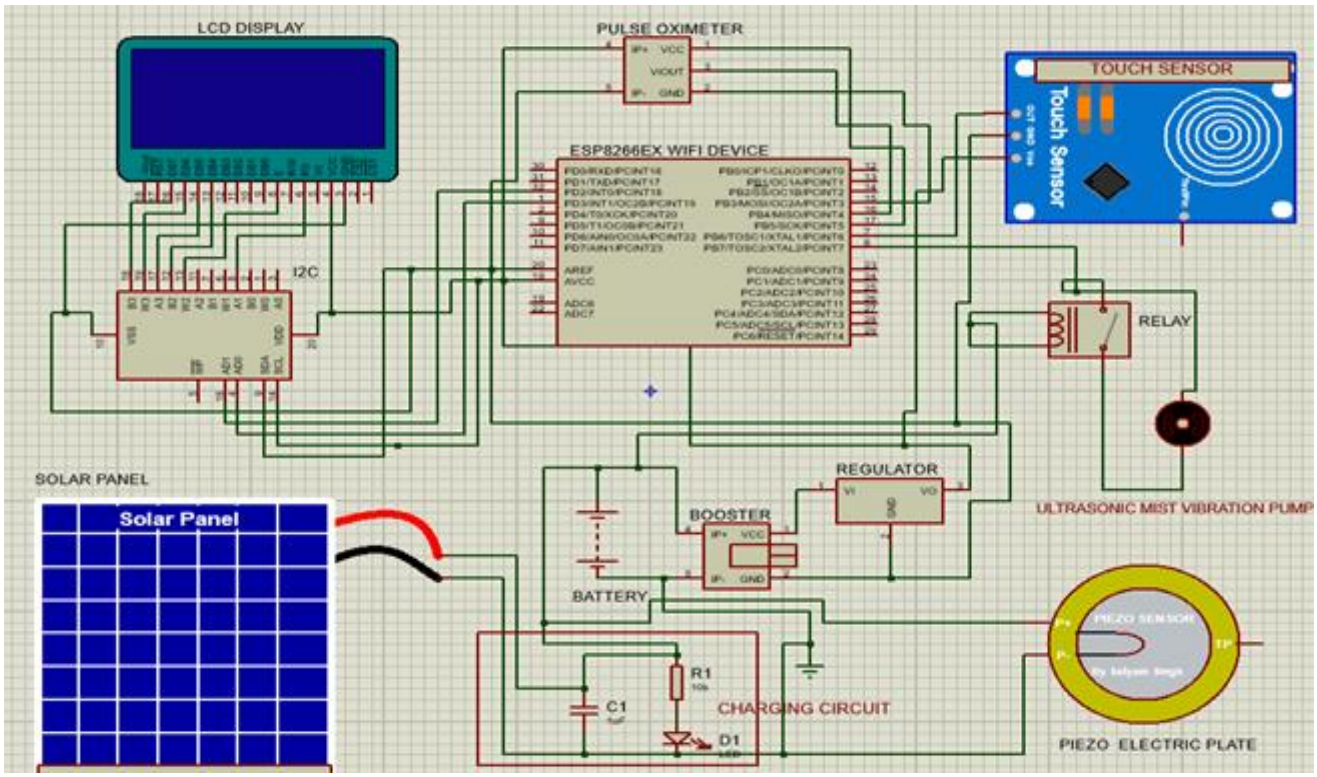


Fig.3 CIRCUIT DIAGRAM FOR OXYGEN CONCENTRATOR

The higher than circuit diagram consists the core elements of ESP8266EX WI-FI device, show| LCD |digital display |alphanumeric display} display, electrical device, I2C, bit device, battery, booster, pulse measuring device, relay, inaudible mist vibration pump, piezo electrical plate.
Power from electrical device is keep within the battery by exploitation charging circuit then the ability is given to booster input pins then the boosted power offer is given to regulator then connected to Wi-Fi device. The piezo electrical plate is connected to charging circuit then power keep within the battery.

- LCD display connected to I2C. VCC pin is connected to 5v supply, GND pin is connected to ground, and remaining data pins are connected to I2C.
- I2C connected to Wi-Fi device. VCC connected to positive. GND connected to negative pin. Output pins connected to digital pins.
- Touch sensor connected to Wi-Fi device. VCC connected to positive. GND connected to negative pin. Output pins connected to digital pins.

- LCD show connected to I2C.
- VCC pin is connected to 5v provide, GND pin is connected to ground, and remaining information pins square measure connected to I2C.
- I2C connected to Wi-Fi device.
- VCC connected to positive.
- GND connected to negative pin.
- Output pins connected to digital pins.
- bit device connected to Wi-Fi device.
- VCC connected to positive. GND connected to negative pin.
- Output pins connected to digital pins.

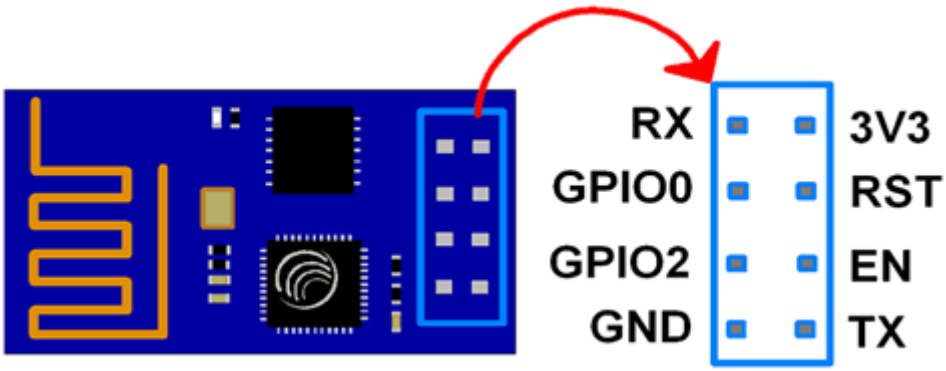


**Fig: 4 ESP8266-01 module pins**

This project is covid primarily based patient chemical element level watching system aims to avoid deaths rates, a star primarily based powered medical device designed to concentrate chemical element from close air. wont to deliver chemical element at the side, usually through Associate in Nursing hooked up nasal tubing, to a patient requiring chemical element medical care. The meant use or clinical purpose is that the delivery of low-flow, continuous, clean and targeted chemical element. The earliest doable stage, if vulnerable, the relay

gets activated and provide the chemical element through chemical element pump to person in peril to administer him immediate life support and conjointly the system sends signals from the wearable device hooked up to the neck of the victim. So, they're going to begin to malfunction in terribly extreme cases will cause death. So, again, the rescue treatment here then is medical chemical element. So, medical chemical element is taking the chemical element from the air and press it so the chemical element that soak up. that's that they're currently inhaling virtually, pure chemical element. which is what we tend to provide patients so as to stay chemical element levels at a traditional level within the body.

## V. CONCLUSION AND FUTURE SCOPE

Portable gas concentrators area unit increasing in quality, and will have potential to act as one gas medical care device. Success as one device can depend upon the arrogance however periodical gas delivery is efficacious across the breadth of patient respiration behaviors. a large form of nasal geometries additionally exist which might influence the power to find breath flow, as will suboptimal positioning of the tubing. With fashionable technology gas concentrators is engineered to be noise-free, compact and energy-efficient. It is taken anyplace. those that area unit combating severe COPD, Corona, pathology and that they have low gas levels within the blood, POC may facilitate to measure a healthier and longer life. moveable gas concentrator is in demand particularly by those that area unit beneath home quarantine and wish further medical support. The POC isn't requiring to be refilled. Normally, this could involve causation off tanks for refill and this concentrator can ne'er run out of gas.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Intravenous Flow Monitoring and Automatic Control System for Smart Hospital using IoT

**Selva Sherin T[1], Karthick B[2], Mohammed Fawaz S[2], Muthamil M[2], Saravanan P[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Hosur, Tamil Nadu, India

## ABSTRACT

Injectable treatment is a basic treatment where a bottle of salt water given to treat dehydration, thus improving their condition. The patient needs regular monitoring by the nurse. Unfortunately, the patient's blood begins to flow back into the duct because of the unavoidable and careless conditions. These effects can be dangerous and life-threatening in many cases. Prevention, monitoring of blood flow rate and alert system should be developed to protect their health during meal hours. Here the proposed system has an appropriate way to measure the flow rate and monitor it remotely using the IoT platform. The system determines the levels of the bottle and displays the component and essential levels with the help of a buzzer and an online notification sent to hospital / control room staff using a mobile application (IoT platform) via Wi-Fi. This system uses a method that will stop the flow of water when the bottle is empty. This system is integrated, affordable, and can be used in rural and urban hospitals.

**Keywords—**Monitoring, Wi-Fi module, IoT platform, buzzer.

## I. INTRODUCTION

The Internet of Things (IoT) basically uses the data collected by embedded sensors and actuators in machines and other perceptible objects of intelligently related devices and structures. This is necessary in order for it to spread quickly to be completed in the coming years and this joining will yield another measure of organizations that improve individual customer fulfillment and profitability efforts. Communication involves the Internet of Things by combining common objects. IoT will create a range of administrations, each of which requires a change in the levels of data transfer capacity, portability and inactivity. The benefits that come with redundancy may require higher data transfer. In health facilities, where a patient's condition needs to be monitored regularly, it is usually done by a physician or another caregiver. In developing countries like India because of a shortage of weird doctors, it is increasingly difficult for the same physician to care for so many patients at once. So in that case, the doctor may not even know the condition of all the patients. In an emergency, even a slight delay in treatment may be a threat to the patient's health. Our

proposed framework is useful for monitoring field knowledge and managing flexible field activities. Control of all these activities will be done through remote sensing systems connected to the Internet and will be handled and performed by connecting sensors. In this framework, it uses different senses to measure conditions.

## II. LIST OF SURVEY

Gavimath, [1] and et al., (2018) proposes analysis takes place to predict the changing time of saline bottle.
Phaniraj A, [2] and et al., (2018), proposes the quantitative determination of saline levels the device performance and accuracy were tested. For analysis the values of output voltages across photodiode against the saline level of the bottle were used.
Ramya D [3] and et al., (2019), proposes a LED-photodiode is used here to maintain this. Even in night time this system when nurses might not be awake.

## III. PROPOSED METHODOLOGY

The proposed system is to provide reliable, convenient, effortless and cost-effective system for intravenous level monitoring. The bottle gets emptied and if health care faculties are unaware about it, it might end up in reverse blood stream. In this method Signals from load cell with HX711 sensor is converted from analog to digital using ADC. The load cell is utilized to persistently screen the weightage of the bottle container and it will be shown on the IoT web page, when it arrives at the critical level a programmed message will be forwarded to hospital staffs through mobile application. At the point when container gets to threshold level to the hospital staff. Specialist can control the stream rate. It is mainly very useful at night timing as there is no need for nurses to go to patient's bed to check the level of intravenous flow in the bottle.

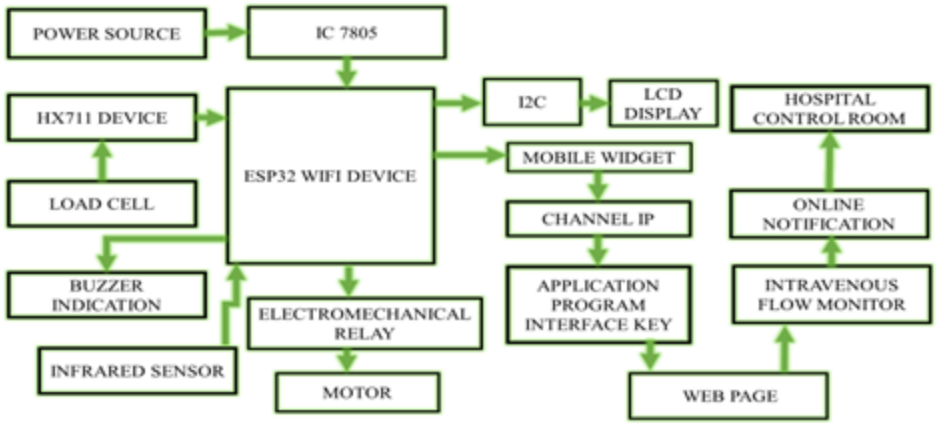


Fig 1: Block diagram of IV flow monitor

**ESP32 Wi-Fi:** ESP32 is Wi-Fi enabled Wi-Fi module on Chip (SoC) developed by the ESpressif system. It is widely used in IoT development (Internet of Things) embedded applications.

**Gear motor:** Gear motors are complete exhaust power systems that include an electric motor and a reduced gear train that is easy to install. Gear motors allow for the use of low horsepower motors to provide low power output at low speeds.

**Buzzer:** A buzzer or beeper is a device that displays signals, usually electronic. It usually contains a number of switches or sensors connected to the control unit that determines which button was pressed or the pre-set time expired, and usually the specific button or control panel, and sounds a warning type of continuous or intermediate or vibrating sound. Originally the device was based on an electromechanical system that resembled a stainless steel (which makes a ringing sound).

**HX711 device:** HX711 is a precision 24-bit analog to digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor. The input multiplexer selects a different input channel A or B to a standard low-volume output (PGA) amplifier. All controls on HX711 are pins.

**IR sensor:** The IR sensor can measure the temperature of an object and detect movement. These sensors measure only infrared radiation, rather than emitting it called a passive IR sensor.

Liquide Crystal Display (LCD): The LCD represents the Liquid Crystal display. Components are special for use with small controls, which means they cannot be operated by standard IC circuits. They are used to record different messages on a small LCD

**Electromechanical Relay:** This is a 4-Channel Relay interface board. It can be controlled directly by microcontroller (AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic).

**Thing shown:** To visualize private ThingSpeak private channel charts ThingShow uses the ThingSpeak™ chart API. Channel ID and API key are required to unlock private channel. To visualize the ThingSpeak™ community channel's, ThingShow is embedded directly from the ThingSpeak ™ website. It can be a chart, gauge or any other type of gadget including MATLAB visibility displayed on the channel's public page. A visual channel can be created to collect different widgets for different channels on a single screen.

**Embedded C:** Embedded C is the most popular programming language in the field of electrical gadget development software. Each processor used in the electronic system is associated with embedded software. The embedded system C plays an important role in performing a particular function with a processor.

**µVISION KEIL:** µVision Keil provides IDE system 8051 very easy to use. KEIL development tools for 8051microcontroller development tools support all levels of software developer from professional software developer to a recent student about embedded software development.

## IV. WORKING

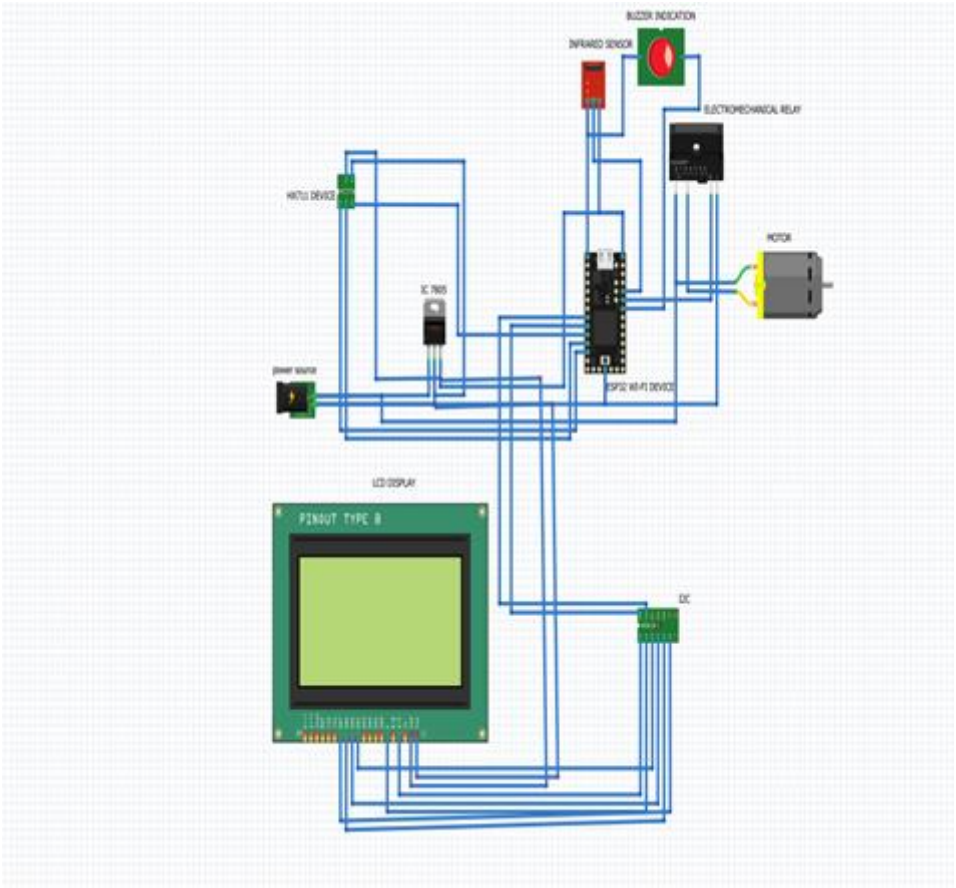


Fig 2: Circuit of IV flow monitoring

The circuit diagram consists the components of ESP32 Wi-Fi device, power source, IC 7805 regulator, HX711 load cell, infrared sensor, electromechanical relay, motor, buzzer, I2C and LCD display. The input power from power source is given IC 7805 voltage regulator for voltage regulating 12V to 5V. The 5V supply is given to ESP32 device. Infrared sensor has 3 pins VCC pin is connected to 5V supply, GND pin is connected to ground, and output pin is connected to ESP32 digital pin. HX711 load cell is connected to ESP32 device digital pins. Electromechanical relay is connected for activate the motor. Buzzer has two pins; positive pin is connected to controller digital pin and negative pin is connected to ground. LCD display data pins connected to I2C.I2C SCK and CLK pins connected to ESP32 Wi-Fi device digital pins.

When the power of 12V is applied, IC Regulator converts 12V to 5V then it given to other components of the circuit. The saline bottle is loaded at load cell; the value is transmitting to the display screen and ESP32 Wi-Fi device. This Wi-Fi device transmits the values to the web page that will display on the screen of the mobile. The relay sends signal to start up gear motor which makes a flow of saline solution from the bottle. If the saline solution gets its threshold value (or became low level) the Wi-Fi device sends a signal to buzzer for alert sound. If a patient has any reverse flow of blood, IR sensor detects it and sends a signal to ESP32 device

and it is transmitted to buzzer circuit for alertness. During this situation the motor will automatically stop the flow of saline.

## V. RESULT

The saline level values are displayed in the LCD screen and graphical representation are showed in the web pages. A normal level condition of the saline bottle and shows the level of saline solution in the bottle. The low level of saline solution after the saline bottle reaches its threshold value.

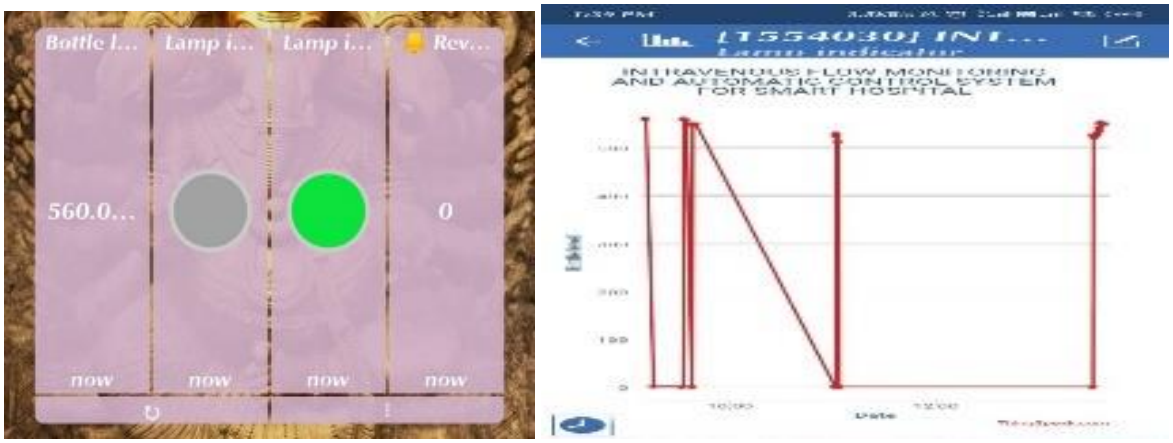


Fig 3: Web page

## VI. CONCLUSION

The patients result such as the number of droplets coming from saline bottle, droplet rate, saline solution given to the patient in milli liter and remaining time to empty the saline bottle can send the data wirelessly to nurse's or doctor's computer and with the help of serial port test software. Nurses can easily monitor the saline level from longer distance. It is mainly advantageous at night timing as there is no need for nurses to go to patient's bed to check the level of flow in the bottle

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Blood Infusion Warmer Using Wi-Fi Indication

**N. Bagyalakshmi[1], D. Praveenkumar[2], R. Shyam Ganesh[2], S. Srivarthan[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Hosur, Tamil Nadu, India

[2]Student,Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Hosur, Tamil Nadu, India

## ABSTRACT

Temperature maintenance is that the prime consideration for the effective and safe handling of the patient. It's very dangerous to directly infuse cool blood in patient because it results in hypothermia disease. To avoid this Blood Infusion Warmer is utilized, The main concept behind this project is to extend the temperature of cold blood almost about the vital sign by using Peltier plate. Thermistor, a awfully suitable temperature sensor with negative temperature coefficient is used employed with the kind of bridge configuration. As, sensing range of the thermistor is in microvolts, directly the error signals are often given as input to the heating circuit because it'll provide insufficient heat production. The device may be fixed on IV panel near the patient bed. ESP8266, a Wi- Fi embedded system on chip module is employed, It's used for the event of IoT embedded applications which is employed to test whether the blood bag is obtainable or not in a very particular slot. Thus, the heated infused blood whose temperature up to the traditional blood is infused within the patient's body.

**KEY WORDS:** Peltier plate, Wi-Fi Module

## I. INTRODUCTION

The normal human body temperature is 37.5°C. The blood is stored at lower temperature to lower the speed and bacterial growth. After a unit of blood is collected, it's prepared then cooled for storage within the bank. When many units of cooled blood are given during a brief time, temperature may drop to threatening level, a condition called hypothermia.The definition of hypothermia is an involuntary visit temperature below 35C. Accidental hypothermia isn't limited to regions or times of severe cold and will occur in milder climates.[1] Symptoms will vary reckoning on the severity of hypothermia. Severity is defined supported core temperature as mild (32 to 35 C), moderate (28 to 32 C), and severe (under 28 C), with some experts also categorizing certain individuals with profound (less than 24 C) hypothermia. More severe symptoms, morbidity, and mortality are related to worsening degrees of hypothermia.[2] Hypothermia is thanks to utilization of anesthetics and cold intravenous fluids. Also, maintaining a surgical patient's normal temperature has been shown to scale back infection, speed healing, shorten hospital stays, and diminish

thepossibility of great heart injury. The motive is to live the temperature accurately. The procedure is minimally invasive, portable and time saving and hence useful in emergencies to beat this problem, the employment of blood warmer became more widespread [3–4]. Thermistor is one in every of the resistance types where it's barrier value changes significantly when natural process [5]. There are two kinds of thermistors, namely PTC and NTC. PTC could be a variety of thermistor which resistance value will increase when there's a temperature upgrading. While NTC could be a style of thermistor which resistance value will decrease when there temperature upgrading. Currently there has been much development of NTC type thermistor, because this thermistor has more widely used for its linear sensitivity if it's compared with PTC. NTC thermistors have applications which will be employed in various fields including, health, nuclear, electronic, and automotive [6]. Blood infusion warmer aims at warming the blood before the transfusion therapy. The blood is warmed to be infused into the body of a patient by warming the infusion pipe. It uses a temperature difference signal that's necessary for proportional heating of the cold blood, that's the difference of two temperatures. The device keeps heating the blood bag till the time it equals the vital sign.

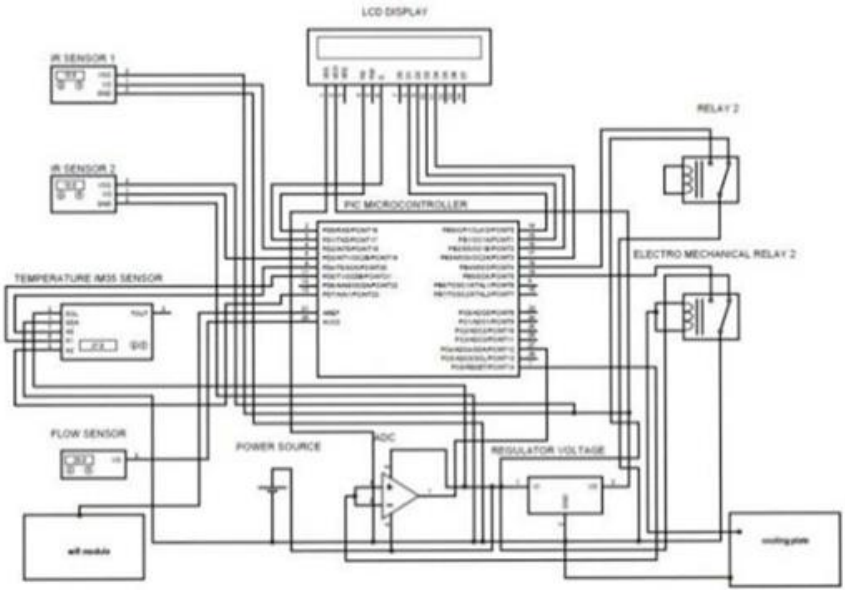
## II. EXISTING SYSTEM

A hot air drier is an mechanical device designedtoblowhotairoverthecoldbloodbag, so as to accelerate the evaporation of water particles and warmth the blood bag. Most models use coils of wire that have a high electric resistivity and warmth rapidly with an electric current. A devotee usually blows ambient air pass the recent coils leading to heatedaireffectivefordrying.Thecomponent may be a coiled nichrome wire that's wrapped around insulating mica heating boards. It's placed inside the fiber box. The ON and OFF of the drier is controlled by microcontroller that's connected there to.

## III. PROPOSED SYSTEM

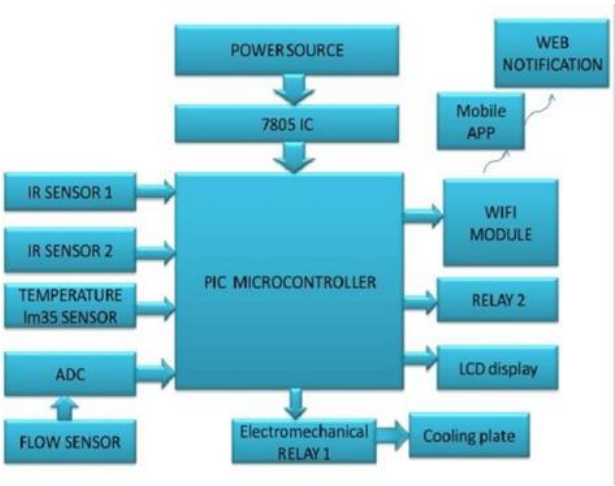
Patienttemperatureissetas37°Cto40°Casdefault and blood bag temperature is sensed continuously using temperature sensor. A PIC microcontroller is used which is connected to LCD for display and hot air drier. The microcontroller controls the working of the drier according to the sensed temperature. Bloodinthebloodbagisheatedtill37°Canditdoes notexceedabove. Controlled heating is provided by this approach. Also we added a feature for knowing bloodavailabilityinbloodbankthroughonlineweb page.UsingIP (internetprotocol) addressforonline pagemonitor.

## IV. BLOCK DIAGRAM DESCRIPTION




Power supply block to give DC supply to IC and other devices. Temperature sensor with bridge to senses the temperature for blood bag temperature and patient body temperature. Flow sensor senses amountbloodflowing.Relayissetfor5soperation. In this time duration blood bag temperature increases to 37.5°C. PIC microcontroller is used which is connected to LCD for display and hot air drier. The microcontroller controls the working of the drier according to the sensed temperature. We can check blood availability in blood bag using webpage.

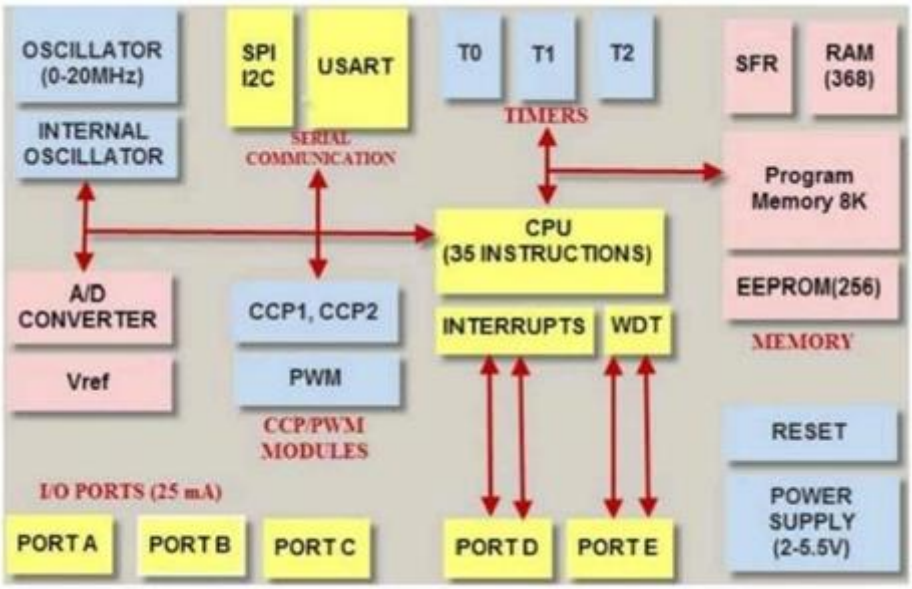
## V. CIRCUIT DIAGRAM




The AC voltage is typically 220V RMS which is connected to atransformer,whichstepstheACvoltage in all the way right downto the extent of the desired DC output value. A diode rectifier then provides a full wave rectified voltage that's initially filtered by using a capacitor filter to supply a DC voltage. The resulting DC

voltage usually has some ripple or AC voltage difference. A regulator circuit removes the ripples and also remains the identical DC value same or not the input DC voltage changes, or the load connected to the output DC voltage changes accordingly. This voltage regulation is sometimes obtained by using one in all the popular transformer Integrated Circuit units.

## VI. PIC-MICROCONTROLLER




The term PIC stands for Peripheral Interface Controller. Initially it was developed for supporting the PDP computers to regulate its peripheral devices, and thus named as a peripheral interface device. These microcontrollers are in no time and simple to execute a program compared with other microcontrollers. PIC Microcontroller architecture relies on Harvard architecture. PIC microcontrollers are very hip thanks to their easy programming, wide availability, easy to interface with other peripherals, low cost, large user base and serial programming capability (reprogramming with flash memory), etc.

## VII. IR SENSOR

Infrared system uses a good style of wireless application. The most areas are remote controls and sensing areas. Within the electromagnetic spectrum, the infrared portion is split into three regions. They are near infrared, far infrared and mid infrared regions.

- Near infrared region ranges from 700 nm to 1400 nm, which are for the IR sensors.

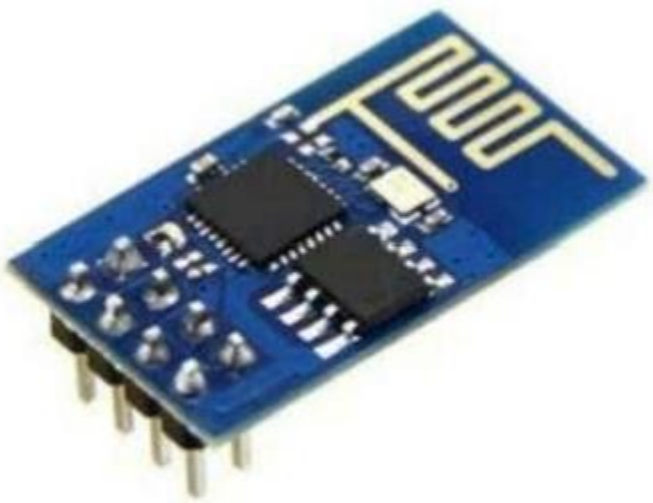
The frequency range of infrared is more than the microwave and lesser than actinic ray i.e.,between the visible light and microwave. 26 for optical sensing and optical communication, photo optics technologies are utilized in the near infrared region because the light is a smaller amount complex than the Radio Frequency when implemented as a source of all signals. Optical wireless communication is completed with Infrared data transmission for brief range application and areas. There are five basic elements employed in a typical

infrared detection system. They areatransmissionmedium, infraredsource, infrared receivers or detectors, signal processing and. Infrared lasers and Infrared LEDsofspecific optical component wavelengthcan beusedinfrared sources.

## VIII. PELTIER PLATE

The Peltier effect may be defined as the temperature difference created by applying a voltage between two electrodesconnectedtoasampleof a semiconducting material.Thiseffectis oftenusefulwhenit's necessary to transfer heat between two mediumson atiny lowscale.ThePeltiereffectisoneamong the three types of thermoelectric effect; the opposite two are the Thomson effect and therefore the See beck effect. Inside a Peltier-effect device, the electrodes are typically product of a metal with excellent electrical conductivity. In the peltier plate one side is cooler and the other side is hotter. When we place the blood bag near to the hotter side it will heat the blood and make it equal to the body temperature and when the temperature of blood exceeds the body temperature then we can place it on the other side to bring it back to the normal body temperature.

**Wi-Fi MODULE**



ESP8266 is a Wi-Fi enabled system on chip module developed by the Espress system. It is mostly used in the development of IoT (Internet of Things) embedded application.

## IX. CONCLUSION

Theproposedprojecthassuccessfullyusedto warm the blood bag under controlled manner. The temperature is measured accurately. The procedure is minimally invasive, portable and time saving and hence useful in emergencies. The novel project explicated here finds its feasibility and application in blood banks and hospitals. Effortsmuststill improvetheprotectionof warming fresh blood transfusion for patients when it's

required in emergency situations. Alarm system and air emboli detectors can be added to the hardware which increases theprotection.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Smart Log Automated Nutrition Monitoring System - Based on IOT

**T. Selva Sherin M. E[1],S. Gomathi[2],K. Elakiya[2], M. Magila[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Dr. M.G.R Nagar, Hosur -635130, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous) Dr. M.G.R Nagar, Hosur -635130, Tamil Nadu, India

## ABSTRACT

Nutrient intake is very important, particularly in infants. When the body is insufficient of essential nutrients, it can lead to serious disease and organ deterioration which can cause serious health defects in adulthood. Automated monitoring of the nutritional content of food supplements to infants, not only at home but also in daycare facilities, it is essential for their healthy development. To address this problem, this paper presents a new Internet of Things (IoT) based fully automated nutrition monitoring system, called Smart-Log, to advance monitoring in smart healthcare. Smart-Log is prototyped as a consumer electronics product that consists of Wi-Fi enabled sensors for food nutrition quantification, and a smart phone application that collects nutritional contents of the food ingredients.

**KEYWORDS:**DPM,BMI,IoT

## I. INTRODUCTION

Monitoring the nutritional supplements of infants and children has becoming an important procedure in present world.This lead to an development of a design to continuously monitor dietary intake and nutritional status of a selected population groups(infants and children)by collecting a variety of data through certain data collection methods .The ultimate goal is to lead policy formulation and action planning. The purpose of nutritional track and estimation is to discover and measure the amount of development made for the nutrition assessment.

## II. LITERATURE SURVEY

Yoshiyuki Kawano and Keiji Yanai (2015) proposed a system to leverage existing knowledge on food of other cultures by a generic “foodness” classification and domain adaptation

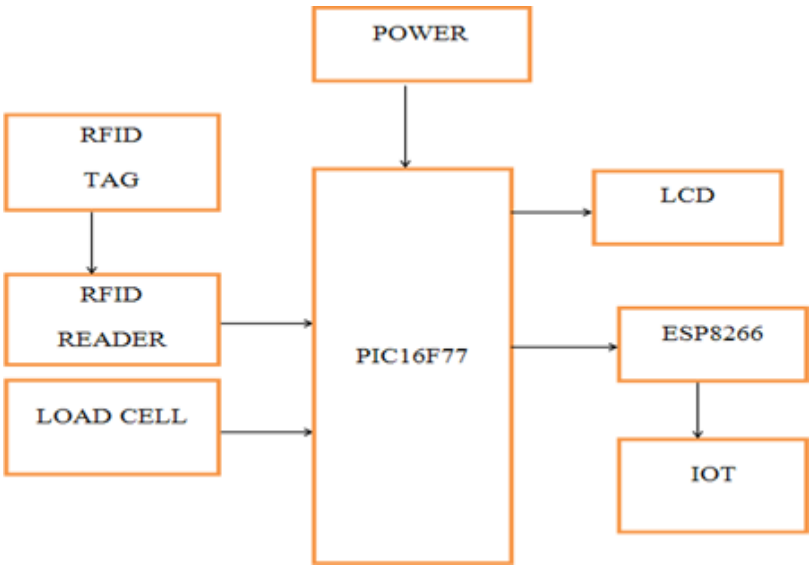
Keiji Yanai et.al., (2015), proposed one of the internal fully connected layers, in conjunction with layer-restricted retraining to avoid retraining the entire network.

Y.Dong (2012) proposed a mobile food recognition system the purposes of which are estimating calorie and nutritious of foods andrecording a user's eating habits. In this there is no need of sending images to a server and can run on a basic smartphone in a real-time approach.

Demetrius Albanes (1987) explained that the relation between total caloric intake, body weight, and tumorigenesis, as well as the independence of these effects from those of dietary fat, Comparing experimental to control groups showed that the former consumed 29% fewer calories,50% les total fat, 1% less protein, and weighed 25% less than control animals. The multiple-food images can be recognized effectively by the two-step method.

## III. PROPOSEDSYSTEM METHODOLOGY

Load cellsensor gives the weight of used food itemRFID is used to identify the kind of food item. Microcontrollercontrolstheoverallsystemandtheweightsensedandtype of food item is passed tocontroller.Algorithm used in the controller is analyze the given data that weight and type of food it calculate the nutrition, calories, vitamins in thefood.To monitor the vitamin levels of infants and the lack of essential vitamins may lead to serious diseases like lack of vitamin A leads to eye blindness, lack of vitamin B1 causes Beri-Beri and calcium deficiency leads to bone weakness.This device can monitor the nutrients in the users diet.This paper is IoT based fully automated nutrition monitoring system. BMI (Body Mass Index) is also taken into account to decide the user's nutritionalrequirements. .




Overload directive is required when overload functions Pointer size was set to only access first bank (PCM *=8, PCB *=5) 47 var16 = NegConst8 is compiled as: var16 = NegConst8 & 0XX rom qualifier is called _rom #device CCS3 ADC default is 8 bits (#device ADC=8) boolean = int8 is compiled as: boolean = (int8 & 1) Overload directive is required overload functions Pointer size was set to only access first bank (PCM *=8, PCB *=5) var16 = NegConst8 is compiled as: var16 = NegConst8 & 0xFF (no sign extension) rom qualifier is called _rom #device CCS4 ADC default is 8 bits (#device ADC=8) boolean = int8 is compiled as: boolean = (int8 & 1) it can overload functions without the overload directive . If the device has more than one bank of RAM, the

default point. Serial I/O functions uses RS-232 like I/O. The hardware serial transceiver must be used . They provide very efficient code for the bit and I/O functions.

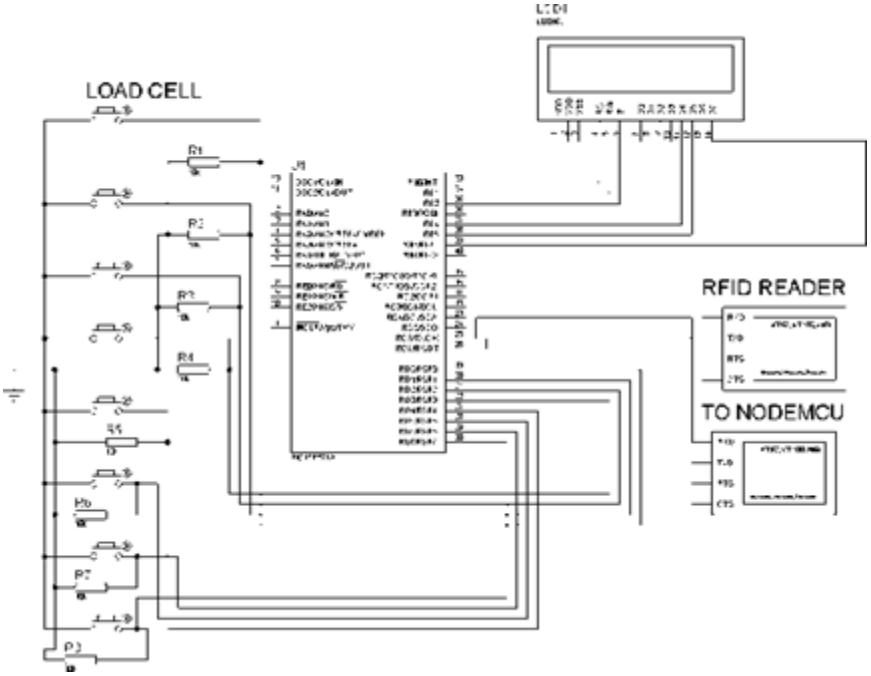
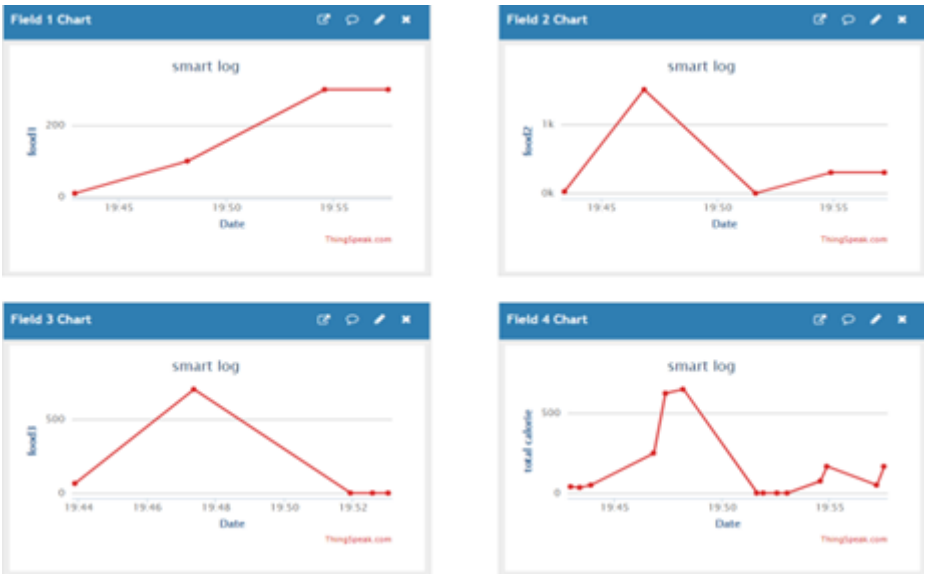



Fig 2 PIN DIAGRAM

## IV. RESULTAND CONCLUSION

In upcoming advancements, it has been shown that visual recognition and machine learning methods have paved way for development of systems that keep tracks of human nutritional supplements. The actual importance of these system depends on the ability of perceiving foods in abandoned environments.



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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# An IOT Enabled Early Warning & Prediction of Foot Ulcer

**Selva Sherin.T, Raguraman.S, Sowmiya.P, Sudha.M**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

Diabetic foot complication is one among the leading causes of non-traumatic lower extremity amputations. Because of diabetic complications like neuropathy, diabetic patients don't feel any of the pain in their feet. Due to this, it's often unaware of any ulcer or wound formed on their feet. Therefore, together with impaired healing of the injuries often escalates into lower extremity amputation affecting patient's socio-economic well-being. By monitoring the various parameters of the foot and using it for predicting possible occurrence of ulcer we aim to avoid occurrence of ulcers. It had been developed a replacement hardware with accompanying software while evaluating the planning to confirm it helps in taking early preventive measures for the feet and avoid the occurrence of ulcer and further complications. Certain efforts had been developed and focused on the individual factors instead of the microclimate of the patients.

**Keywords—**non-traumatic, impaired healing, neuropathy, amputation affects, ulcers, complications.

## I. INTRODUCTION

The initial steps and procedures were taken under care to treat the ulcers of the feet. If there was any small variation in their foot pressure it must be monitored and the patients should take their medications. It helps in the reduction rate of foot ulcer. With the help of current technology, these devices can be placed as an insole in our normal footwear.As it is easy to afford, it can be prevented easily. The normalized foot pressureis measured between 400 to 750 kpa . Patients with pressures below 400 kpa are at danger of developing diabetic foot, and those with pressures below 280 kpa are at an even higher risk. Diabetics are a type of genetic disease that is passed down through the generations. Diabetic foot ulcers can also be caused by being overweight or obese. For those patients, we need to check their BMI (BMI). If a patient's BMI is between 25 and 29.9 kg/m2, it's likely that they're in the early stages of a foot ulcer. Sarahostadabbas.et.al. In the development of in-shoe plantar pressure monitoring systems, I proposed a sensor architectural trade-off. It's solely used to keep track of the process, not to forecast outcomes [1]. ANN paradigms based on real-time recurrent learning will also be investigated, according to Gavin Robertson and colleagues.

Ning Wang Guixiakang the self-monitoring andcontinuous monitoring of blood glucose are considered an important adjunct for achieving and maintaining optimal glycemic control. There are three methods of assessing glycemic control whichprovide distinct but at the same time complementary information.[4].

## II. PROPOSED METHODOLOGY

The causative factor for foot ulcer is the DPN. For the prevention of ulceration and amputation, patient was educated and detected . Patient education and detection should be provided. Better diagnostic procedures should be implemented. Revascularization procedures, wound debridement, infection treatment.. The PIC micro controller is the key element of the entire system, the sensor elements like ultrasonic, load cell, feet force sensor and the user interface unit like LCD, IOT. The ultrasonic and load cell sensors were used to calculate the BMI value with the result comparison, the feet force sensor is used to sense the person pressure level. The blood glucose level is sensed by the glucose sensor. By analysing the entire sensor parameters can predict the foot ulcer with some predefined threshold values. The LCD display will indicates the information's to user with in the place.

Using cloud storage medium they can get information's at any place. PICs are familiaralike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

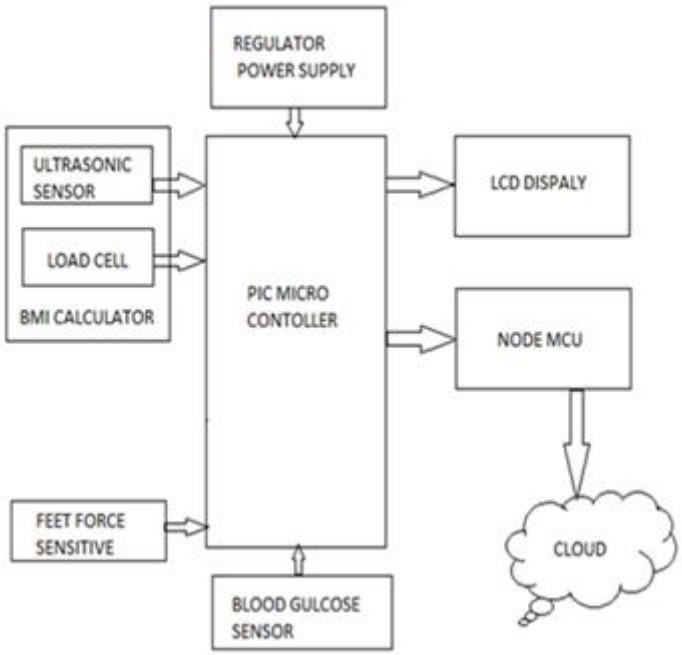


**Fig 1: Block Diagram for proposed system**

**THING SPEAK:** It is an "Application Programming Interface" (API) andweb service for the "Internet of Things" (IoT). While the interpretation is to be done and change over time, here we refer to enabling objects or simple devices to be identified and communicated with via the Internet. The thing Speak API is an open source interface which listens to incoming data, timestamps, and outputs it for both human users and

machines (through easily parse-able code).It look into practical examples using the Arduino micro-controller with graphical interface operating systems through a Python script.

**NODEMCU ESP8266:** The Arduino project created an open-source hardware design and software SDK for their versatile IoT controller. Arduino acts as the microcontroller. Standard interfaces are interacted with the other boards. The Arduino board can have different types of CPU chips with memory chips, and a variety of programming environments.

## III. WORKING

The PIC architecture is characterized by its multiple units Separate code and data spaces. A small number of fixed length instructions. Most instructions are single cycle execution. One accumulator (W0), the use of which (as source operand) is implied and it is not encoded in the opcode. All RAM locations functions and acts as registers source and destination. A hardware stack for storing return addresses.

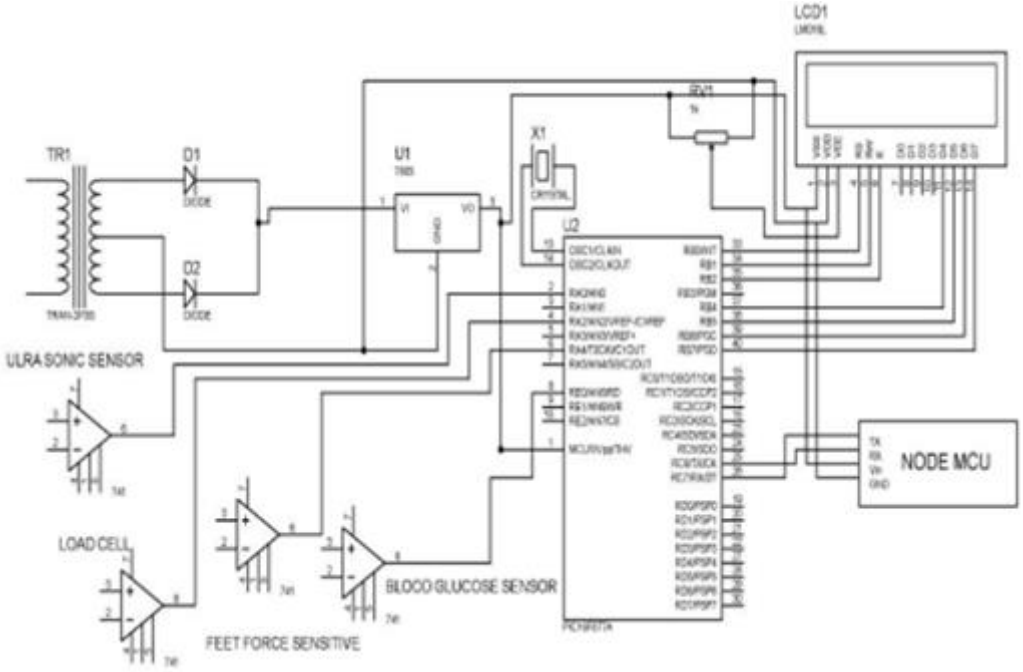


**Fig 2: Circuit Diagram for proposed system.**

For the purpose of connecting an object to the IoT, it isfocused on the Thing Speak API. The interface provides simple communication capabilities to objects within the IoT environment, as well as interesting additional applications (such as Thing Speak, which will be further discussed in a later section). Moreover, Thing Speak allows you to build applications around data collected by sensors. It provides near real-time data collection. Each channel allows us to store up to alphanumeric characters each. There are four dedicated fields for positional data analysis.

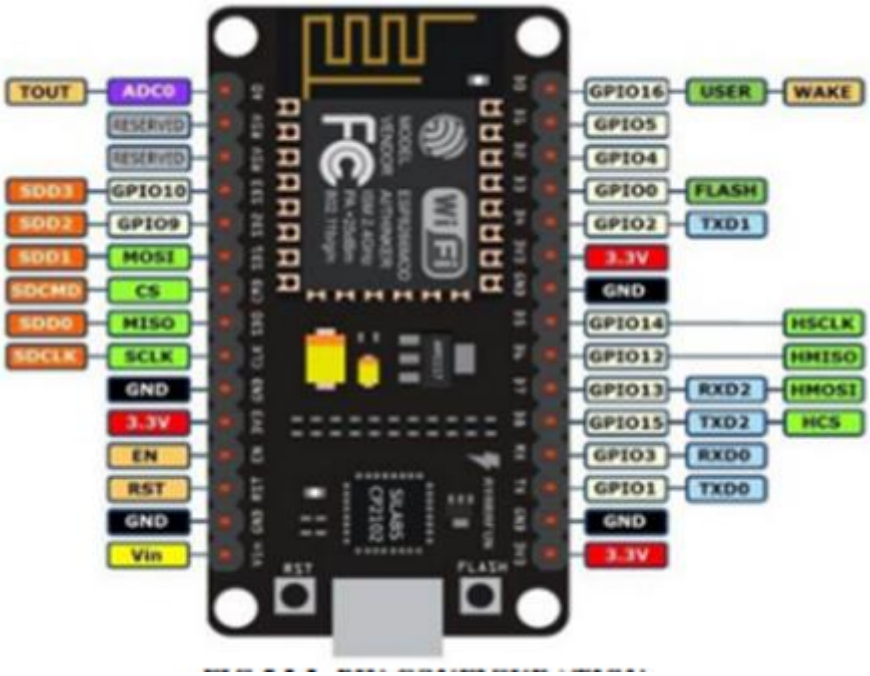


**Fig 3: Pin diagram of nodeMUC ESP8266**

The NodeMCUis an open-source software and hardware development environment built around an inexpensive System-on-a-Chip. The ESP8266, designed and manufactured by Expressive Systems, contains the crucial elements of a computer: CPU, RAM, networking and even a modern operating system and SDK. NodeMCU is an open-sourcefirmware and development.

## IV. CONCLUSION

DFU (Diabetic Foot Ulcers) are debilitate disease with severe consequences in diabetic patients. It is an essential to train the preventive measures as well as foot care to all diabetic patients. The recommendation should be reinforced . The physician should be certain that the patientthe recommendations and is able to care for their feet effectively. They have to be extremely essential to remind diabetic patients to specifically care for their feet.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design And Implementation of Web Camera Based Online Surgical Robot

**Mrs. T. Selva Sherin[1], C. Harani[2], M. Mamatha[2], L. Padmini[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Over the past decade, in the medical field, there has been an exponential growth of robot-assisted procedures and of publications concerning robotic-assisted laparoscopic surgery. Robotic technology is safe and allows more complex procedures in many fields of surgery, at relatively high costs. Although randomized controlled trials in surgery are lacking, robotic surgery might not only reduce morbidity but also be cost effective if performed in high-volume centers. Adequate Training is necessary for safe and effective implementation.

**Keywords:** Robotic technology, smart camera, Magnet.

## I. INTRODUCTION

The existing system uses a pre-fixed anatomical landmark as points of recognition and registration by the computer to allow movement within set confines. The rigid and predictable behaviour of the bone was first exploited. Early surgical robots were computer-aided design/manufacturing (CAD/CAM) systems. RoboDoc (Integrated Surgical systems, Sacramento, CA, USA), first used in humans in incorporated prior two-dimensional fluoroscopic imaging to improve placement and dimensional accuracy of prosthetic implants by robotic drilling and bone preparation. Robotic technology offers the unique opportunity to control and monitor the operational process outside the location, with the skilled and expert operators not being physically present. Probably, more important than the tele-operating features are opportunities for extremely precise, controlled and fatigueless acts of the robot. It replaces human movements that are limited both in time and in space to make complicated processes, more secure and safe. This technology was mainly applied in manufacturing processes but is now becoming increasingly important in machines for personal use. It is expected that the medical field will also start to make increasing use of robotics, after the current surge in the public domain. This dissertation presents the design and implementation of a smart camera robotic assistant to collaborate with the surgeon in a real surgical environment. First, it presents the design of a novel camera robotic assistant being able to augment the capacities of current vision systems. This is based on an intra-abdominal camera robot, which is completely inserted into the patient's abdomen and it can be freely moved along the abdominal cavity by means of magnetic interaction with an external magnet. To provide the camera

with the autonomy of motion, the external magnet is coupled to the end effectors of a robotic arm, which controls the shift of the camera robot along the abdominal wall. This way, the proposed robotic assistant has six degrees of freedom, which allow providing a wider field of view compared to the traditional vision systems, and also to have different perspectives in the operating area.

## II. LITERATURE SURVEY

Kranzfelder. M et.al., (2017) proposed that, although camera control research is applicable in many different tele operation domains, this paper reviews the current state of the art in camera control for tele robotic surgery. It also provides a discussion of potential avenues of research to bring advancements in this field and fulfill the unmet need for improved and intelligent camera control.

Aiono. S et.al., (2012) proposed that there are also a number of robots designed specifically to manipulate a laparoscope, such as the AESOP (Intuitive Surgical), End Assist (Armstrong Healthcare, High Wycombe, UK), FreeHand (Freehand 2010 Ltd., Guildford, UK), and ViKY EP 6 (Endo Control, Grenoble, France). These devices employ various forms of control, such as foot control, voice recognition, hand control, and head tracking. Despite the various forms of control, there is still a one-to-one correspondence between the movements of the laparoscope and surgeon's action.

Schafer. M et.al., (2016) proposed that, the open surgery, where the surgical site is directly viewed, provides a clear 3D view and easier access. Surgeons can see the surgical area and surrounding anatomy from the natural view point of their eyes. Open surgery, however, comes with various disadvantages, this includes a larger incision, sometimes more bleeding, more pain for the patient, and other complications (e.g., adhesions for certain operations) that may be severe enough to require reoperation.

Shah. R.D et.al., (2019) proposed that, some work on optimal visualization for medical robotics was done to ascertain the effects of camera views on surgical tasks using multiple cameras. It was found that using two distinct camera views on two different monitors (one zoomed out and one zoomed in) helps both surgeons and non-surgeons perform complex tasks with fewer errors. While it is not same in the autonomous camera system, the research showed that efficient camera views are important for surgical performance.

## III. PROPOSED METHODOLOGY

The proposed system uses a software system and hardware-based robot, the doctor verifies and manipulates the plan generated by the robot. During the actual operation, the surgeon fixes the femur to the robot base to limit movement and moves the robotic arm to the locator pin locations to complete the patient registration process. The robot system then performs the milling procedure based on the predefined motion plan under the doctor's supervision through online.

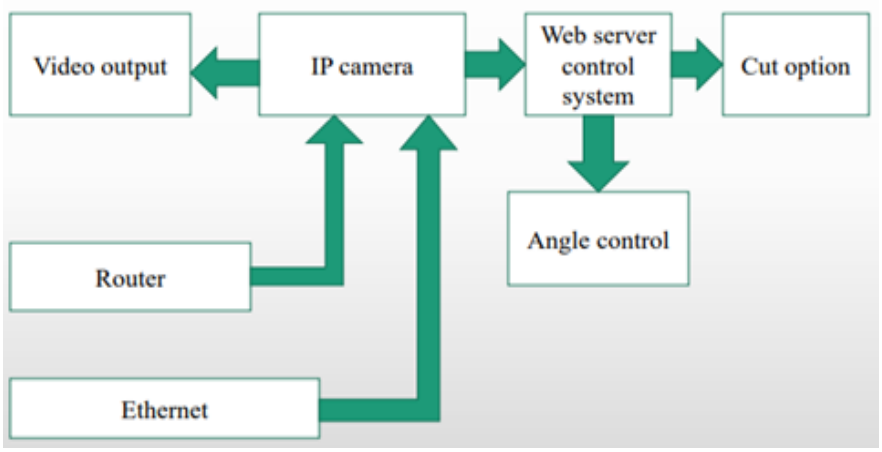


FIG 1: Doctor side

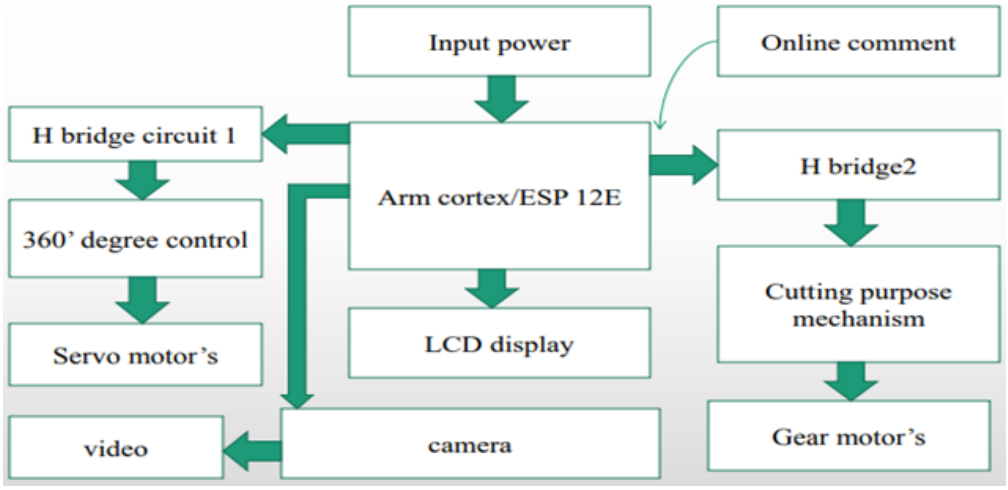


FIG 2: Hardware side

The Wi-Fi module ESP12E is used to establish the network connection for the microcontroller which controls two bridge circuits namely H-bridge circuit 1 which controls the 360° angle movement of the robotic arm using gear motor 1 and H-bridge circuit 2 which controls the upward and downward movement of the arm using gear motor 2 and the closure and opening of the hand using gear motor 3. In order to record and display what is happening at the hardware side which is where the surgery takes place, an IP camera will be connected to the system. It will capture everything that is going on in front of it and sends it to the Doctor side of the system through Ethernet. By seeing the situation through online video transmission the Doctor can decide the action to perform and give the command to the hardware side of the system. The whole control system of the hardware side will be functioned according to the command which is received from the doctor.

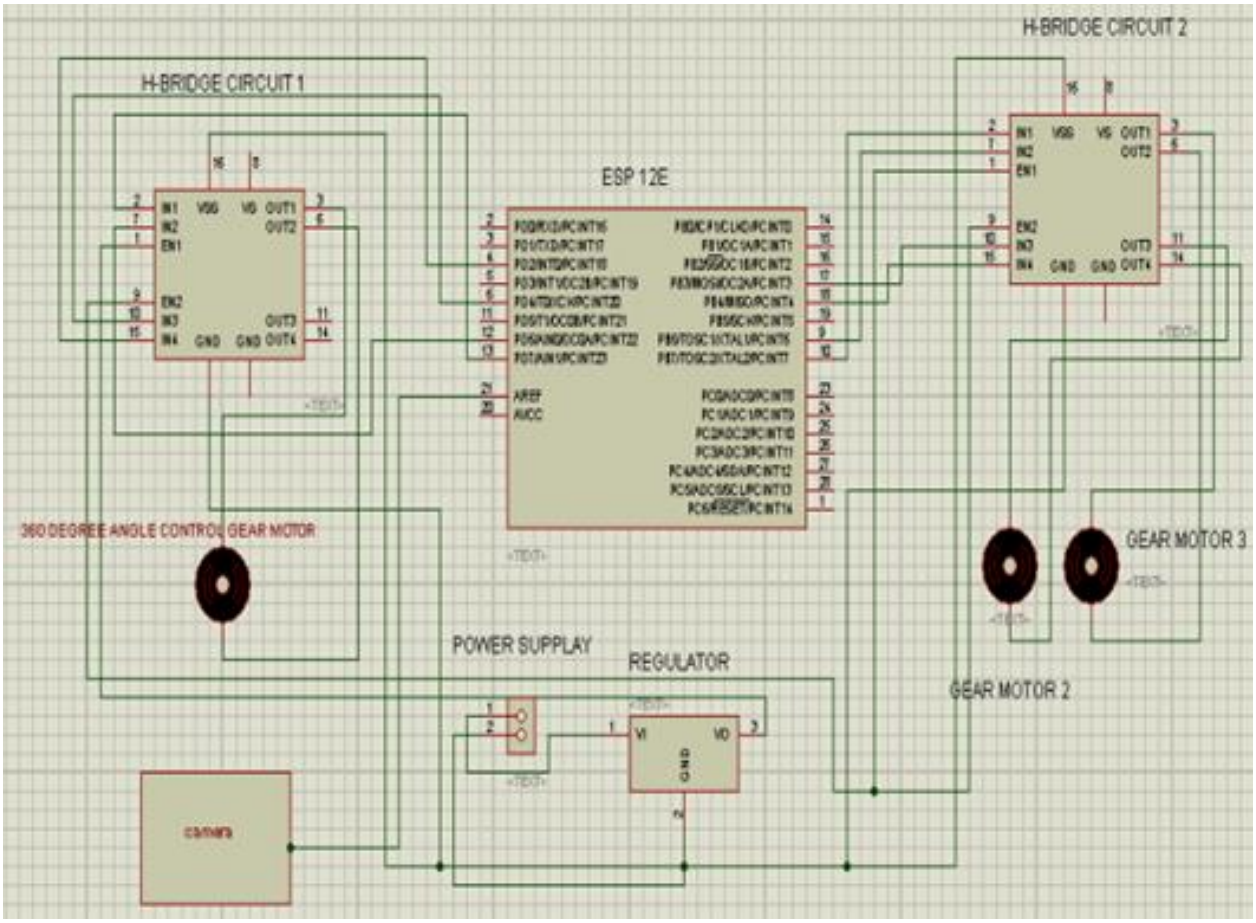


FIG 3: Circuit diagram

At the Doctor side, there will be a web control system by which the Doctor (surgeon) can be able to send the online command to control the system i.e., to perform the surgery. Live streaming of the surgery at the doctor side will enable him/her to perform the surgery effectively. Sometimes the camera can also be connected to router for network connection. In the web server, there will be various options like Move right, move left, move upwards, move downwards, open and close to give the various commands accordingly to the robotic arm at the hardware side of the system. The given online command will drive the whole functioning of the arm to perform the surgery successfully.

## IV. FUTURE SCOPE

Some challenges have been identified primarily as challenges due to limited perception of the robot and surgical site and indirect routes of access, typical of natural orifice surgery, the high number of degrees of freedom in such systems. Technologies such as magnetically actuated robots and capsule robots have enabled new approaches to intervention within the patient body. Despite recent progress made, there are several unmet challenges in terms of actuation, sensing and localization of these systems within the body. Micro robots offer new opportunities for targeted drug delivery, yet their full potential for other applications remains unlocked due to challenges in power, localization, locomotion and biocompatibility.

## V. CONCLUSION

This system enables us to make it possible for a surgery to happen in a particular area which is far away from the doctor who is going to operate. Thus, it helps us to provide effective treatment to the patients even when the specialized doctor is out of station and even the foreign specialists will also be accessible right after, without any time delay due to their arrival from their place to the Hospital. Further, the cases in which there is a chance of spread of infection can also be treated effectively in this type of system without any fear of risking the lives of those who are all involved in treating those cases. So, it will be a best solution in a way, for the current situation by reducing the chances of infection. While providing health care assistance to COVID-19 patients.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Tongue Sensitive Based Voice Command Alerts to The Caretaker for Severe Disabilities Patient

**Selva Sherin T[1],G. Haritha[2],K. Sanjana[2], M. Saranya[2]**

[1]Assistant Professor, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R. Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R. Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

This paper describes the development of a smart system with voice command and sensors using an embedded system. The system is divided into two main modes: voice command mode and sensor mode. For the sensor mode, elder lies or physically disabled people (users) can provide the tongue action input, using conductivity sensor for example, " conductivity top for food", "conductivity bottom for water", "conductivity left for toilet" and "conductivity right for medicine". The voice command will given to caretaker according to the command given in the android smart phone. An microcontroller is used to execute all commands. The HC05 Bluetooth modules are used in this system.

**Keywords:** eclipse software, HC05 bluetooth, AT

## I. INTRODUCTION

Manypeoplearewithdifferentkindsofdisabilities.Itcanbedeaf,blindandwithoutarmsandlegs. Duetothesetypesofdisabilitiesmostofdisabledpeopledependontheirparentsorguardians.Theparentsorguardianssometimewant to get rid of these duties. These problems have some solution, which are discussed in this project. If rehabilitation specialist tries to train these disabled peoples with the proposed mobile application with hardware device. The disabled people guardians will become more comfortable. Assistive Technology (AT) used to increase, maintain, or improve functional capabilities of individuals with disabilities. It encompasses an enormous range of devices, including mobility aids, augmentative communication devices (voice synthesizers and communicationboards),prostheticandorthoticdevices,andamyriadofadaptivecomputerequipment.Itwillhelppeoplewhoaredisabled toimprovetheirqualityoflife,contributeeconomicallyandsocially,andincreasetheirindependence.Duetothepotentialusefulness,the availabilityofappropriateATforpeoplewithdisabilitiesmaybeproblematic.Thereisaspecializedneedsofeachpersonwithadisability,

themarketforoneparticularassistivedevicemaybeexceedinglysmall,drivingupthecostofspecializedassistive devices.

## II. LITERATURE SURVEY

Assistive technologies are most helpful and it is easy for the disabled to communicate their intentions to others and control the environments effectively. It would be enable them to pursue many activities like self-care, educational, vocational, and recreational activities and hence, greatly improve their Quality Of Life[QOL]. These assistive technologies are not only ease to individuals' and also receive some help continuously, and also reducing some healthcare and assisted living costs, so dedicated caregiver is released, and it also help them to be experience and employed active, independent, satisfying and productive lives [1].
Today, it is very effective and powerful speech recognition have been created and developed. Thus it is not a big deal to convert speech or voice into text and text is converted into speech or voice. In this field, lot of work has been done[2].
Tongue operated Assistive Technologies is that they all require tongue pressure and it can cause fatigue and it some chances to scratch the tongue or lips over the long-termusage. Now, recently the touch-based keypad in TTK was replaced by an array of coils which operate to base on changing the coils in resonance frequency by proximity of a tongue is attached by a piece of metal core. Even though this device eliminated the need for physical touch, it suffers from the same limitations as the TTK in addition to being hard wired. In general, peoples are don't like to put large objects permanently in their mouth.[3]
Mobile devices are rapidly introduced with a location determination or Location awareness applications. A very impressive work has been done in this area and improvement in algorithms and technique is rapidly changing and improving. proposed application is very useful for disabled peoples. If provide this application in other word disabled people to use this software, they will be more comfortable in life. The detail of this application is as under.[4].

## III. PROPOSED METHODOLOGY

A tongue operated conductivity sensor based wireless assistive technology has been developed for people with disabilities to lead a self-supportive independent life by enabling them to control their environment using their tongue. This technology works by tracking the movements of a tongue, and utilizing an array of linear conductivity sensors. The sensor outputs are a function of the position-dependentonthetongue.Itwillallowsasmallarrayofsensorstocapturealargenumberoftonguemovements.Hence it provides more conventional method like quicker, smoother and it compared too many existing assistive technologies and other some benefits over the tongue based system are being very low cost, minimal invasive, flexibility and it is easy to operate.

## IV. SYSTEM FUNCTION

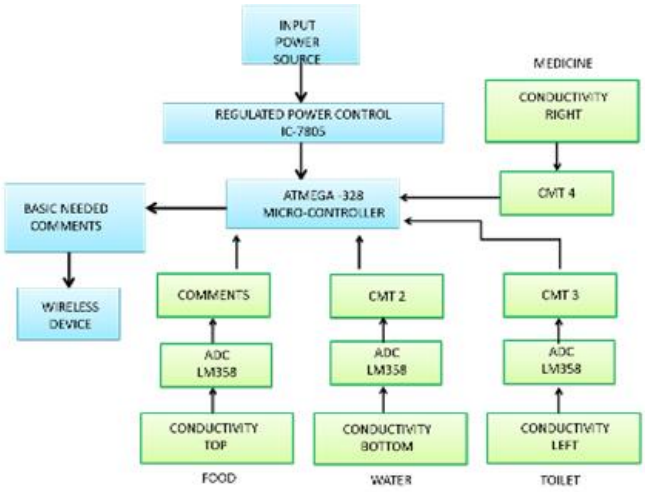


**Fig: Block diagram for tongue sensitive based voice command alerts.**

## V. CONCLUSION

This project is to use smart phone as a tool to help, and improve the living standard of disabled people. An application for disabled persons is proposed which help and monitor their activities. Also how to create useful applications for disabled people with the use of sensors and mobile is introduced. The physically disabled people can provide the tongue action input and the voice command will given to caretaker according to the command given in the android smart phone. This system is designed to fast notification to caretakers.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Alarm System for Bed Exit and Prolonged Bed Rest

**Dr. T.S. Udhaya Suriya M.E. PhD[1], B. Bala suriyan[2], R. Muhes kumar[2], U.Venkadeshaperumal[2]**

[1]Professor and Head, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

The pressure ulcer or decubitus ulcer is a illness instigated by pressure applied to the body surface for a certain period, consequential in blood flow insufficiency. To prevent pressure ulcers, it is necessary to conversion the patient body position at consistent interims. However, the physical liability of the patients is increasing to fully execute this patient-repositioning due to several reasons like the aging of the patients, the busy schedule of the future generation, etc. This project is offering a method to lower the incidence of pressure ulcers (bed sores) in debilitated patients. Smart air mattress support zones on each side of the mattress which is self-reliantly controlled by pressure sensor support. The mattress can automatically make pressure and positional reforms to avert patient injury and pain. A Force Sensitive Resistor (FSR) sensor senses the pressure data which is being processed by an At mega 328pu controller to inflate or deflate an air mattress.

**Keywords:** patient-repositioning, force sensitive resistor, anti-bedsore mattress, blood flow.

## I. INTRODUCTION

to Wounds formed on the skin that covers bony areas of the body are called bedsores which is caused due to long-term confinement to bed. They are also called pressure ulcers and decubitus ulcers the injuries to skin and fundamental tissue resulting from prolonged pressure on the skin. Bed sores are one of the most unnoticed medical problems in most of the patients with moving disability. It is inferred from that the existing methodologies moving the patient from left to right and right to left by influence of the human body gives relief to a particular extent. Sometimes the wound is analyzed by a multimodal sensor and a three-dimensional image of the wound is taken for assessing the treatment. Timely change in the posture of the patient may have great effect in preventing the bedsore. This project discusses about the design of a mattress with hassled tubes which inflates with very low displacement. Moving or turning the patient is the vital key in preventing bed sores but, patient may feel scratchy while the patient is turned from left to right or right to left. But our model eliminates the discomfort by providing very less movement of the stretchy tubes. Also our system uses tilt sensor to detect the position of the patient to ensure that they are in bed and not fell down.

Also the temperature sensor (DHT11) sensor is used to measure body temperature of the patient and if those limits found to be high, the system will alert the concerned person through SMS alert using GSM module. The alert message will also be generated and sent when the pressure is detected as very high in the patient's body.

## II. LITERATURE SURVEY

Mattress relieves the body pressure however also produces a seasick-feeling due to water movement, leading to immense discomfort to the patient. Physiotherapists suggest regular reintegration activities are necessary and delayed mobilization [1].

The patients who are unable to change their position like the ones who are obese; they are highly furthered from this mattress [2].

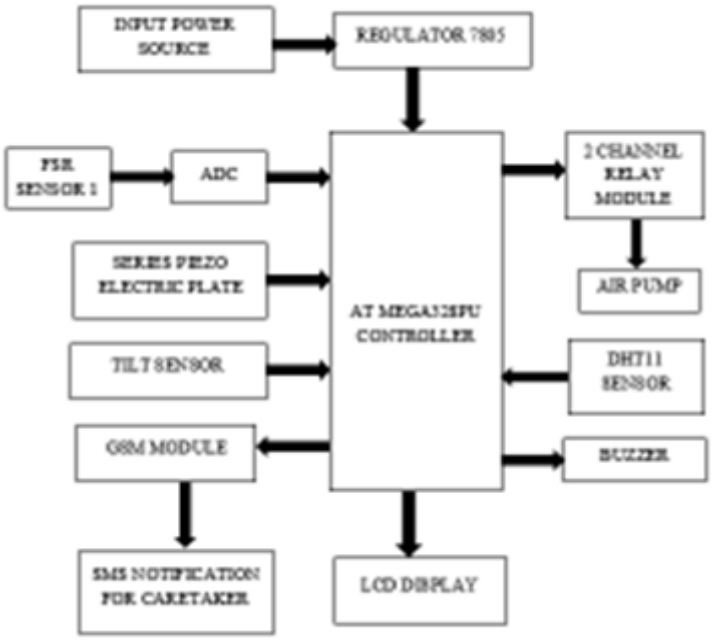
It is necessary to give a sense of relief to caregivers by reducing their physical and mental liability. To provide such a nursing environment, scientific development must be done to develop a mattress that has an inbuilt pressure sensor with a constant closed-loop feedback system by automatically adaptable the mattress tension to fit the body posture of the patient [3].

Severe physical confines like back problems, spinal cord injury would greatly benefit from a technology that has pressure redistribution surface support. A smart bed is able to redistribute the patient body forces to maintain complete equilibrium on all regions[4].

Smart body pressure dispersion mattresses are very helpful tools for the prevention of pressure ulcers. For the treatment and prevention of bedsores, two forms of pressure dispersal mattresses are presently available in the market: water surface mattresses which are composed of urethane foam and the other one called "active support" surface mattresses, which uses a combination of air cells [5].

## III. PROPOSED METHODOLOGY

In this project, a design of mattress for patients suffering from pressure ulcer has been proposed. When patients are lying in the bed due to their infirmity or disorder, the body cells do not function properly and leads to rotting because the body is pressurized and there is no circulation of air. This design helps in lifting the patient body in a periodic manner in order to prevent decay and hence the formation of ulcers is prevented. The most important is that patient does not feel any discomfort in the body when the movement is made. The anti-bedsore mattress was intended using materials such as flexible tubes. The continuous movement of the mattress was made and tested by giving air pressure. Inflation and deflation of the tubes were good.

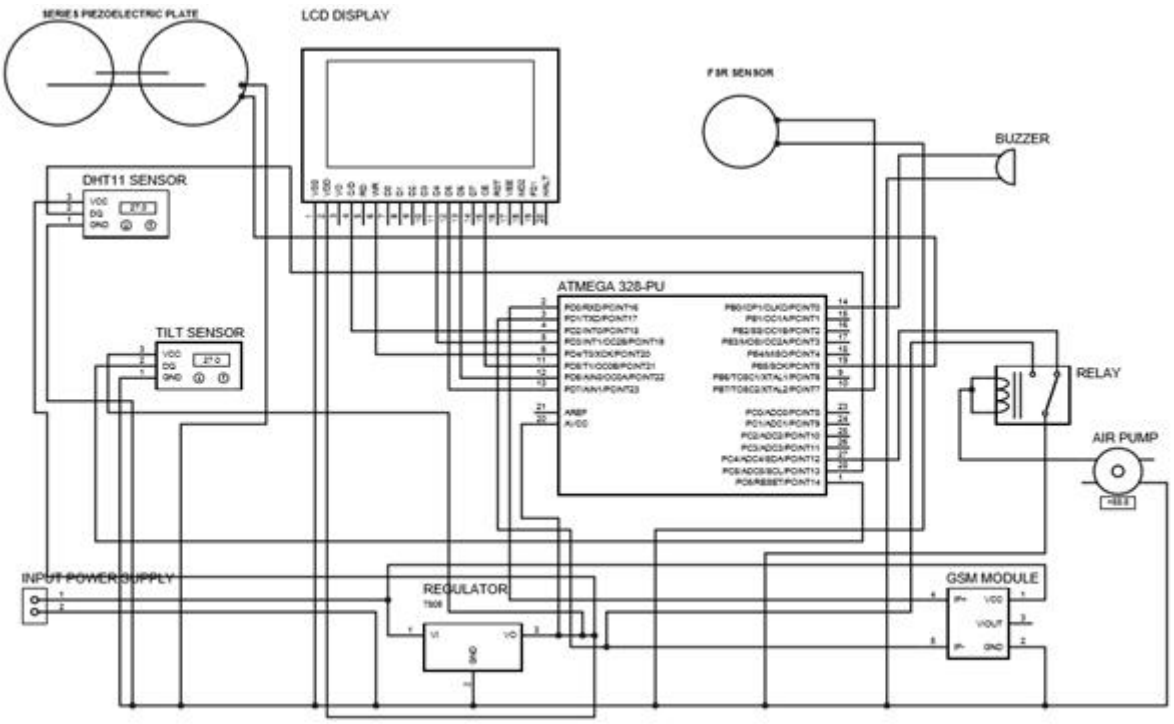



## BLOCK DIAGRAM

Input power is given regulator 7805, two sensors are used FSR and tilt sensor. This FSR will vary its resistance depending on the pressure being applied to the sensing area. The resistance of the FSR is inversely proportional to the pressure applied. Tilt sensors measure the tilting position in multiple axes with reference to gravity. ADC is used to convert the analog signal from FSR to digital signal, they are given to AT Mega 328pu controller, this is used to control the device and is given to 2channel relay module, when the temperature of patient body goes high, buzzer produces the sound and is displayed on LCD display, DHT11 sensor senses and allows air to be pumped by air pump. As soon as the buzzer produces the sound the evidence will be sent to the care taker in the form of SMS with the help of GSM module.

## IV. WORKING

When a patient falls down from the bed, a message will be displayed on the LCD and an SMS will be sent to the caretaker from the GSM. When a patient takes rest for long time on the bed it causes tissue pressure and also the temperature increases then again a message is displayed on the LCD screen and SMS will be sent to the caretaker from the GSM module .




CIRCUIT DIAGRAM FOR THE PROPOSED SYSTEM

## V. CONCLUSION

The proposed system for the anti-bedsore mattress was designed using materials such as flexible tubes. The continuous movement of the mattress was made and tested by giving air pressure. The prototype gave the required movement for every one minute and was able to withstand the pressure provided to the tubes. Inflation and deflation of the tubes were good. Further the use of DHT11 sensor ensured the continuous monitoring of the patient's body temperature. The patient's position is also monitored by the use of tilt sensor. And SMS alert was successfully generated and sent to the respective person through GSM module. The pressure is continuously managed in this system to avoid the development of pressure ulcers and bed-sores for patients. Thus our model successfully served the purpose of the design and satisfied the mentioned objective.

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# Security System Using Near Field Communication Technique to Prevent New Born Kidnapping / Swapping In Hospitals

**Mr. C. Sathish Kumar[1], V. Ajay[2], S. Hari[2], S. Gopalrathinam[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

Currently, the most common approach to identifying newborn in hospitals relies on the information band attached to baby's wrist.Although newborn abduction in pediatric area of hospitals happens at a low probability normally overlooked, its impact can be devastating for families and healthcare staff. To improve newborn security in hospitals, this project developed an NFC (Near Field Communication) based system integrated with IR sensor and real-time camera. The system uses infrared sensor attached near the baby, to ensure the presence of new born. Whenever a person with unauthorized NFC tag or even without the tag tries to take the child from cradle, the NFC reader in the cradle would reads the tag and detects the abnormal case and if there is no tag, the reader will read nothing but IR sensor will sense that the child is being taken from the place. In that case, the camera will capture the face of the person who is taking the newborn. Further, this system uses face detection and recognition technique to check whether the person is authorized or not. Faces of parent, Doctor and caretakers (nurses) will be pre-stored in the database and when one of them comes near the cradle, nothing happens and if person other than those, tries to take the newborn, their face will be detected as face not in database. Then, the camera will capture the face which is then sent to mail by using SMTP protocol. It will provide an economical approach to digital hospitals, improving newborn security and hospital management in general. Thus, our system prevents baby kidnapping and swapping in hospitals which is psychologically stressful for both parents and hospital management.

**Keywords:** NFC Device, Camera, IR Sensor

## I. INTRODUCTION

The system consists of one camera and NFC device for providing real time security against culprit who lifts the baby from cradle. Additionally a IR sensor is used for monitoring the baby present in cradle or not. In this system the real time monitoring of authorized and unauthorized person which will be easy to find out the person who lifts the baby from cradle.

The message will be generated in the form of E-mail which will be having the snap of the unauthorized person to notify the parents or guardian.

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Combined RFID with images to locate the children's position in kindergartens and this system can raise alarm to nursing staff when children are in dangerous area. Saranya et al. uses the ARM processor, GSM and GPS chip, sound playback chip to constitute children devices.[**1**]. The system includes atmega controller, Global positioning system, (Global Syatem for Mobile communication), Voice recognition develop module, Radio Frequency Identification, ATMEGA644 controller. **[2].** In this paper the new born babies are monitored continuously to prevent the mismatch due to the lack of different features in them. This is done using the Radio Frequency Identification and Wi-Fi modules. This is identified by the unique ID from the tags attached to the infant. **[3].**

This paper presents the tracking system which is used to monitor the child with the help of the RF Signal and is used for indoor calculation for the safety purpose. The Data can be transferred and received with the help of the RF Module and also it may affect due to the external radiation waves. **[4]**

## II. PROPOSED METHODOLOGY

The proposed system of our project using NFC tag and receiver and camera for unauthorized person recognition. In which we are using face recognition techniques and we are going to interface sensor and NFC scanners with the controller .Firstly we are implementing camera on the room and that camera will be interfaced with the system. It will monitor the baby continuous, the images of the parents, doctor, nurse and relative images can be trained and stored in database.

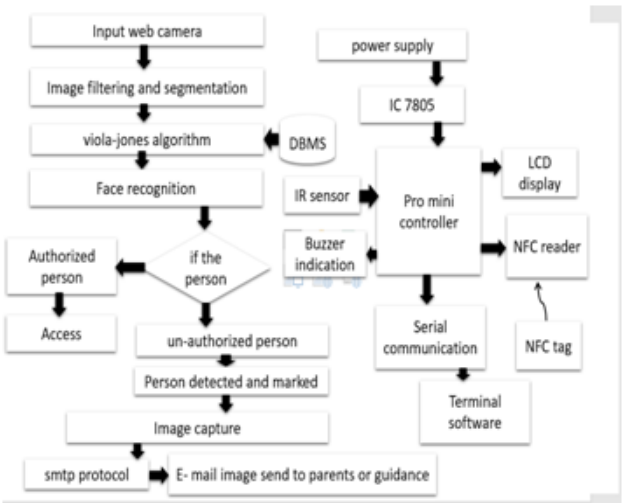


Fig.1 Flow chart

If any unauthorized person trying to swap the baby from cradle this system detect the unauthorized person compared with stored database image based on face recognition technique and camera will capture the unauthorized person image and sent to email to parents and authorized person by using SMTP protocol. Then we are using a passive NFC tag is prepared by writing specific information to the NFC tags are readable. Whenever a person with unauthorized NFC tag or even without the tag tries to take the child from cradle, the NFC reader in the cradle would reads the tag and detects the abnormal case and if there is not registered tag is presented means sound alert will be activated .Even we are using IR sensor which will continuously monitor the new born present in the cradle which will be displayed on LCD display screen, and if the baby is not present in the cradle the buzzer sound indication will be activated.

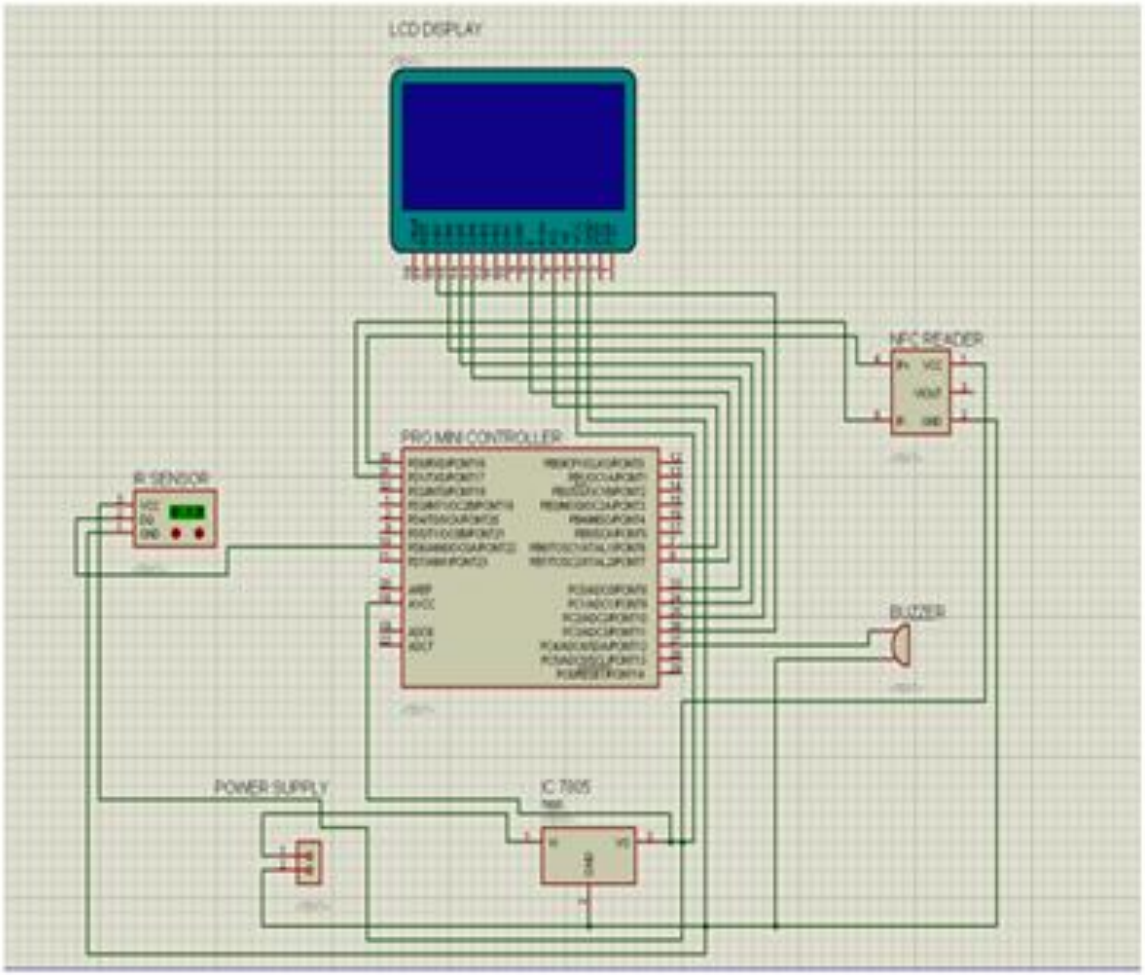


Fig.2. Circuit diagram

The Viola-Jones algorithm is the first ever real-time face detection system. To enable a fast and accurate detection there are three ingredients working in concert i.e.an attentional cascade for efficient computational resource allocation, intergral image for feature computation and an adaboost for feature selection. Here we propose a description, a learning code and a learned face detector.Post-processing step isproposed to reduce detection redundancy using a robustness argument.

## III. RESULT

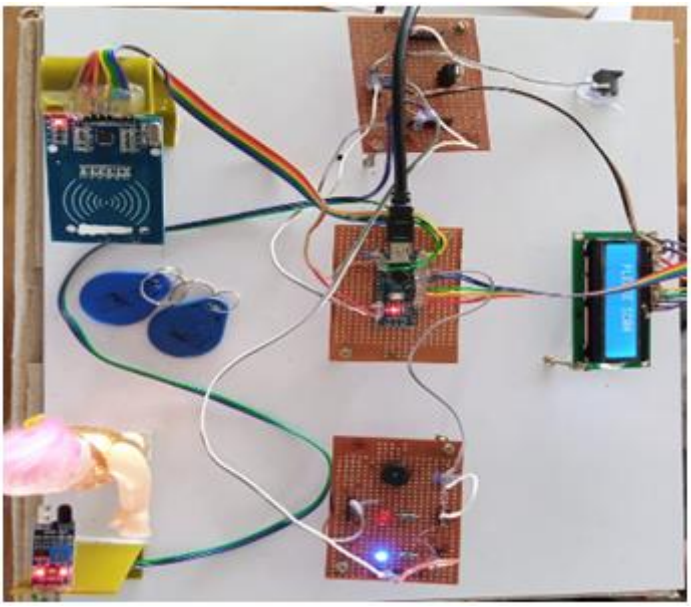

Fig.3. Prototype


Output

This research performs preliminary study on using automatic face recognition algorithm has been proposed that extracts local texcture features from different levels of Gaussian smooth images.

## IV. CONCLUSION

Baby swapping/kidnapping are very important problems across the world.Face detection and NFC technology have been evaluated to reduce the number of such incidents.This research performs preliminary study on using automatic face recognition algorithm has been proposed that extracts local texcture features from different levels of Gaussian smooth images. Experimental results on a data base of images show that automatic face recognition for authorised is feasible. The NFC technology is also been implemented in this project.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Implement of Advanced System of an Insulin and Glucagon Pump

**Bagyalakshmi.N[1], Soumya.V[2], Gowri Shankar.G[2], Vasanth Kumar.S[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Students, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Diabetes is an incurable disease where the body is not able to maintain the blood sugar level as the glucose in the blood is not utilized due to the destruction of the beta pancreatic cell of the liver. Blood sugar level of body is a very important factor for health and it should be maintained within the desired level or else this would result in complications and often serious damage to the body.Therefore proper treatment is necessary when there are fluctuations in the sugar level.In case of high blood sugar insulin should be administered to the patient and in case of low blood sugar glucagon should be administered to the patient. This project is concerned on advanced method of simulation that can be used to implement real insulin and glucagon pump that can work in real time to prevent the fatal effects of diabetes on body. This project aims at providing highly safe delivery without affecting the biological system of the patient body. To provide better insulin and glucagon management and to reduce the need for human supervision, we have implemented a control algorithm for the insulin and glucagon pump to automate the delivery process. The control algorithm adapts to the glucose metabolic rate and determines the appropriate amount of insulin or glucagon to be delivered into the body.

## I. INTRODUCTION

[1]According to World Health Organization survey, the number of people with diabetes has risen from 108 million in 1980 to 422 million in 2017. Globally, the prevention of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2017.The number of diabetic patients are increasing in the low income countries.[2]Diabetes imposes an increasing economic burden on national health care systems worldwide.Almost half of the deaths that occur due to diabetes are due to high blood glucose level. There are several attempts in the past by researchers in creating a artificial insulin delivery system. One of the main approaches of the project is to develop an automated closed loop insulin delivery system. A fully automated closed-loop insulin delivery system (also known as an artificial pancreas) could be an ultimate solution for blood glucose (BG) control in diabetic patients. This system is an artificial model of the human pancreas that maintains the normal blood glucose level and normal body conditions. [3]Such an artificial pancreas system

can theoretically produce tight glucose control without finger-stick BG measurements, subcutaneous insulin injections, or hypo-glycaemic /hyperglycaemic events, thereby, dramatically improves the quality of life for an insulin-dependent diabetic patient. The artificial pancreas is a system of integrated devices containing only synthetic materials, which substitutes the need of the original pancreas by sensing plasma glucose concentration, calculating the amount of insulin required, and administering the accurate amount of insulin. Typically, such a device is comprised of a glucose monitoring sensor, an insulin pump, and a control algorithm to regulate the pump to deliver no insulin in order to maintain normal glycaemia in presence of sensor measurements.

## II. LITERATURE SURVEY

[1]National Diabetes Statistics Report, released in 2014 by Centre for DiseaseControl and Prevention (CDC), highlighted about diagnosed and undiagnosed diabetes. In 2012 there were 28.9 million people aged 20 years or older in United States who was diagnosed with diabetes.

[2] American Diabetes Association, Diabetes Care, vol 37.Diabetes mellitus is a complex illness to require continuous medical care.Providing proper awareness and support to patients in diabetes are to prevent acuteComplications and to reduce the risk of long-term complications.

[3] M. Shichiri, H. Kishikawa, Y.Ohkubo, Glycaemic control is a key component of effective diabetes management, and the maintenance of near-norm glycaemia is critical to minimize the risk of developing the micro vascular and macro vascular complications that are generally associated with diabetes. Although, most number of patients already know that the tight glucose control is very essential. However, they still fail to monitor their blood glucose level in actual clinical practice because of the frequent and painful finger stick tests.

[4] http://www.edn.com/design/medical/4422840/Non -invasive -blood - glucose - monitoring -using -near - infrared –spectroscopy In this type of article we have to presented a non-invasive blood glucose meter that can provide the measurements of glucose painlessly, without a blood sample or finger pricks, within a few seconds. The type of devices can be easily adapted to provide continuous blood glucose level and blood glucose monitoring and maintain a history of these measurements.

[5] S. H. Golden, T. Sapir, To (a) educate health care professionals on the findings from AHRQ's 2012 comparative effectiveness review in glucose-monitoring modalities in patients with diabetes and glucose delivery; (b) to apply review findings to make treating conditions in clinical field; and (c) to identify shortcomings of research in currents and future directions relating to the comparative effectiveness of insulin delivery and glucose-monitoring modalities for patients with diabetes.

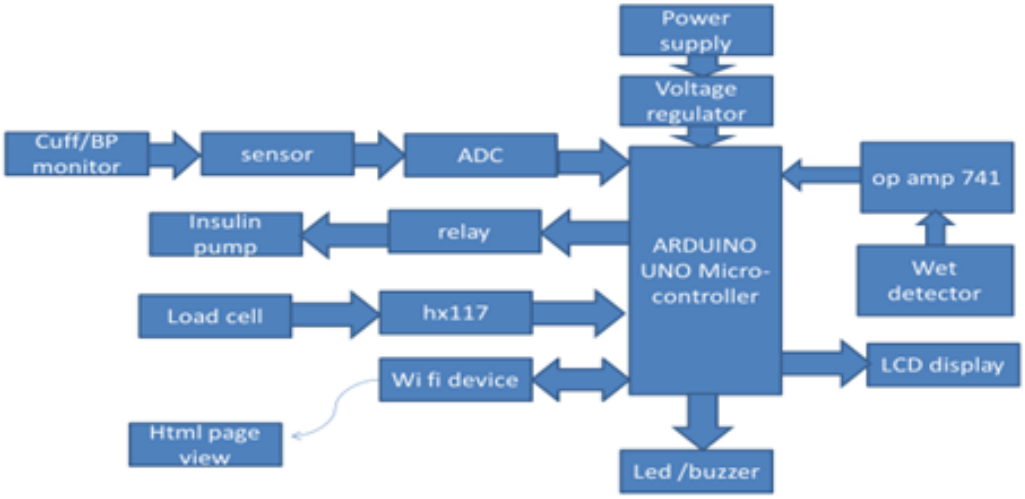
## III. EXISTING SYSTEM

The system begins with a microcontroller unit having an analog voltage input that's derived from a calibrated linearity curve relative to it of glucose concentration; the microcontroller algorithm processes the

information and determines whether an output of insulin or glucagon is required. The output of the microcontroller unit may be a time variable pulse which depends on the glucose concentration reading. The proteus software test for the microcontroller unit indicates that the algorithm may be wont to properly read glucose concentrations and supply an output accordingly.

## IV. PROPOSED SYSTEM

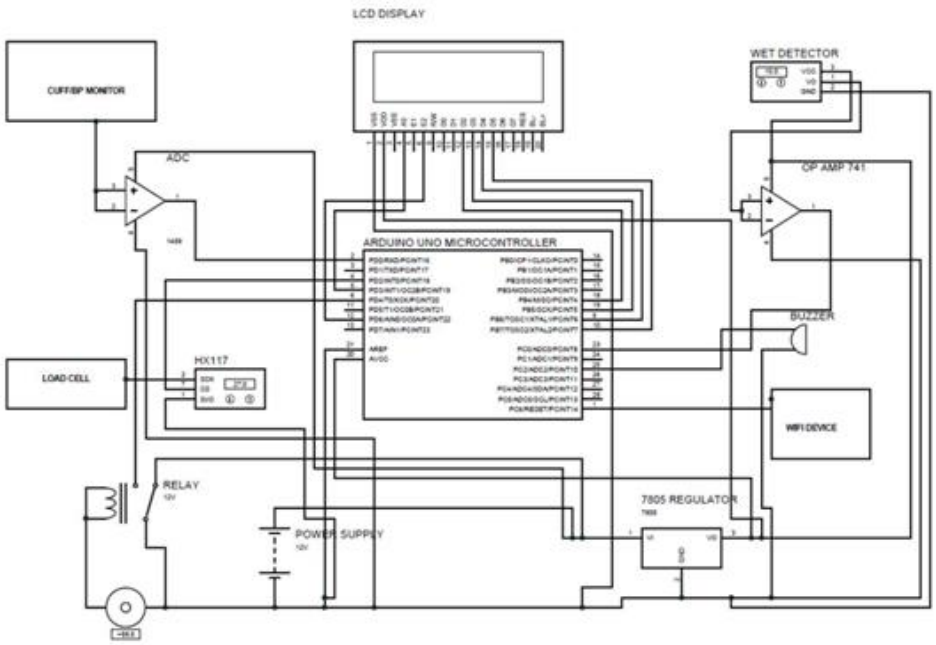
There is a specific amount of insulin that a body can absorb in a day in a specific rate of absorption. The glucose and body weight data can be stored in online data base. Weight and BP level of the patient will be display in LCD display. Patient's daily routine can be monitored. Normally glucose level is detected via blood but in this Wet detector (detected through sweat) is used for glucose level monitoring. Load cell and hx117 is used for weight measure. Centrifugal pump is used for inject the insulin to the patient. Think speak web page is used for online data storage in addition to this we also developed the mobile app widget.




### Block diagram

The block diagram consists of Arduino UNO, wet detector, load cell, relay, BP cuff, ADC, sensor, voltage regulator, op amp 741, LCD display, hx117, and power supply. The wet detector detects the blood glucose level through sweat on the skin and then sends the signal to the LM741 to the Arduino UNO. The Arduino UNO Microcontroller sends alert to the connected patient mobile through Wi-Fi. Think speak web page is used for online data storage. Now the patient switches on the insulin pump. The BP is measured through BP cuff monitor. That senses through sensor and to the ADC converter which converts analog into digital. BP level of the patient will be display in LCD display. The weight of the patient is weighed through load cell. The load cell detects the weight of the patient that is send to the hx117 sensor to the Arduino UNO Microcontroller.

## V. CIRCUIT DIAGRAM




**Circuit Diagram**

The Circuit diagram describes that Arduino UNO Microcontroller has 14 digital inputs – output (I/O) pins. Out of these 14 pins, 6 can provide 8-bit PWM output i.e. 3, 5, 6, 9, 10, and 11. Arduino Uno has 6 analog input pins. The digital pins are operated at 5V and it can give the output of 20mA. The circuit diagram consists Uno controller board, LCD display, WI FI module; load cell, BP monitor device, and glucose level monitor device, insulin pump and power supply. LCD display VDD pin is connected to controller GND pin. VCC pin is connected to 5V. LCD enable pin is connected to controller D3 pin, and 5 pins are connected to controller (D2, D4, D5, D6, and D7). Glucose sensor output pin connected to B0 pin. Positive pin is connected to controller 5v pin, GND pin connected to GND. Load cell pins are connected to HX117 has connected E+, E-, A-, A+ pins, HX117 has 4pins they are ground pin, data pin, SCK (serial clock) pin, VCC pin. VCC and GND pins connected to positive and negative pins. Data and serial clock pins connected to D8 and D9. BP device output pin connected controller Analog pins A0. WI FI device glucose analog pin connected to wireless device A0.

## VI. SYSTEM MODULES

**Arduino microcontroller:**

Arduino is an open-source prototyping platform in electronics supported easy to use hardware and software. Subtly speaking, Arduino may be a microcontroller based prototyping board which might be employed in developing digital devices which will read inputs like finger on a button, touch on a screen, light on a sensor etc. and turning it in to output like turning on an LED, rotating a motor, playing sounds through a

speaker etc. The Arduino board are often programmed to try to do anything by simply programming the microcontroller on board employing a set of instructions that, the Arduino board consists of a USB plug to speak along with your computer and a bunch of connection sockets which will be wired to external devices like motors, LEDs etc.

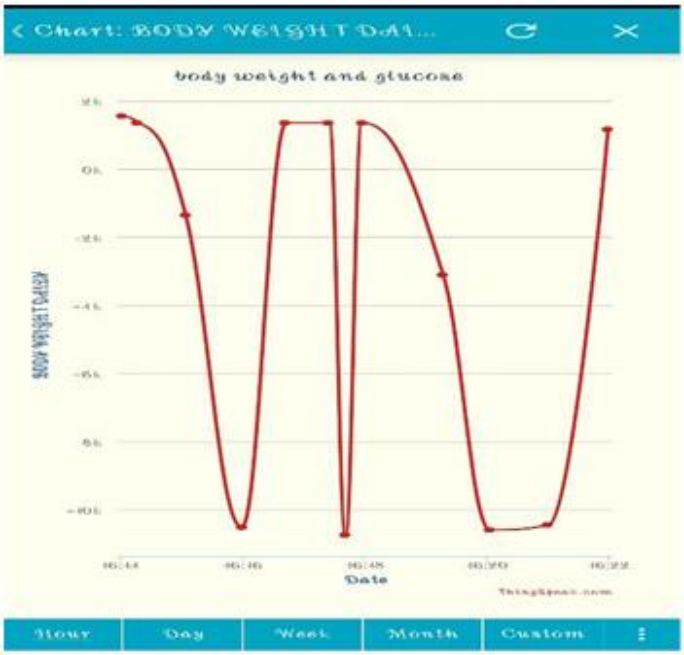
**Working:**

A simple electromagnetic relay, like the one taken from a car within the first picture, is an adaptation of an electromagnet. It consists of a coil of wire surrounding a soft iron core, an iron yoke, which provides an occasional reluctance path for magnetic flux, a moveable iron armature, and a set, or sets, of contacts; two within the relay pictured. The armature is hanged in to the yoke and mechanically linked to a moving contact or contacts. It's held in situ by a spring in order that when the relay is de-energized there's an air gap within the magnetic circuit. During this condition, one in every of the 2 sets of contacts within the relay pictured is closed, and therefore the other set is open. The relay within the picture also encompasses a wire connecting the armature to the yoke. This ensures continuity of the circuit between the moving contacts on the armature, and therefore the circuit track on the computer circuit Board (PCB) via the yoke, which is soldered to the PCB. When an electrical current is more established the coil, the resulting magnetic field attracts the armature, and therefore the consequent movement of the movable contact or contacts either makes or breaks a reference to a hard and fast contact. If the set of contacts was closed when the relay was de-energized, then the movement opens the contacts and breaks the connection, and contrariwise if the contacts were open. When the present to the coil is shifted, the armature is returned by a force, approximately half as strong because the attraction, to its relaxed position. Usually this force is provided by a spring, but gravity is additionally used commonly in industrial motor starters. Most relays are manufactured to control quickly. In an exceedingly low voltage application, this is often to scale back noise. During a high voltage or high current application, this is often to scale back arcing. If the coil is energized with DC, a diode is usually installed across the coil, to dissipate the energy from the collapsing field of force at deactivation, which might otherwise generate a high voltage dangerous to circuit components. Some automotive relays already includes a diode inside. Alternatively, a contact protection network, consisting of a capacitor and resistor serial, may absorb the surge. If the coil is intended to be energized with AC, a small copper ring is crimped to the tip of the solenoid. This "shading ring" creates an outof-phase current, which increases the minimum pull on the armature during the AC cycle. By analogy with the functions of the first electromagnetic device, a solidstate relay is created with a thyristor or other solid-state switching device. to attain electrical isolation an opto-coupler will be used which may be a semiconductor diode (LED) in addition to a photograph transistor.

## VII. RESULT AND DISCUSSIONS

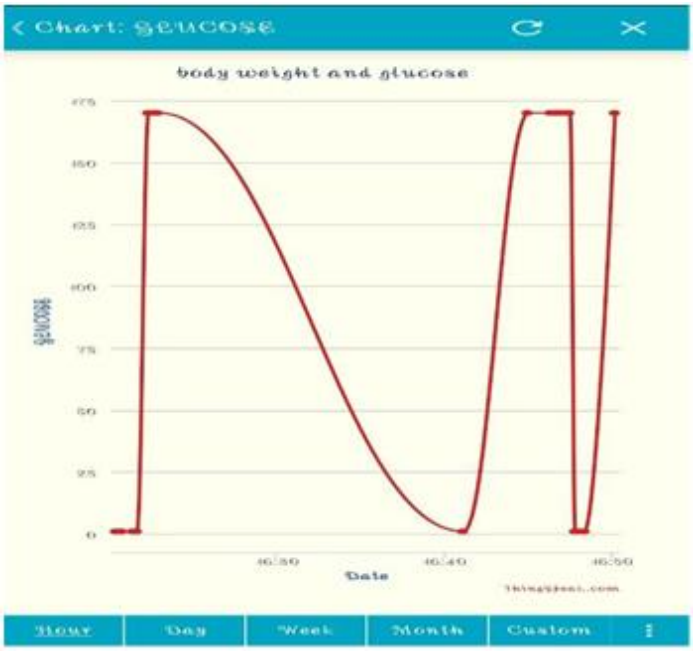
In this project, advanced method of simulation that can be used to implementa real insulin and glucagon pump that can work in real time to prevent the fatal effects of diabetes on body. We have implemented a control algorithm for the insulinand glucagon pump to automate the delivery process. The glucose and body

weightdata can be stored in online data base. Weight and BP level of the patient will bedisplay in LCD display. Thinkspeak web page is used for online data storage inaddition to this we also developed the mobile app widget.




**Body weight chart**

In this chart, daily body weight of the patient's data can be stored on theThinkspeak app.




**Glucose chart**

If the glucose level exceed, there will be an alert to thepatient to switch on theinsulin pump. This is the patient's glucose intake chart. This data's will also be stored onthe think speak app. We can share this data to the doctor for medication.

## VIII. CONCLUSION

Many glucometer systems have been developed using different techniques. Many of these systems assist only in self-monitoring of glucose levels. We have designed a system which is not only used for self-monitoring but also to know the general information about the diet, exercises, medication to be taken for that particular blood glucose level. Additionally, the same information will be intimated to their personal doctor for further reference. The advantage of this system is that the waiting time for the doctors is reduced and the prior appointments are eliminated. This approach will be of greater importance and usable in the future. The advances in the technology have paved a way for the development of glucose monitoring methodologies in the medical field. The idea proposed for glucose, weight and BP level monitoring can be enhanced efficiently with the increase in technology.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Multi-Patient Medication Register with RTC and Trend

**N.Bagyalakshmi[1], Aakash.K[2], Yuvasri.M[2], B.Vivek[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

In the field of health care, the use of RFID (Radio Frequency Identification) technology can be used for not onlytobringdownhealthcarecostsbutalsofacilitatesautomatingandstreamliningpatientidentificationprocessesin hospitals. This project aims to design an RFID based multi-patient Register model for designing a system in thehealth care. An application of the architecture is described in the area of RFID-based Real-time Multi-patientmedication register to monitor the multiple patients present in the hospital. It can be used to monitor multiplepatientsusingZIGBEETechnology, usingwhichwe canwirelesslymonitorallthe patients.

**Keywords:-** RFID, Multi-patient register, Zigbee, Wireless monitor

## I. INTRODUCTION

Nowadays almost every country in the world is allocating sufficient financial resources to the health care sector. Technology development and modern medicine practices are the outstanding factors triggering this shift. Developed countries like Australia, USA, and Europe are currently facing a middle-and older-aged market place from a predominantly youth-driven marketplace. This results in a greater demand for health care-related services and greater competition among the health care providers. Achieving a highly operational and efficient health care sector is an essential goal for organizational performance evaluation of any nation.

Efficiency is considered as the primary indicator of performance of a hospital. For a management, understanding the hospital's cost structure and their inefficiency in utilizing resources is crucial for making health care policies and budgeting decisions. The cost of medical services in hospitals is controlled by higher operational efficiency and to provide more affordable care and improved access to the public.

## II. LITERATURE SURVEY

Radio frequency identification technology has a great impact in the field of health care. By attaching radio frequency tags to different entities, RFID technology can provide identification, tracking, location, security

and other capabilities. The goal of this is to show how RFID technology may be used to reduce medical mistakes, improve patient safety and enhance the quality of medical services in hospitals. After briefly introducing Health domain and some of the healthcare issues, this describes how RFID technology can be used in healthcare. Thus the third section describes some hospital use cases that could be benefited from RFID technology. Also it briefly presents some of the existing projects that successfully implement this emerging technologies in the healthcare [1].

A radio-frequency identification based smart hospital environment with distributed reading capability to enhance the quality of service by improving just-in-time healthcare, patient identification, emergency message delivery, healthcare worker,assignment and rescue response.

An Android-based smartphone is used for sending patient alarm messages to healthcare workers [2].

Radio frequency identification will become a technology in the logistics and management industry, distinctive features such as the low cost of RFID tags, and the easiness of the RFID tags' deployment. In consequence, RFID plays a fundamental role in, aiming to increase the level of automation of industrial processes. This contribution reviews the state-of-the-art of RFID for describing the contributions to improve medical services and discussing the limitations. In particular, a lot of effort has been put into software development, but in most of the cases a detailed study of the physical layer is not properly conducted. Ultra high- frequency technology is selected over the most extended near-field communication and high frequency technology to minimize hardware infrastructure.

In particular, UHF Radio Frequency Identification also makes the coverage or reading area conformation easier by using various kinds of antennas. Information is stored in a database, which is accessed from end-user mobile devices (tablets, smartphones) where the position and status of the assets to be tracked are displayed [3].

In this study, we developed an intelligent living environment with radio frequency identification (RFID) readers to detect when a person inappropriately self-administers medications with meals or drinks, for which co administration is contraindicated and would decrease beneficial effects of the medicines or produce serious adverse effects. In a laboratory, Radio Frequency Identification readers were strategically placed in a novel intelligent medicinal case and around the kitchen. The readers recognized the RFID tags affixed on a objects such as foods,medicines, beverages, and some drinking vessels.To measure a tap water consumption, a wireless device with flow sensors was also placed in the kitchen unit. Our experiments was confirmed, it is based on the proposed algorithm, this system was able to recognize the objects and usage of tap water and to detect a typical contradicted co-administration of a medication with some particular food product.

The results indicate the potential of the system to directly alert caregivers by using the intelligent medicine case, in order to prevent inappropriate medication administration [4].

## III. EXISTING METHODOLOGY

The existing system focuses on RFID based system taking into consideration every individual patient RFID Tag and it will be verified manually by the hospital nurse or it will work for particular distance of patients.

They only monitor one individual patient at a time. It is less efficient to monitor multiple patients. This leads to a complicated, time-consuming process. It will monitor one patient at a time.

## IV. PROPOSED METHODOLOGY

The working our project is project to design a RFID based multi-patient Register model for designing a system in the health care. An application of the architecture is described in the area of RFID-based Real-time Multi-patient medication register to monitor the multi patient presence in hospital. We can monitor a multi-patient using ZIGBEE Technology using these we can wireless monitor the all patients. Initially the patient tag is read by RFID Reader the information stored in individual patient is displayed in LCD display and wirelessly received ZIGBEE transmitter to receiver. ZIGBEE covers an entire block of multi-patient RFID Tag and patient registration another details are monitored by PC.

## V. DESIGN COMPONENTS

### HARDWARE USED

- PIC Microcontroller
- LCD Display
- RFID Reader
- ZIGBEE Transmitter and Receiver

### PIC MICRO CONTROLLER

Microcontroller maybe defined as a tool, that integrates a variety of the components of a microprocessor system to single chip. The CPU, memory and peripherals are in-built. This uses a separate bus. This makes it possible to process instruction and data allowing simultaneous access of program and data memory. The benefits of CMOS and RISC combination is low power consumption. This ends up in a really small chip size with a low pin count. It's free from noise compared to other fabrication techniques.

### LCD DISPLAY

A liquid crystal display (LCD) is a thin, flat electronic display that uses the light modulating properties of liquid crystals. CRTs have been replaced by LCDs in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and safer to the eyes. They are available in a wider range of sizes than CRT and plasma displays. LCD's are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption makes it easy to use in battery powered electronic equipment. It is an optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in colour or monochrome.

### ZIGBEE

ZigBee is a long time set of specifications for wireless personal area networking (WPAN), i.e. digital radio connections between computers.

WPAN Low Rate or ZigBee provides specifications for devices with low data rates, consume very low power and are thus characterized by long battery life. Completely networked homes where all devices are ready to communicate and be controlled by a single unit are possible by zigbee.

There are three different ZigBee device types that operatethese layers in any self-organizing application network. These devices have 64-bit IEEE addresses, with an choice to enable shorter addresses thus reducing packet size, and add either of the 2 addressing modes – star and peer-to-peer.

## VI. CONCLUSION

RFID applications can provide significant benefits to healthcare industry to ensure patient safety at the same time improving supply chain efficiency. Healthcare is predicted to be a major area of growth for RFID. This work presents some applications that integrate RFID technology in healthcare domain. It also presents an RFID-based integrated system for multi patient identification and monitoring system. This system could be used in hospitals with large flow of patients, allowing hospital staff to read patients' id tags (RFID cards), which can help in avoiding some medical errors. The errors include giving patients improper prescriptions or someone else's treatment.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Implementation of Smart Device to Help People with Alzheimer's disease

**T Selva Sherin[1], Lydia M[2], Karunya M[2], Sivasakthi[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Hosur, Tamil Nadu, India

## ABSTRACT

The aim of this project is to remind individuals who fail or forget to take their medicines properly. People who are having Alzheimer's disease forget to take their drugs regularly. This project will help the patient to take his/her medicines at proper time. The proposed system is a helpful tool for elderly people and also for people working in busy schedules, as it will give voice commands and remainders about medicines to be taken at prescribed times. Using a RTC (Real Time Clock) interfaced to a microcontroller, the programmed time for medicinal drug is displayed on the LCD along with a voice sound to alert the patient. The microcontroller used in this project belongs to AVR family. In addition to this it also track the location of the Alzheimer's patient.

**Keywords: -** Alzheimer's disease, medicines, Real Time Clock (RTC), microcontroller, Liquid Crystal Display (LCD).

## I. INTRODUCTION

Today in healthcare systems, the utilization of mobile application has become more prevalent. In recent times the usages of medicines have tremendously increased due to the number of diseases. Some diseases are short term or acute diseases while many are long term or chronic and life threatening diseases. These diseases ultimately reduce the life span of individuals and to overcome or to live a better life it is mandatory to take medicines regularly and also in large amount. People suffering from chronic diseases get used to living with medication throughout their life. According to World Health Organization's Health Statistics and health information system-elderly people's threshold age is sixty years. People who take multiple tablets are at a point of forgetting the right tablet at the right time. And when the prescriptions are revised there are chances of repeating the old prescription due to forgetfulness. Thus when the patient does not take pills at right time and when the patient takes the wrong medicines and accidentally some expired medicine it causes health issues. And thus our project aims are creating a microcontroller based Smart medicine box which uses Real

time clock. It is compulsory for the patient to take pills from the box at the right time otherwise our system continues to give alarm notification until the medicine is taken from the box.

## II. LITERATURE SURVEY

[1] J. Oresko et al., They have implemented a prototype system for wearable Cardiovascular Disease (CVD) detection on windows smart phone. They developed two smart phone-based platforms for continuous monitoring and recording of a patient's ECG signals. Application successfully detects real time CVD and generates personalized cardiac health summary reports.

[2] Mei-Ying Wang et al., developed a smart phone application Wedjat, to avoid in-take medicine mistakes. It reminds its users to take the medicines on time and keep a record for later review by healthcare professionals

[3] World Health Organization, "Health statistics and health information systems –elderly people", the system contains Meals and Water Page which consists of list of meals that have been added. When user press on (+) button the system will display another page contains the Meal type, Meal time, and Alarm tone. It also sends an alert at the specified time for reminding the patient to drink water. World Health Organization states that the threshold age to be considered elderly is sixty years.

[4] A. Timothy, and Salt house, proposed that as age increases, it is usually associated with a reduction in the efficiency of the immune system, lessened and weakened hearing, diminished eyesight, and reduced cognitive ability.

[5] HSU CHUN-LIANG stated that many times patient forgot to take medicine on time once they are discharged from the hospital and due to this negligence it may lead to death. So to avoid such situation HSU CHUN-LIANG developed a system that reminds to take the medicines on time.

## III. PROPOSED METHODOLOGY

The smart device helps the Alzheimer patients to take their medicines at proper intervals by giving remainders and alarms. Especially the RTC system involved in the device helps in the real time operation of the device. And in the proposed prototype the system consists of microcontroller, LCD, IR sensor, RTC system and alarm system. The brain of the system is microcontroller which controls the function of the system and performs all the tasks. There is no requirement of external peripheral devices and memory devices. Initially the AVR based unit interfaces with LCD display. The RTC system which is one of the feature of controller based unit is present in it, is used to match with current time. Here the number of medicines and time setting operations are changed frequently as per the prescription schedule. Here GCM and GPS module is used to track the location.

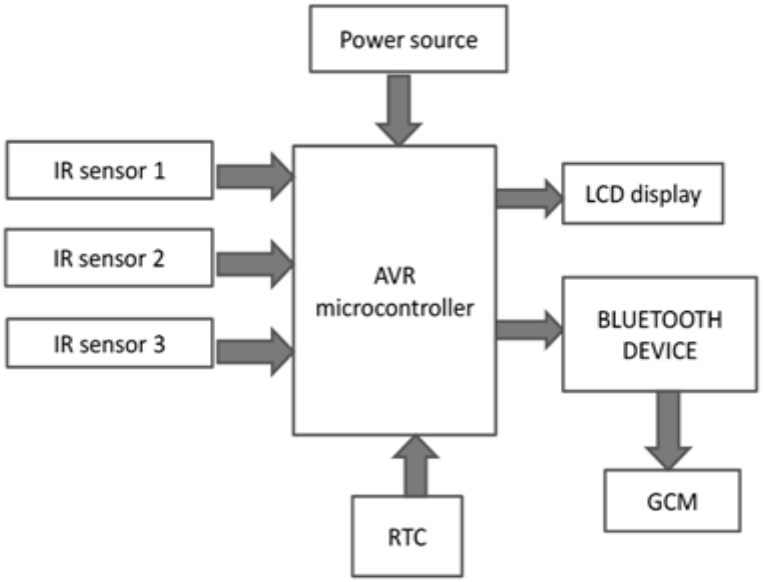


**Fig.1.Block Diagram**

IR Sensor is connected to the circuit to detect, if the patient is medicated or not. Three IR sensor is placed to detect medicine is taken by the patient on morning, afternoon and evening. IR sensor 1 is for morning tablets, IR sensor 2 is for afternoon tablets and IR sensor 3 is evening tablets. AVR microcontroller plays a key role in saving the data. Power source is given to the circuit. Here, RTC (Real Time Clock) is given which is mainly used to indicate the patient to take tablets on time with voice alarm device. LCD display is also connected and it displays the data. GCM (Google Cloud Messaging) which is used to identify the patient when they missing or .crossing the particular distance. This is pair up with the android app given to the patient when the patient crossing the particular distance immediately message send to their family members with location. It is easy for them to identify the person who is missing. Bluetooth is to transfer data from one device to another and also used to store data for the future use.

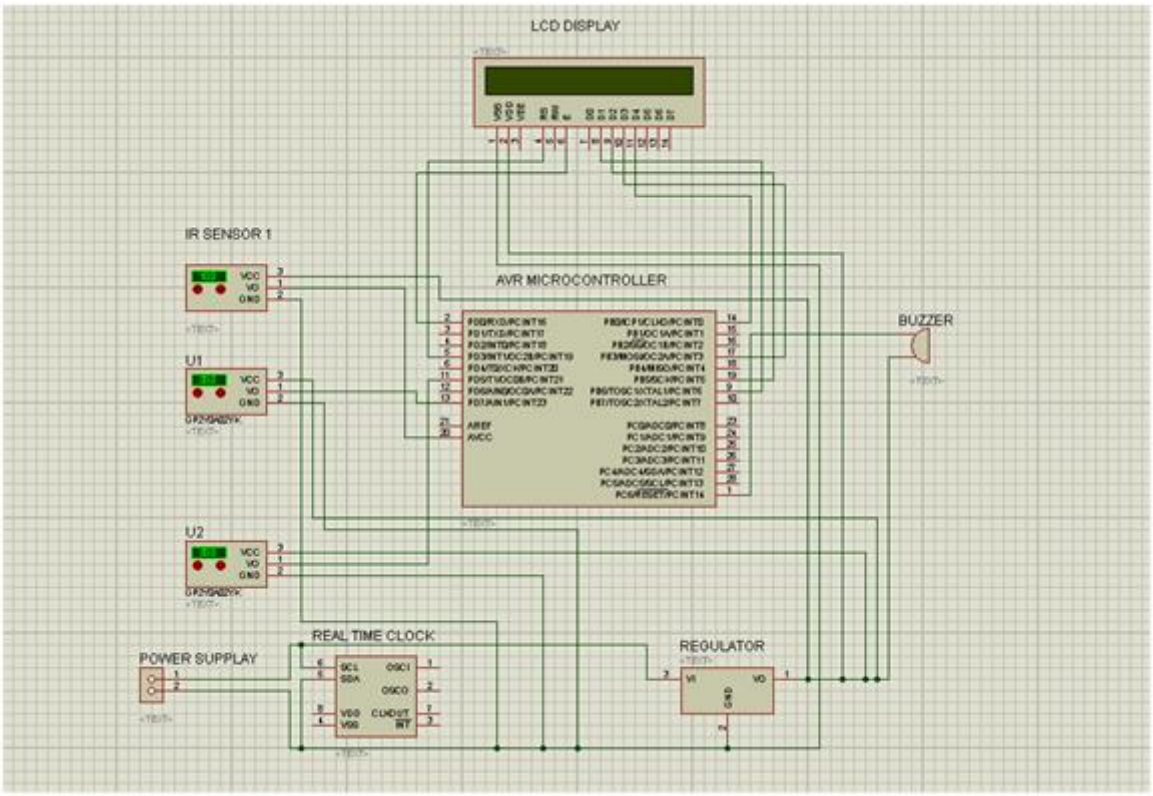


Fig.2.Circuit Diagram

Power supply is connected to the input of the regulator to control the current supply. It is also connected to the Real Time Clock and the regulator. Here three IR sensors are connected to AVR microcontroller to indicate the Alzheimer's patient to take medicine at correct time. The function of real time clock is to indicate the patient to take medicine in correct time. Real time clock is connected to the regulator and the output of the regulator is connected to the buzzer. The main function of the buzzer is to give alarm sound to take medicine if the patient forgets to take medicine in the correct time. LCD Display is used in this project to displays the output, it displays the medicine taken by the patient.

## IV. RESULT

When the power supply is given to the circuit and the Bluetooth is turned on and paired up with the android application. Real time clock is used and the certain time is fixed to indicate the patient to take tablets. If the fixed time is crossed, then voice message given to indicate the patient to take tablets. It will continue for the afternoon and night time. It is also displayed on the LCD display. Then another advantage in this is to track the location of the Alzheimer's patient. The sensor is placed on the doorstep if the patient crossed that it immediately sends the message to the family members. For this GCM (Google Cloud Messaging) is used to track the location of the person. Bluetooth is used to share the information to the family members through the android application.

## V. CONCLUSION

Looking at the current systems in the market and their services it can be concluded that our project has overcome all the drawbacks of the system available so far and it has made a thorough in depth research on the requirement that an Alzheimer's Patient suffers and targeted in solving all the problems to maximum extent.. Thus this project will help the Alzheimer's patient by providing them a life of independence wherein they can believe in our app. Thus it can be conclude that this app could be developed and launched in the market to serve the needs of the Patient's.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Implementation of Automatic Medicine Vending Machine Based on Android App

**N. Bagyalakshmi[1], K. Thanga Thirumalai[2], B. Devadharshni[2], B. Shraya[2]**

[1]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

This project shows a machine with an Android app that can deliver healthcare in places where a medical shop isn't practicable or possible. It lets the user to choose a drug, pay the needed money, and then have the medicine dispensed when it validates the amount received. It gives a comprehensive answer for someone seeking rapid symptomatic alleviation for minor health issues. It can entirely eradicate both presentism and absenteeism in the workplace by alleviating minor symptoms at work. It also has the potential to reduce the existing expenses of open medication cabinets. Workplaces without clinics or pharmacies can profit from greater work productivity and minimise underperformance by sick personnel by installing an over-the-counter vending machine. Furthermore, it guards against It also saves time spent waiting in lines at clinics for minor ailments such as colds and headaches. When a place is hit by a localised epidemic or pandemic, the situation becomes even more dire. This project shows a machine with an Android app that can deliver healthcare in places where a medical shop isn't practicable or possible. It lets the user to choose a drug, pay the needed money, and then have the medicine dispensed when it validates the amount received. It gives a comprehensive answer for someone seeking rapid symptomatic alleviation for minor health issues. It can entirely eradicate both presentism and absenteeism in the workplace by alleviating minor symptoms at work. It also has the potential to reduce the existing expenses of open medication cabinets. Workplaces without clinics or pharmacies can profit from greater work productivity and minimise underperformance by sick personnel by installing an over-the-counter vending machine. Furthermore, it guards against It also saves time spent waiting in lines at clinics for minor ailments such as colds and headaches. When a place is hit by a localised epidemic or pandemic, the situation becomes eve

## I. INTRODUCTION

For folks who live in remote areas, diagnosis is always a problem. In addition, discounting the aspect of full cure, drug availability has a significant influence. The goal of this prototype is to provide brief comfort so that patients have a greater chance of preventing their health from deteriorating until they can see a doctor.

People would be able to get pharmaceuticals through patient kiosks in public locations such as drug shops, malls, buses, and train stations, as well as on highways and in areas where medical stores are few. As technology advances, every aspect or institution, whether corporate or health-related, must improve. There have been many innovations, but the health department has not been one of them. Various pharmaceutical vending machines have been created to improve the efficiency and reliability of health care services. Vending machine advancements for various goods such as drinks have been witnessed over the years. It is usual in most hospitals, especially public hospitals, to find that the process of providing medications takes a lengthy time, and this machine is one technique to combat this problem. Patients must utilise a unique identifier in order for the machine to function properly. This will prevent confusion between patients and the medications to be taken from the device. The medication dispenser's architecture has been meticulously built, and it has sensors that can detect the number of medicines dispensed, when they should be dispensed, and how much should be dispensed.

## II. LITERATURE SURVEY

[1]. Yasothaa Kalai Chelvam, has developed An electronic pill box that can keep track of when medicine is taken from it. This might exacerbate the problem of prescription abuse, particularly among the elderly. It is critical that they take the medication exactly as prescribed in terms of dose and duration. They may require the assistance of family members to remind them of their prescription regimen, but this strategy is not appropriate for the elderly who live alone at home. [2] M. Volk, J. Sterle and U. Sedlar, has invented. The user interface, where the nurse must first sign up using her name and password to create her user id and password for her first time login, then the next window pops up for face recognition, where the nurse must authenticate her face and password. Only if the face and password match will the nurse or the caretaking staff be able to access the device and send medication to the patient. Thing talk is used to connect the gadget from the nurse station to the Automatic Medicine Dispenser has developed a pill dispenser that ensures that medications are taken safely and on time, particularly by the elderly. The alarm function is introduced to the system as a popup notice utilising the Insta push programme on the smart phone, which is the key advantage of this system.

[3] A Medium Corporation [US] has studied Nurses and caretakers are authenticated using a face recognition technology. For face recognition, histograms of oriented gradients (HOGs) and neural networks are utilised. OpenCV provides a number of face detection and recognition packages that are loaded into the Python code..

[4] Aakash Bharadwaj et al., has developed Patients keep pill boxes in which they can store medicines for their daily, weekly requirements. There are also other systems to remind patients about their medical schedule, such as a computer-based alarm technique that reminds patients about their medication with closed loop communication between the doctor, nurse, and patient using the internet of things concept the medicines.

## III. PROPOSED SYSTEM

Keeping the benefits of the existing technique in mind, the suggested solution would provide access to the machine via an Android application, which will be available to all users who have the app. It will also lower the production costs. Above all, this gadget will be a lifesaver in emergency circumstances when having the proper drugs at the right time, even before a diagnosis, may save a person's life. In this project, an Atmega16 microcontroller is employed, and an ultrasonic sensor is used to count the medicine in the vending machine. The tables are dispensed using a gear motor. The android app is paired via a Bluetooth device.

## IV. BLOCK DIAGRAM

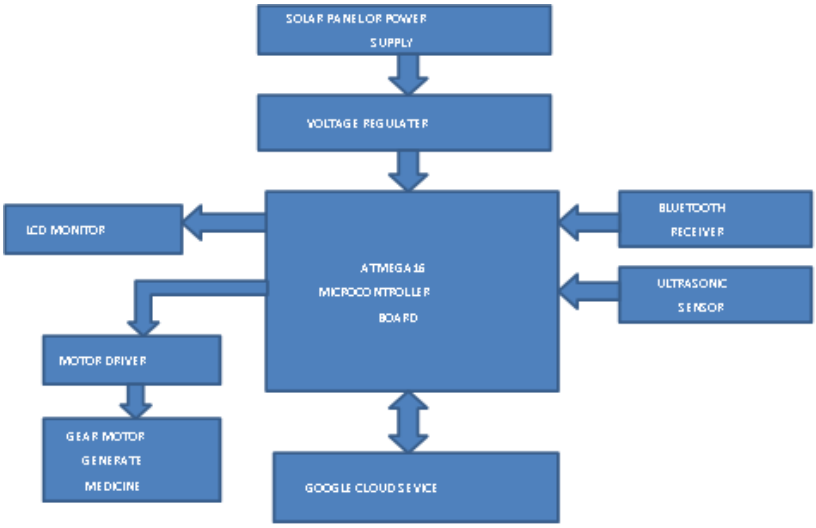
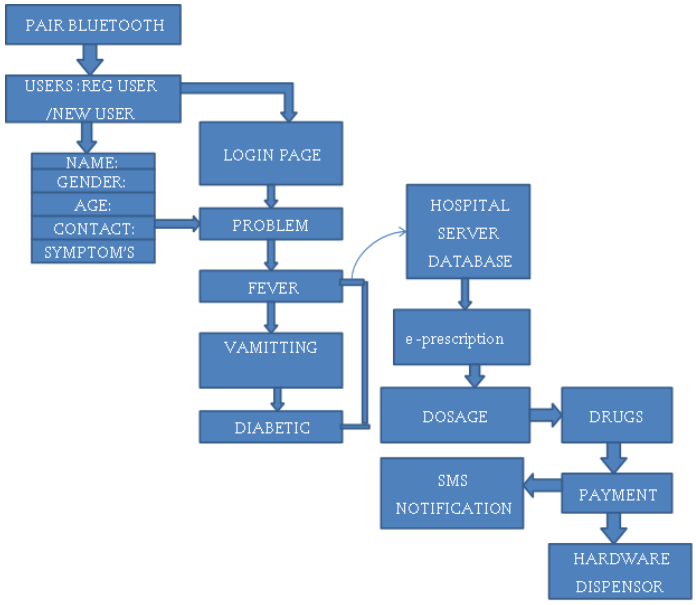



**Fig 1. Block diagram for hardware side**



**ATMEGA16 MICROPROCESSOR** : It is a 28-pin low-power 8-bit microcontroller based on the AVR architecture and created using CMOS technology. This Atmel Mega microcontroller is the most widely used AVR microprocessor. The Atmega16 is a low-power 28-pin microcontroller.

**TIMER:** Timers are utilised in the controller to calculate the internal signal. Two 8-bit timers and one 16-bit timer are included in the Atmega16..

**WATCHDOG TIMER***:* The watchdog timer, which is used to produce the interrupt and reset the timer, is a notable feature to this controller.

**SERIALCOMMUNICATION:** The USART and SPI units on the Atmega16 are used to develop serial communication with external devices. Other microcontrollers, such as the Atmel 8051, are preferred over the Atmega16.

**LCD DISPLAY:** A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that makes use of liquid crystals' light modulating properties. Liquid crystals do not directly emit light.

**ULTRASONIC SENSOR:** The LV-Max Sonar delivers extremely short to long-range detection and ranging in an impressively tiny size with 2.5V - 5.5V power.

## V. CIRCUIT DIAGRAM AND DESCRIPTION

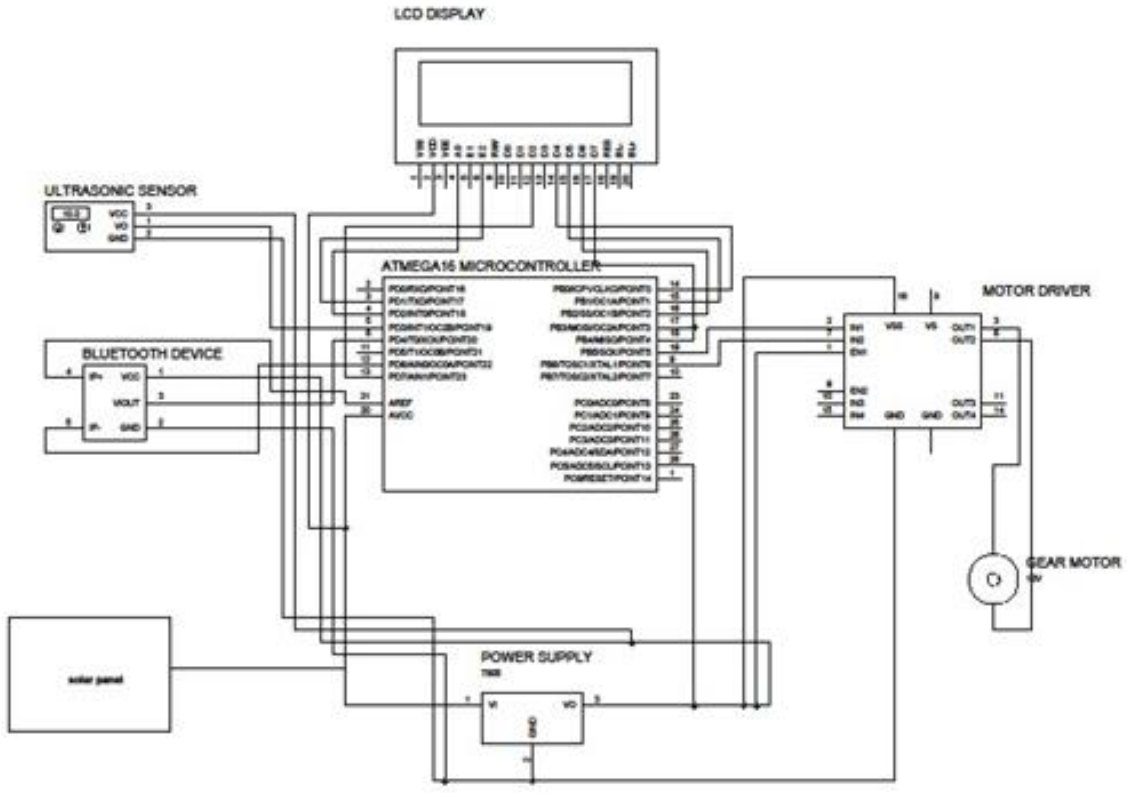



**Fig3: circuit diagram**

This includes both the hardware and software aspects. The user has access to the hardware in order to obtain medication from the machine. The ATMEGA16 microcontroller board, which serves as the primary unit of the hardware and is powered by the solar panel, makes up the hardware side of the machine. Because the power supplied by the solar panel is ac current, the voltage regulators must convert it to a power of 0-5 mv and dc current. The user's data is retrieved through Bluetooth, and the ultrasonic sensor is utilised to determine the level of medication inside the chamber. The LCD monitor receives data from the microcontroller and displays the device's status. The force to dispense the medicament from the machine is generated by the gear motor. The google cloud service should save the data retrieved from the user for subsequent usage. The dispenser's software consists of a login page that gets data from the Bluetooth. The data is then sent to the user page. The user page requests information such as name, gender, age, contact information, and other information depending on diseases such as symptoms, while the logic page requests that we enter the primary symptoms that have already been programmed into the device. The information is then sent to the hospital. database on the server The physicians then issue an E-prescription, which is followed up with an SMS notice. The data is supplied to the device and the hardware dispenser when the payment is done via online transaction, and the medicine is dispensed.

## VI. SOFTWARE

Adding additional activities to an existing app module is one of the most typical applications of templates. Add an activity with the Login Activity template, for example, to create a login screen for your app's users. The most widely used activity templates for phone and tablet apps are covered in this section. Wear OS, Android TV, and Cloud App Engine are just a few of the app module kinds that Android Studio has templates for. When developing an app module, you may see templates for these distinct module kinds. More API-specific modules and activities, such as Google Ad Mobs Ads and Google Maps, have their own templates. The code components for certain usage circumstances, such as login into an account, are provided in the following phone and tablet templates. Displaying a detailed list of objects or scrolling over a big block of text Each may be used as a standalone app or as part of a larger app.

**Fig4 : simulated prototype**

## VII. CONCLUSION AND FUTURE SCOPE

The pharmaceutical dispensing machine is a cost-effective, versatile, and reliable option for extending basic healthcare to all locations. The machine may be adjusted to fit any terrain and environment with minor hardware and software adjustments. This machine will be upgraded to include an intelligent medication unit that, when the quantity of medicine strips falls below a specific threshold, sends a refill notification message to the nearest pharmacy. People can use an automated medication vending machine because it is technically viable. It is based on a microcontroller and provides GCM functionality. It ensures that drugs are always available, even in remote locations. It's incredibly useful, and it's also quite easy to use.

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# Self-Powered Wearable Suit for Sensing Vital Parameters and Location Tracking of Soldier

**V.Saranya[1], J.Ashwini[1], P.Mukesh[1], Dr.T.S.Udayasuriya, M.E., PhD[2]**

[1]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

The climatic conditions are changing with the era. The climatic conditions today are very different compared to the olden days. In human history, temperature related troubles such as heat stroke, heat rash, frostbite, dehydration, hypothermia, etc. are the major problems and one cannot get away from these problems. Some of these conditions even led to some unfortunate deaths. Some technological solutions are made to keep people thermally comfortable such as air conditioning units which can be installed in one's homes, cars etc.,. The climate adaptable jacket is very useful for anyone who wants to move it to unfavorable climatic conditions. This jacket can naturally keep a specific temperature inside the jacket, so as to maintain an optimum temperature; the design of this jacket gives better protection to the soldiers & navy people who are working in unfavorable weather conditions.

## I. INTRODUCTION

Soldiers are a country's most important resource. They play an important role of protecting the country. Soldiers are subjected to extreme weather conditions throughout the year and when we say extreme weather conditions it can be scorching heat as well as freezing cold. Both very hot and cold temperatures could be dangerous to health thereby reducing their efficiency in work. In this project we have made an attempt to design an E-Uniform which gives better protection to the soldiers who are working in extreme weather conditions. When the soldiers are exposed to the extreme weather conditions it can be harmful to their health in the long run. In this paper an E-Uniform is developed which protects the soldiers who are working in unfavorable weather conditions. Temperature sensor is used for checking the temperature at any time. Here LM358 temperature sensor is used to precisely measure the temperature in the surrounding. Sensor gives the analog voltage which is converted into digital by using ADC in the microcontroller. These digital values are checked with the optimum level of temperature .If the temperature is more than the normal heat temperature, cooler and fan will be activated. If the temperature is less than the optimum temperature

required for humans, heater and fan will be activated and values of temperature are displayed in LCD. The power supply to the internal circuit is provided by the Solar panel.

## II. OBJECTIVE

To assist soldiers using an android app based health monitoring and tracking system.
To send a message to central control console regarding soldier's health status and current location using GPS.

## III. LITERATURE SURVEY

Nikam et al (2013) have presented an idea for the safety of soldiers to view the health status as well as ammunitions on them.
Pramod (2014) has focused on integrating the bulky components into lightweight package which could acquire more power without using large power source. Global Positioning System (GPS) is used to guide the soldiers in the war field when they get lost and also to guide them to find the safe place whenever needed.

## IV. PROPOSED SYSTEM

Soldiers are a country's most important resource. They play an important role of protecting the country. Soldiers are subjected to extreme weather conditions throughout the year and when we say extreme weather conditions it can be scorching heat as well as freezing cold. Both very hot and cold temperatures could be dangerous to health thereby reducing their efficiency in work. In this project we have made an attempt to design an E-Uniform which gives better protection to the soldiers who are working in extreme weather conditions.

## V. BLOCK DIAGRAM

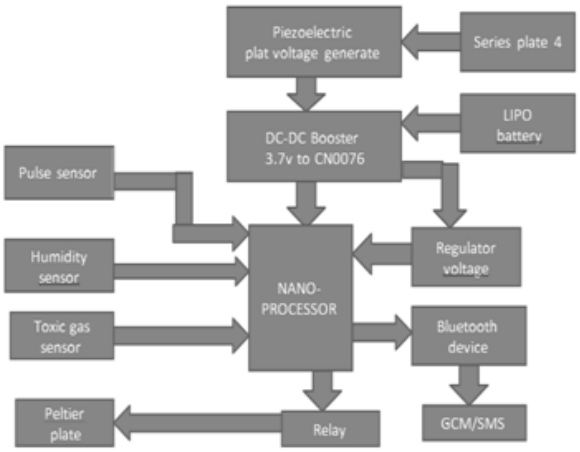


**Fig 1. Block diagram for smart soldier vest**

## VI. WORKING

The Heart of the system is the nano-processor which controls all the processes that takes place in the system. The power required for the functioning of the system will be provided by piezoelectric plates that are attached to the foot of the soldiers. These piezoelectric plates act as a transducer that can convert the mechanical vibrations (energy) generated due the movement of the soldiers into electrical power (energy) and delivers it to the system. This will leads to the conservation of energy and also it paves way to reduce the weight of the system due to the presence of heavy batteries and makes it much more wearable. Further there will be also a back-up lipo-battery which can be used in the situations when the soldier doesn't move for some reasons and when the movement of soldier is not sufficient to generate the required power for the system. A DC-DC Booster will boost the power generated by the transducer as well as the back-up battery. Further, there will be three sensors namely Toxic gas sensor, Pulse sensor, Humidity sensor to sense the presence of toxic gas in the soldier's surrounding, pulse rate of the soldier and humidity level in the atmosphere around the environment of the soldier respectively. In order to maintain the body temperature of the soldier at optimum level, there will be a peltier plate which will sense the temperature of the environment there and heats up or cools down the body according to the surrounding temperature. LCD Display is used to display the findings of the sensors like pulse rate of the soldier, amount of toxic gases and degree of humidity level in the environment of the soldiers. The Bluetooth device used in the system will get the location of the soldier and gives the information to the distant centre through GCM which can enable us to track the location of the soldiers.

## VII. CIRCUIT DIAGRAM

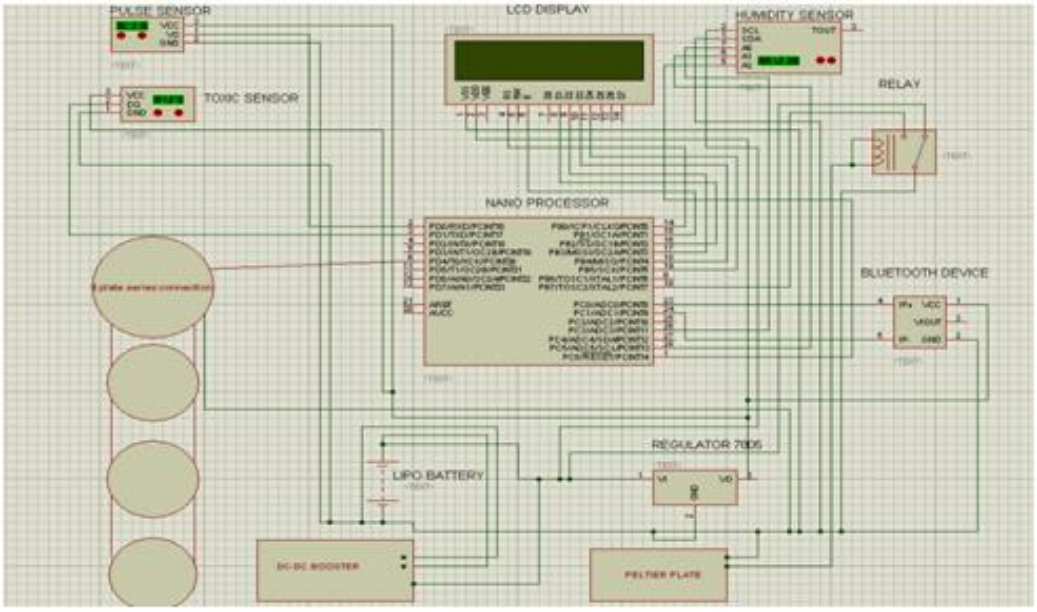


**Fig 2. Circuit diagram for smart vest**

## VIII. CIRCUIT DIAGRAM DESCRIPTION

Lipo Battery provides the required power to all the components of the system. The Regulator 7805 will regulates the boosted power which was boosted by the DC-DC booster CN0076. The relay circuit is responsible for the power required for the functioning of the peltier plate. The Nano processor used in this project consists of 28 pins out of which both digital and analog pins contribute in the function of the processor. The three pins of Pulse sensor are connected to the second pin of Nano processor and LCD Display and also to the relay circuit. Similarly the three pins of the Toxic gas sensor are connected to the third pin of processor for processing, to the 2nd pin of LCD Display for the purpose of displaying the sensed recordings and to the relay circuit for the need of power. The First pin of Bluetooth Device is connected to the LCD, second pin to all the sensors, third pin to output, fourth and fifth pin to 23rd and 24th pin of the processor respectively. The seventh and sixth pins of the Humidity sensor are connected to the 26th and 28th pins of the processor respectively. Its fifth pin is connected to the first pin of the processor, first pin to Bluetooth, second pin to Regulator and third pin to output. Peltier plate is connected to the Bluetooth Device and Relay circuit. Further, the four plate series connection is connected to the sixth pin of the processor. Appropriate circuit connections are required for the purpose of ideal function of the system.

## IX. CONCLUSION

This project reports an android app based system for the health monitoring and tracking of the soldiers. Biomedical sensors are used to measure heartbeat, body temperature, and environmental parameters of every soldier to control room. This technology can also be used to track the location of the missing soldiers and also to track their live location. This system can also be helpful in communication between the soldiers during any emergency situation. Thus we can conclude that this system will act as lifesaver to the army personnel all over the globe. Later, a handheld portable sensor device with more sensing options may be developed to help the soldiers. In addition to that, toxic gas sensors can be placed which measures toxic concentration in environment.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Nerve and Muscle Stimulation with Wireless Operator

**Mr.C.Sathish Kumar1, T Abirami2, V Praveena3, J Cyril4**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Students, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

Physiological disorders can be both incurable and fatal which is found right from infants to old aged people. To overcome the physiological disorder due to aging and hereditary disease, electrical impulse is used as a therapy for both the nerve and muscle stimulation. This therapy is mainly used by the physiotherapist to cure paralyzed patients and people having localized pain due to aging. This project comprises about the nerve and muscle stimulation using wireless device like Bluetooth (or) ZigBee wireless operator, which will help both the physiotherapist and the patient to overcome end errors by the normal nerve and muscle stimulator. The electrical impulses provided for the muscle and nerve will vary with the voltages therefore the stimulation for the nerve and muscle is separately provided with the coded format for the different stimulation. This will provide easiest access to the therapy for the therapist and patient.

**KEY WORD:** Physiological disorder, muscle stimulator

## I. INTRODUCTION

Neural stimulation may be a powerful technique for modulating physiological functions and for writing information into the system as a part of brain machine interfaces. Current clinically approved neural stimulators require batteries and are many cubic centimetres in size typically much larger than their intended targets. We present an entire wireless neural stimulation system consisting of a 1.7 mm3 wireless, battery less, leadless implantable stimulator an ultrasonic wireless link for power and bi-directional communication, and a hand-held external transceiver. High efficient ultrasonic power is produced by IC which decodes stimulation parameter downlink data, and generates current-controlled stimulation. Pulses. Stimulation parameters are time-encoded on the fly through the wireless link instead of being programmed and stored on the mote, reducing power consumption and on-chip memory requirements and enabling complex stimulation protocols with high- temporal resolution and low-latency feedback to be used in closed-loop stimulation. Stimulation of mote is indicated by plink data , it's encoded by the mote via backscatter modulation and is demodulated at the external transceiver. We investigate the performance of the system with motes acutely implanted with a cuff on the nerves of anesthetized rats and show highly repeatable stimulation across a good range of

physiological responses. Percutaneous electrical nerve stimulation and electrical muscle stimulation are two 12 therapies which will be recommended if transcutaneous electrical nerve stimulation (TENS) has not been successful. The difference between them is that the needle electrodes deliver current closer to the nerves or the muscles beneath the skin, making the nerves less sensitive to pain. PENS therapy is probably going used first in a very health care or physiotherapy setting, but may be used reception. EMS is employed to treat muscle atrophy after surgery to reconstruct an anterior crucial ligament. If a muscle doesn't get any use, the body will eventually break it right down to conserve energy. Muscle atrophy that develops because of inactivity can occur if someone remains immobile while they get over an illness or injury. Getting regular exercise and trying physiatrics may reverse this kind of muscle atrophy. People can treat muscle atrophy by ensuring lifestyle changes, trying physiatrics, or undergoing surgery. The usage of the electrical stimulation on a localized part of the part with an undergone surgery with the high complication of self-utilization of the electrical stimulation producing device [1]. The device used to treat the pain with electrical stimulation provided by the physician as electrotherapy will directed to the patients to make use of them directly by the patient itself

[2]. The usage of the surface electrodes for the electrical stimulation has no interference in producing the electrical impulse on the surface 15 of the sensory organs. The usage of surface electrode will make the patient and the physician to direct for the treat with ease [3].

The information about the surface electrode and the switching of voltages between nerve and muscle stimulation by using the relay switch. The patient and physician can use a single device to treat the pain localized by nerve and muscle[4].

## II. PROPOSED SYSTEM METHODOLOGY

Nerve or muscle stimulation through a code made default according to the type of stimulation. The LCD crystal provided in the hardware is to show the type of stimulation is being in process by the patient or the therapist.

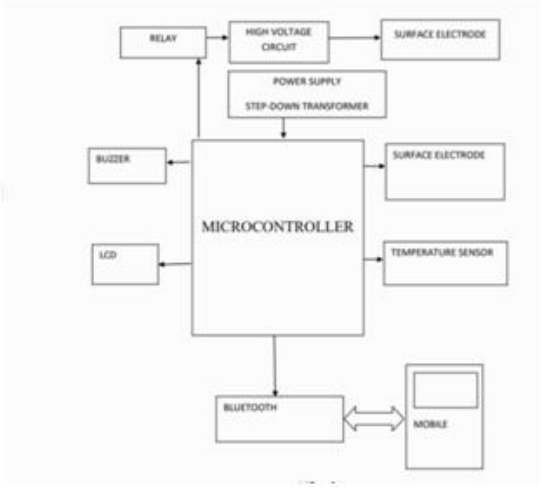



Fig: BLOCK DIAGRAM OF HARDWARE AND SOFTWARE

The wireless operation is performed using the mobile Bluetooth via hardware Bluetooth component used on the hardware which is used to choose the type of stimulation. The stimulation provided to the patient as electrical impulse is proceeded with the surface electrode. The surface electrode should place on the patient to experience the stimulation electrical impulse which is therapy provided for the patient with the injury and for the aged people. The temperature sensor used for the patient to know the variation of temperature in the body before and after the stimulation which might vary with the exposure of electrical impulse with the high injury and since the electrical impulse is provided to the patient with the normal body temperature to with stand the electrical impulse during the therapy period temperature sensor is embedded in the hardware.

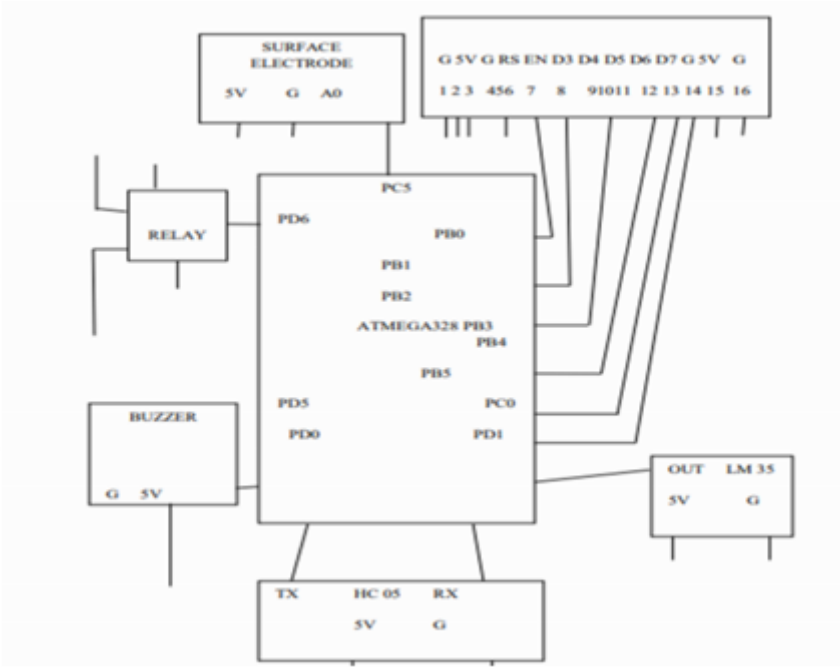
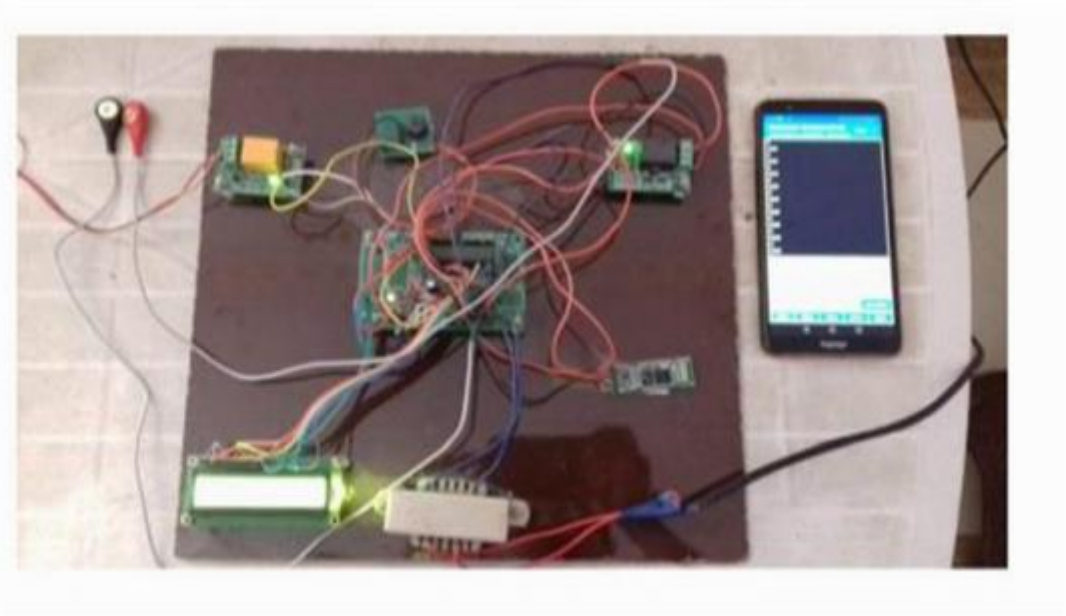



Fig: CIRCUIT DIAGRAM

A relay is an electrically operated switch. The coil of the relay creates magnetic fields that attracts and changes the switch contacts using the current flow. Relays are usually Single Pole Double Throw or Double Pole Double Throw but they can have many more sets of switch contacts, for example relays with 4 sets of change over contacts are readily available. The low-power Atmel 8-bit AVR RISC based microcontroller combines 8KB of programmable non-volatile storage, 1KB of SRAM, 512K EEPROM, and a 6 or 8 channel 10-bit A/D converter. The device supports throughput of 16 Millions Instructions Per Second at 16 MHz and operates between 2.7-5.5 volts. The mode which is known as the power down mode saves but freezes the Oscillator, disabling all other chip functions until the following interrupt or hardware reset. The asynchronous timer is running continuously and allows the user to keep up a timer base while the remainder of the device is sleeping with the use of power save mode. The crystal/resonator Oscillator is running while the remainder of the device is sleeping with the use of standby mode. This enables at no time start-up combined with low power consumption. The device is manufactured using Atmel's high density the program is allowed for memory to be reprogrammed by the On-chip ISP Flash. A traditional non-volatile memory programmer in system through an SPI interface, or by an On-chip Boot program running on the AVR core.

The Boot with the ATMega328 microcontroller the stimulation producing the electrical impulses to the muscles and neve is resulted with two different voltages and the operation is performed with wireless format using a Bluetooth devices.

## III. RESULT & CONCLUSION



The surface electrode is connected to different voltage circuit which produces varying voltages with the switching relay circuit. The Hardware is to achieve wireless nerve stimulator and muscle stimulator simulated into a single hardware. The wireless neuromuscular stimulator provides easy access to the therapist and patients which is a major necessity in the physiological treatment. This is made advanced with the wireless mode selection.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Monitoring Module and Phototherapy Embedded in Incubators

**Mr. P. GANESH BABU[1], Durairaj A[2], Niranjan J[2],Vemala M[2]**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Students, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Incubators are mostly used to maintain stable level of the neonates in warm condition as it is inside the environment of mother's womb. Mostly it is used for premature and for those whose skin loses heat rapidly. This is also suggested for infants with some specific birth defects like jaundice. Also patient monitoring system is attached to the offspring to look after some physiological parameters. So this idea was meant to make recordings by implementing parameters of PMS as well as phototherapy equipment in the incubator. This would make observations easier and reduce the physical discomfort faced by the neonates. The parameters would be heart rate, ECG signal along with the temperature and humidity. There is a display meant for the instantaneous manual read out. Also analog signals which are very difficult to understand are being passed to the serial to USB converter that transfers the message into understandable format and is being stored in the system for reference

**Keywords:** premature infants, jaundice physiological parameters, PMS, USB converter, phototherapy, ECG signal.

## I. INTRODUCTION

The newborn baby care is one in every of the foremost important, delegate and sensitive area within the Bio-medical field. Newborn baby requires an environment exactly similar as within the womb to address the external environment. To supply the similar environment as within the womb infants have to be kept during a device referred to as Incubator. An infant incubator provides stable levels of temperature and ratio.With internet connection accessibility and therefore the development of smart phones, m-health application is playing a vital role for monitoring biomedical data.Air temperature should be maintained as constant value. The ratio should follow set values in step with the incubation day number. For doing that the sensors like vital sign, ECG sensors that capture the baby pulse rate and pulse are being given because the input to the microcontroller that compare the worth with the temperature and humidity to be maintained inside the incubator, and if any variations are there it's being indicated through the buzzer and relay signal is being passed to the LED for indication purpose of any fall within the temperature, the values are being stored

within the wireless ZIGBEE.The ZIGBEE signals are very difficult to grasp so the signals are being passed to the serial to USB converter that transfers the message into understandable format and is being stored within the system for reference. LCD is placed to look at the parameters. A mix of sensors and actuators that operates synchronously provides a stable thermal environment inside the incubator.

Monitoring of skin is completed if the baby's skin has less collagen, edema or becomes non keratinized, Phototherapy equipment together with PMS is incorporated at the severity condition or after the onset of certain diseases like jaundice. Rather than evaluating these items externally, it ismade that both PMS and Phototherapy equipment are added to the incubator circuit.

## II. LITERATURE SURVEY

Debashis De, et.al., (2017) proposed an automated neonatal health monitoring system is meant using sensor mobile cloud computing (SMCC). This is often supported by WSN and MCC. During this system, temperature sensor, acceleration sensor and pulse measurement sensor are used. They're continuously monitored through the mobile device using an android application for neonatal. When an abnormal situation arises, an alert is generated within the mobile device.

HongyuChenet.al., (2017) ensures with textile electrodes and inertial measurement unit (IMU) are embedded within the smart clothing to get ECG signal and motion signal whereby convulsion detection algorithm is performed. The look of system architecture relies on cloud enabling the entire system with great potential in clinical practice and residential monitoring[2].

M. Velikovaet.al., (2016) assess the agreement between servo-control temperature and rectal temperature and also the distribution of regional skin temperature of neonates nursed under a radiant warmer in a very neonatal medical aid unit[3].

SushmitaLenkaet.al., (2014) detect any unusual activity of the infant in early possible ways. This prototype helps all of the desired sensors which keep the track of temperature, moisture, sound and alerts doctor and nurse with the buzzer alarm. Those data would get saved within the cloud for future reference.

S. Bouwstraet.al., (2011) directs with the look of a snug monitoring system for prematurely born babies within the neonatal medical care unit (NICU) with the smart jacket connected to state-of-the-art amplifier. It finds correlation among ECG signal, acceleration data and context within the role of clinical validation during the look process.

## III. PROPOSED METHODOLOGY

This proposed system is intended to provide the similar environment to neonate as within the womb to cop up with the external environment. This technique is meant to form recordings by implementing parameters of PMS also as phototherapy equipment within the incubator. this might make observations easier and reduce the physical discomfort faced by the neonates.

The parameters would be pulse rate, ECG signal together with the temperature and humidity. There's a display meant for the instantaneous manual read out. Also analog signals which are very difficult to know are being passed to the serial to USB converter that transfers the message into understandable format and is being stored within the system for the reference.

The non-invasive form of optical vital sign sensor consists of an electronic circuit that monitors heartbeat by clipping onto a finger tip. It does this by shining light into (or through) the finger and measuring what quantity light is reflected (or absorbed). This fluctuates as blood is pumped through the finger

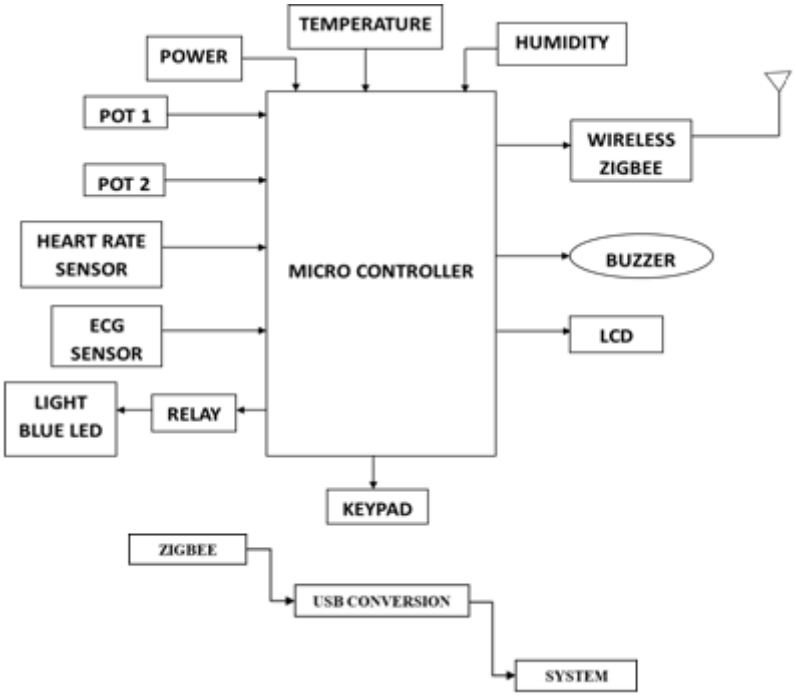


Fig 1:BlockDiagram for the Monitoring Module and Phototherapy Embedded in Incubator.

ECG sensor may be cost-effective board that can be used to measure the electrical activity of the heart. This electrical signals can be graphed as an ECG or Electrocardiogram and output as an analog reading. ECGs can be extremely noisy; the AD8232 Single lead Heart Rate monitor acts as an operational amplifier to help get a clear signal of the PR and QT Intervals easily.

Temperature sensor can measure the amount of heat or cold that is caused by an object or system, and “sense” or detect any physical change in that temperature generating either analogue or digital output.

Humidity sensor also called hygrometer senses, and reports both moisture, temperature of air. It works by detecting the changes that alter electrical currents or temperature in the air.

The AD8232 is an built in signal conditioning block formeausring ECG and for other biopotential applications. It is designed in such a way that it can draw out, amplify signals , and filter low biopotential signals in the presence of noisy environment, such as noises created due to motion or remote electrode placement.

The AD8232 module breaks out nine connections from the IC that can provide essential pins for operating this monitor with an Arduino or other development board. Also provided on this board are Right Arm, Left

Arm, and Right Leg pins to attach and use customized sensors. Additionally, there is an LED indicator light that will raise a pulse to the rhythm of a heart beat.

A buzzer is a device that raises audio signals, which may be mechanical, electrochemical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user inputs.

Zigbee is an IEEE802.15.4-based specification for a collection of high-level communication protocols wont to create personal area networks with small, low power digital radios, like for home automation, medical devices fordata collection, and low-power, low-bandwidth, for tinyscale projects which require wireless connection.

LCD screen contains two linesand each with 16 characters. Each character consists of 5x7 dot matrix. Contrast depends on the power supply voltage and messages that are displayed in one or two lines. For that reason, variable voltage 0-dd is applied on pin marked as vee.Some displays have integrated backlight (blue or green diodes).

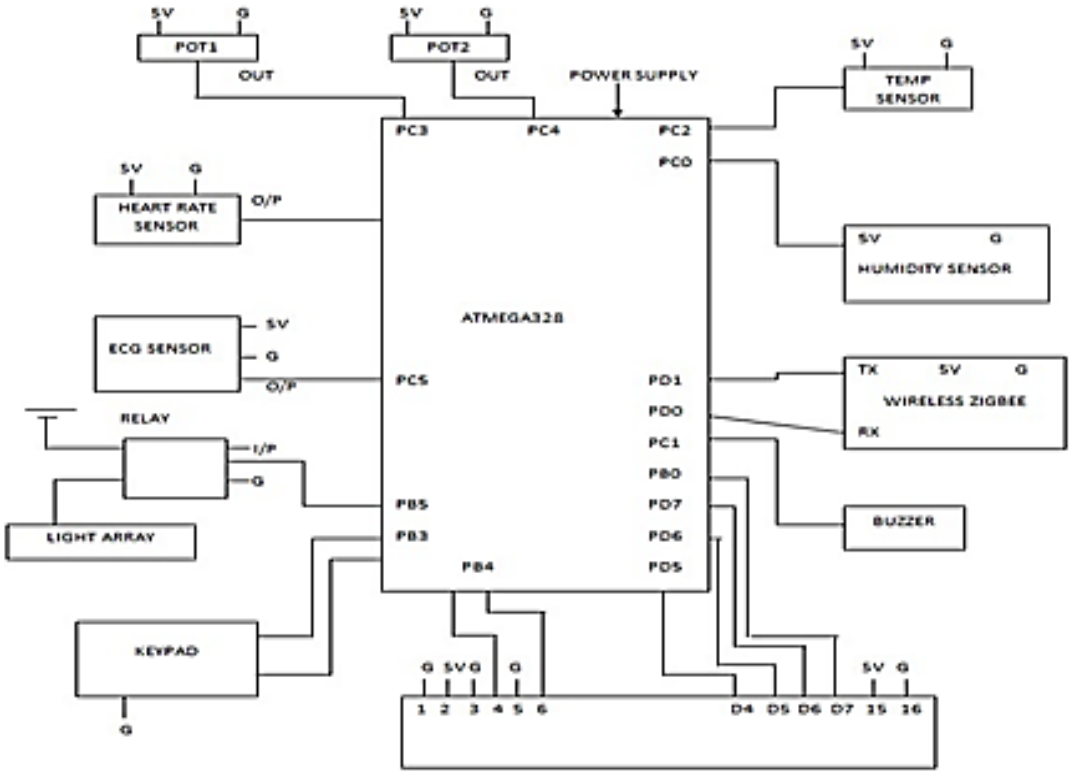


Fig 2: Pin Diagram of Monitoring Module and Phototherapy Embedded in Incubators

## IV. RESULT

This system has resulted in the combination of PMS and Phototherapy in the incubator. It makes monitoring of the neonates with specific birth defects and the premature easier and even intricate changes in the

physiological parameters can be identified and given appropriate attention. Even in the case of skin problems or improper perspiration, phototherapy aided with the use of relay is used.

## V. CONCLUSION AND FUTURE SCOPE

This system generally display the physiological parameters required to monitor the condition of the infant along with the phototherapy treatment. The parametric measures can be viewed in the display circuit as well as the database will be maintained for future analysis. An alert for any kind of exceeding from threshold is sensed through the buzzer. The scope of this system is that, it can be used for reducing the discomfort, faster data interpretation and accuracy with précised readings.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Analysis of Chronic Wound Infection Detection Using Computer Vision (CV)

**Sathish Kumar C[1], Anbarasi.M[2], Janani Priya R.P[2], Kavitha.S[2]**

[1]Associate Professor, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio Medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

Increasing damaged tissues are the major cause of the evolution of wounds. The area covered by the wounds determine the way of accessing it as per the traditional norms. This makes the accessing and measuring process slow. Contact and non-contact methods are taken into consideration for basic wound healing. The motive of the research work is to assess the wound healing status by capturing image then using it to analyse appearance of chronic pressure ulcers and leg ulcers due to vascular insufficiency. techniques including segmentation are incorporated to segment the wound from the images. Pre-processing is done as the next step and noise filters used to reduce noise. Wound images can be classified only using proper efficient classifiers. Wound image analysis classifiers (WIAC) are one such classifiers.

## I. INTRODUCTION

For an optimal wound care an accurate wound assessment is essential. A wound assessment serves two important purposes to determine wound severity in order to predict expected rate of wound healing & develop a comprehensive plan of care and to make the outcome measure consistent which is used to assess the effectiveness of the wound treatment program. Several methods of determining wound size have been developed and validated including wound depth, surface area rather than wound depth or volume, are believed to be most accurate and reliable. A comparison of several different methods available to assess wound surface area has also been performed, and although stereo photographic determinations may be most accurate, the use of a wound tracing are measured consistent and a easy technique to use. Other determinants of wound healing that should be included in a wound assessment are the evaluation of wound bio burden and wound severity[11]. This requires examining wound exudate and necrotic tissue type, the amount and characteristics of necrotic tissue, granulation tissue, and re-epithelialization, and assessing the viability of the wound edge and peri ulcer skin. To assess these components of wound healing, several assessment tools have been developed including the pressure sore status tool (PSST), the pressure ulcer scale for healing (PUSH Tool), the Sussman wound healing tool (SWHT) the Sessing Scale, and the wound healing scale (WHS)[1],[2].

These wound status scales are in need of a trained wound evaluation health care professionalwho perform a bedside assessment, wound 3 edge, and peri ulcer skin and are renowned. Currently there are many instruments which are used to measure the wound status (in exception for WHS) were developed specifically for use on pressure ulcers. But there were not any results in regards with assessing the manifestation of diabetic, venous, or arterial ulcers which are commonly referred as chronic vascular leg ulcers.

## II. LITERATURE SURVEY

For clinicians and nurses it is a heavy task to monitor the process of wound healing. All types of wounds need assessment; not only routine wounds but also ulcers, burns, traumatic or surgical wounds [9],[13]. Foot ulcers affect majority of patients with type 2 diabetes ranging between 5-6 million individuals. Foot ulcers are painful, susceptible to infection and very slow to heal [17].Mean shift algorithm is a proposed system used to execute analysis of wound image, wound boundary determination method and colour segmentation method to detect the wound healing condition [12]. SVM and level set methods which were used earlier has many drawbacks, i.e. it is too cost effective false edges and mis boundaries are observed when difference in skin colour at different spots are detected. So in order to solve these issues a better method is required like adaptive mean-shift segmentation algorithm[18].Image storage in database, image capture, pre-processing of wound, wound edge determination, wound colour segmentation and wound trend detection encloses assessment of wound images. Storage database stores images of wound captured by mobile phone. The wound image captured by a phone is stored in the storage database. Image pre-processing is the very first initial task involved after capturing the image. Image pre-processing step minimizes the high-resolution image in 6 order to increase the speed and to eliminate the unwanted details. The original image pixel dimension is divided by 4 in both horizontal and vertical direction to get 816*612. It gives a good balance between wound resolution and efficiency [19]. According to foot outline detection result and if the foot detection result is regarded as binary image, at that time infected area is detected by “White” and rest part marked as “black“ and this help to locate the wound boundary within the foot region. When the foot boundary not closed at that time problem become more complicated [20]. The segmentation algorithm can be adjusted to provide sufficient space for skin colour smoothness by changing the resolution parameters. The mode is known as the centre for each cluster. Entitled n data figures ‘i’ taking n inputs, the estimator [21].

## III. EXISTING SYSTEM

Minor or major skin wounds take different time periods to heal.Time consumed for healing isn’t easily predicted as many factorsareinvolved.eg:diet,AgeingFactors,Medicinal intake,environmental conditions.Beyond these,wound characteristics also play a vital role.Hence,wound monitoring is also vital, though many healthcare applications aid in disease monitoring, wound care domain require better sensing systems for wound biomarker identification.Wound care solution in current research is over biosensor-based

sensing system. This measures basic biomarkers which ais to major wound characters,i.e, Designed body temperature inference system that predicts wound hydration and boost healing.

## IV. PROPOSED SYSTEM

From the database Diabetic wound images are collected. The colour segmentation is done through Particle Swarm Optimization (PSO) technique. The Region of Interest (ROI) is extracted from the segmented image, different textural and colour based features are extracted and classified diabetic wound images using classifiers. In addition to this we are using hardware devices, the three pressure sensorsare used tomeasure the leg pressure status and temperature sensor to monitor the leg temperature, septic prevention using aluminium sheet used to detect the septic. RGB sensor is for monitoring the diabetic wound level.

## V. BLOCK DIAGRAM

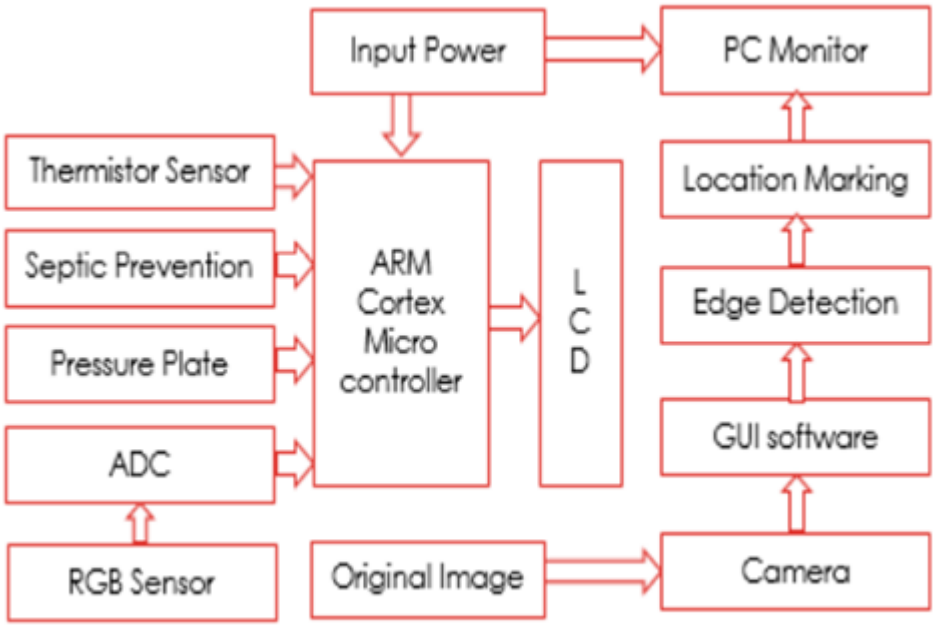



Fig :Block Diagram

## VI. BLOCK DIAGRAM DESCRIPTION

In this project we are proposing a new type of wound detection method that helps to easily find out the foot wound with Artificial Intelligence. The input power supply is used for both electronical setup and pc monitor. The electronical setup consists of power supply circuits built using filters, voltage regulators, and rectifiers.

Starting with an AC voltage, a stable DC voltage is acquired from the AC voltage, then regulating to obtain a preferred fixed DC voltage. In PC, we are using the GUI software for detection. The camera is capturing the original image of the foot[13].The captured image is transferred to the GUI software to process of Edge detection and Location Marking. After completion of these process the actual result is shown in the Monitor Display. In Electronical setup, ATMEGA 16A Microcontroller is control all of the hardware components. The thermistor sensor helps to detect the friction with the 11 raise of temperature level. The septic prevention is used to identify the septic level of foot wound with of conductivity level of Aluminium foil plates. The pressure plates are helps to find the pressure levels of the foot wounds. RGB sensor is identify the specific colour of the wound, the identified data is converted with help of ADC. Microcontroller receives all the data from the components. The transferred data are displayed on the LCD display

## VII. CIRCUIT DIAGRAM

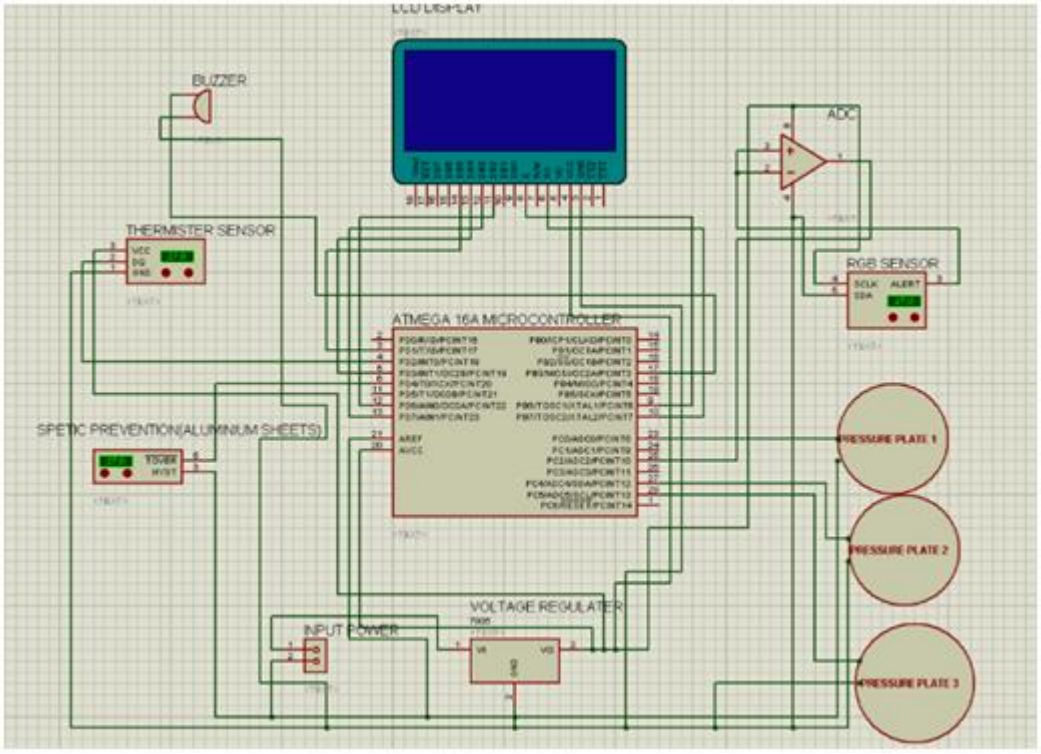



Fig : Circuit diagram

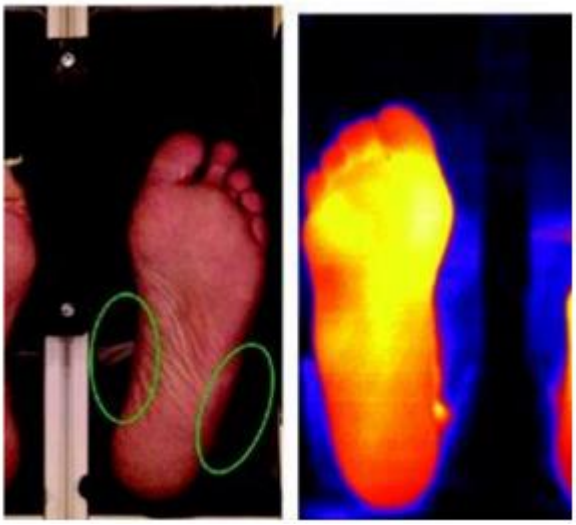
## VIII. CIRCUIT DIAGRAM DESCRIPTION

The 230V AC current is converted into a desired DC voltage, which is separated 12V and 5V regulator and rectifier unit. The ARM Cortex Microcontroller is connected with all components of the circuit. 12 The thermistor sensor is gives the output value of temperature level that is displayed on the LCD. The Septic Prevention is conductivity Aluminium sheet that gives the data of conductivity level of the foot that is helps

to prevent the septic level of the wound. The Pressure Plates are used to measure the pressure levels of the foot. The three plates are connected with microcontroller to transfer the pressure values of the pressure plates. The RGB sensor is identify the pre-set colour this is identify the red colour. The identified colour data is transferred to the ADC. The ADC converts the received analog data to digital
data, this digital data is transferred to the Microcontroller. Finally all data's are display on the 20x2 LCD display.

## IX. RESULTS & DISCUSSIONS

In this project is having two different ways of measuring, the different parameters with help of various components. The PC side helps to find out the wound infection level based on the thermal & black and white display. In the Hardware side is helps to detect and identify the different causes with various components include Aluminium sheets, RGB sensor, Thermistor. In this project we are proposing a new type of wound detection method that helps to easily find out the foot wound with Artificial Intelligence. The input power supply is used for both electronical setup and pc monitor. The electronical setup consists of power supply circuits built using filters, voltage regulators, and rectifiers. Starting with an AC voltage, a stable DC voltage is acquired by correcting the AC fixed DC voltage. In PC, we are using the GUI software for detection. The camera is capturing the original image of the foot. The captured image is transferred to the GUI software to process of Edge detection and Location Marking. After completion of these process the actual result is shown in the Monitor Display. In Electronical setup, ATMEGA 16A Microcontroller is control all of the hardware components. The thermistor sensor helps to detect the friction with the raise of temperature level. The septic prevention is used to identify the septic level of foot wound with of conductivity level of Aluminium foil plates. The pressure plates are helps to find the pressure levels of the foot wounds. RGB sensor is identify the specific colour of the wound, the identified data is converted with help of ADC. Microcontroller receives all the data's from the components. The transferred data's are displayed on the LCD display.



i. Original Image and Thermal Image


ii. LCD Shows Temperature and Pressure Levels

## X. CONCLUSION

This project concludes with developing a Wound Image Analysis Classifier (WIAC) for efficient tracking of wound healing status. Wound images are classified based on severity levels. An effective tool has been developed for analysis of wound healing process using segmentation technique, filtering, denoising and transparent overlay techniques using colour image processing. Effective detection of cells and estimation of their level of healthiness in the diabetic wound image helps to diagnose the wound status without contact. Weakening of wound can be detected. While comparing with the tool the effectiveness of the image can be calculated.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Movement Assisting Device for Stroke Affected and Spinal Cord Injured Patients

**Bagyalakshmi N[1], Sivasomnath G[2], Vidhya M[2], Vijay Sarathy K S[2]**

[1]Associate Professor, Department of Bio medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

There is expanding interest in involving automated gadgets to aid development preparing following neurologic wounds like stroke and spinal rope injury.This project reviews control strategies for robotic therapy devices. A few classifications of methodologies have been proposed, including, assistive, challenge-based, haptic reenactment, and instructing. The best measure of work has been done on creating assistive systems, and consequently most of this survey sums up procedures for executing assistive techniques, including impedance, offset, and EMG based regulators, as well as it helps the spinal injured patient to induces their foot stepping along with patient axis and it continuously monitoring the physical conditions like body weight, temperature, dizziness and at the same time it counts patient footsteps , the above mentioned parameters are displayed in the LCD.This system enables a continuous feedback mechanism for instance in case of an undesired behavior or condition a pre-emptive message wirelessly to the patient and the patient's caregiver.

## I. INTRODUCTION

Spinal cord injury (SCI) is a devastate to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function. Patients with spinal line injury generally have super durable and frequently decimating neurologic shortages and handicap in all intense string disorders, the full degree of injury may not be clear at early. Fragmented line sores might develop into additional total injuries. All the more ordinarily, the injury level raises 1 or 2 spinal levels during the hours to days after the underlying occasion. A complex cascade of path physiologic events related to free radicals, cacogenic edema and altered blood flow accounts for this clinical deterioration. Typical oxygenation, perfusion, and corrosive base equilibrium are expected to forestall deteriorating of the spinal line injury.Spinal string injury can be supported through various instruments, with the accompanying 3 normal anomalies prompting tissue harm.Obliteration from direct injury Compression by bone parts, hematoma, or plate material Ischemia from harm or impingement on the spinal corridors Edema could result ensuing to any of these kinds of distress.

## II. LITERATURE SURVEY

HartwigWaldag.et.al.New findings in basic neuroscience provide stimuli for research in motor rehabilitation .Development gives the main means we need to collaborate with both the world and others.Such connections can be permanently set up or learned through experience with the climate. Learning permits us to adjust to a changing actual climate as well as to novel shows created by society. Here we audit engine gaining according to a computational point of view, investigating the requirement for motor learning, what is learned and how it is represented, and the mechanisms of teaching. They relate these computational issues to empirical studies on motor learning in humans[1]. JH van der Lee.et.al.Customary investigations of engine learning and expectation have zeroed in on how subjects play out a solitary errand. Ongoing advances have been made in how we might interpret engine learning and expectation by exploring the manner in which we learn variable assignments, which change either typically or unusually over the long hale. Similarly, studies have examined how variability in our own movements affects motor learning[2]. Shadmehr R. The capacity to master novel coordinated movements has crucial significance for versatile way of behaving.The capacity to master novel coordinated abilities has crucial significance for versatile way of behaving. Modifications of neural properties, synchrony and synaptic efficacy are all related to the development and maintenance of motor skill[5]. CM Butefisch.et.al. This paper focuses on studies in healthy human subjects that examined the functional neuro anatomy and cerebral plasticity associated with the learning, consolidation and retention phases of motor skilled behaviors using modern brain imaging techniques.Reinkensmeyer[3] CondittMA.et.al.Mechanical gadgets are helping shed light on human engine control in wellbeing and injury. By utilizing robots to apply novel power fields to the arm, examiners are acquiring knowledge into how the sensory system models its outer unique climate. The sensory system fabricates interior models steadily by experience and uses them in mix with impedance and criticism control techniques[7].

## III. PROPOSED METHODOLOGY

Patients with spinal cord injury usually have permanent and often devastating neurologic deficits and disabilityin all intense string disorders, the full degree of injury may not be obvious at first.Thus the development of robotic therapy control algorithms intended to promote neuro plasticity and motor learning during rehabilitation after neurologic injury. Essentially, it is still even indistinct whether automated control approaches can possibly deliver more noteworthy advantages than is conceivable with easier strategies, like repetition, unassisted practice .Even though a substantial amount of work has now been done, the field is rapidly evolving. The greatest amount of work has been done on developing assistive strategies, and thus the majority of this review In this proposed project we assist summarizes techniques for implementing assistive strategies, including impedance, counterbalance, and EMG based controllers, as well as it helps the spinal injured patient to induces their foot stepping along with patient axis and it continuously monitoring the

physical conditions like body weight, temperature, dizziness and at the same time it counts patient footsteps real time manner.

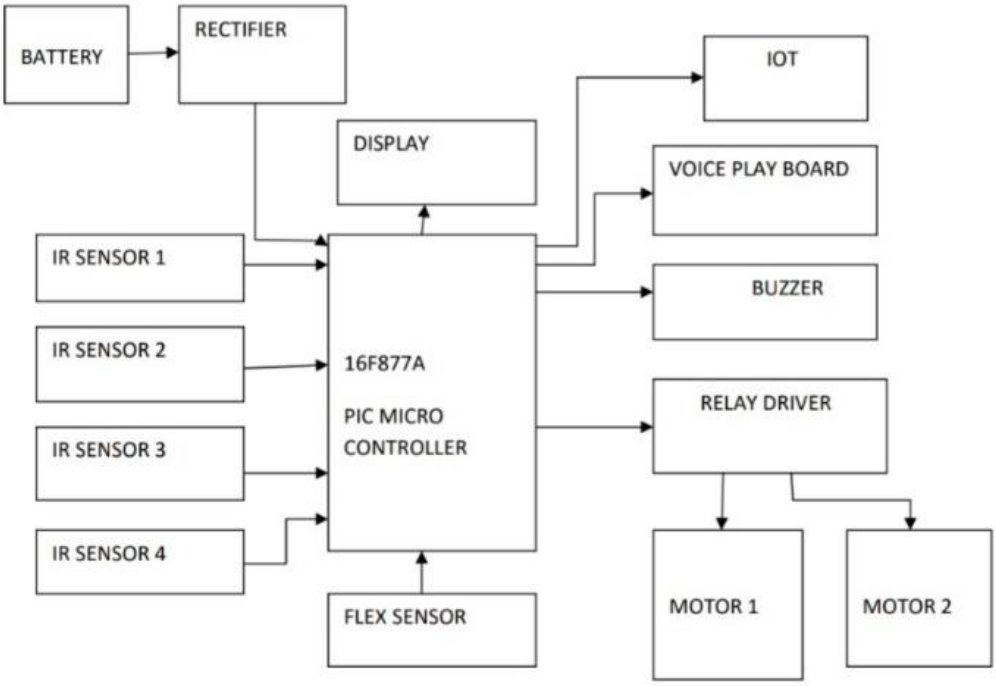


Fig 1 Block Diagram

Microcontroller is the main control unit for sensing the patient conditions like axis, footsteps and dizziness. The IR sensor is a electronic device which is analogous to human visionary, The IR sensor comprises (LM358 IC2 IR variable resistors), receiver and transmitter pairs. 12V battery is used, the range of voltage regulator is 7805, 7812 performance of microcontroller is very fast due to using of RISC architecture. Transmitter sections includes an IR sensor, which transistor continuous IR rays to be received by IR receiver module buzzer is an integrated structure of electronic transducer IR power supplied. It is on-board passive buzzer which consists of 3550 mode drive. It works in the voltage of 5V and it controls single chip microcontroller directly. LCD works on initialized conditions, It send 38H for 8-bit , double lines and dot character format. The outputs are displayed in LCD. Flex sensor 2.2 inch is used that is FS-L-0055.Working voltage is 0-5Vwhich works even in low voltages, it has pads protections 25kilo ohm.Flex sensor is fundamentally a factors “resistor” in which the terminals protections increment when the sensor is twisted.So this surface linearity .so detecting the progressions in linearity is typically utilized.DC motor is placed in a magnetic field, it experiences torque and has a tendency to move , when magnetic field and electric field interact; mechanical force is produced motor works on this basis.

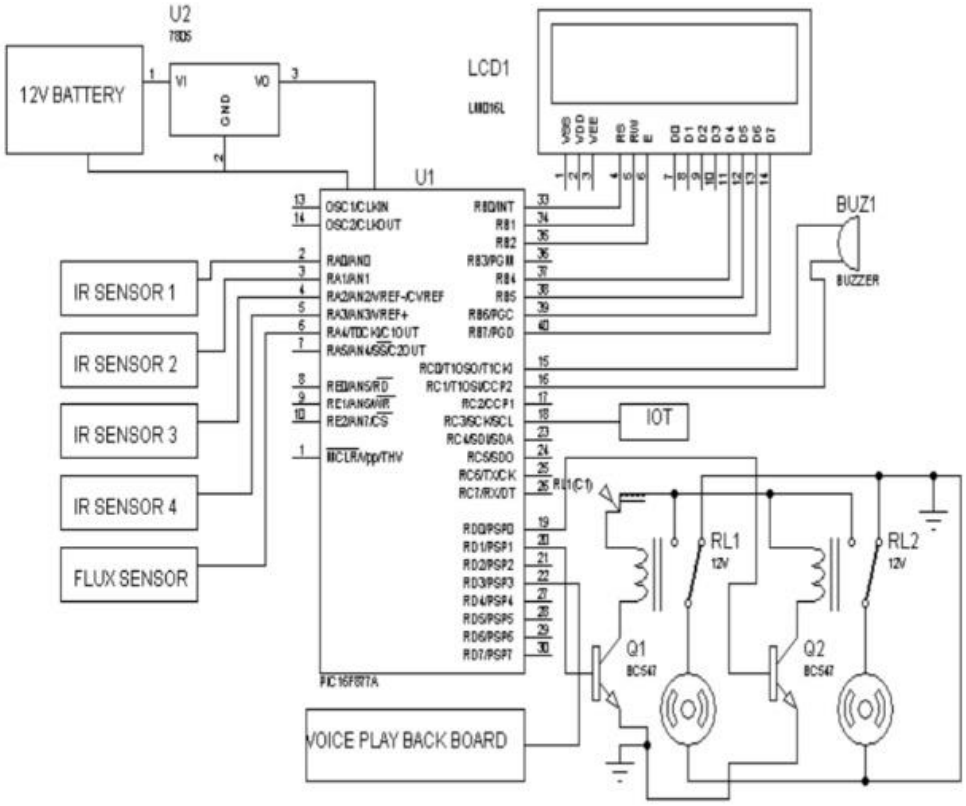


Fig 2 Circuit Diagram

The controller unit (PIC16F877A) is used in this circuit and various sensor modules are connected with it. This microcontroller collect data's from various modules which includes IR sensor (LM3589C2) and flex sensor(FSL-0055), through that patient foot step counts, axial orientation , body weight and temperature are measured. The power supply unit is rectified (bridge rectifier), filtering with a capacitor and regulating voltage (5V) are directed to controller unit. The sensors which connected to the main controller unit sensed a data's of foot step counts, patient axis , body weight and temperatures and simultaneously displayed in LCD in a real time manner and also it transmit these data to patient caregivers mobiles via IOT on the basis of wireless technology.

## IV. RESULT

Several robotic therapy studies have used chronic stroke or spinal cord–injured patients as their own baseline control. Robotic Therapy Algorithm Selection Several modes of robot-assisted movement have been developed, including passive , active-constrained ,counterpoise control , resistive, error-amplifying and bimanual modes .However, the primary therapy paradigm tested so far is active assistance , a clinical term that refers to exercises in which the patient attempts a movement(active) and in which a therapist manually

helps complete the movement if the patient is unable (assistance). This pioneering work provides thesupplemental robotic therapy can improve recovery in acute and now chronic stroke patients. However, these studies do not address whether robotic treatment offered unique advantages to conventional therapy (or) the key components of the robotic therapy were (e.g., mechanical assistance by the robot versus an increased amount of sheer repetitive effort by the patient).

## V. CONCLUSION

Robotic devices are helping us to understand the human motor controller and particularly the structure of feed forward control processes and their relationship to impedance and feedback control. Robotic devices are also helping us to understand how external force and movement practice influences motor recovery. We see the possibility of a new synergy facilitated by robotics, in which choice of patients and training techniques will arise logically from computational motor study. The development of robotic therapy control algorithms intended to promote neuro-plasticity and motor learning during rehabilitation after neurologic injury. Despite the fact that a significant measure of work has now been done, the field is quickly developing. The randomized controlled preliminaries important to recognize these calculations are costly and tedious. Generally, it is still even indistinct whether mechanical control approaches can possibly create more noteworthy advantages than is conceivable with easier procedures, like repetition, unassisted practice. In this project conclude by suggesting three directions for future research.

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# Domestic Wound Care System

**N.Sneha[1], N.Nithya Sri[2], R.Iswarya[2], N.Bagyalakshmi[2]**

[1]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Associate Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Skin diseases like melanoma are traditionally screened by a visual analysis of key features, such as the pigmentation and vascularity of the region of interest. Observing the progressions of these elements during follow-up imaging meetings is basic towards a right clinical determination.This project proposes a framework to monitor these changes on the skin over time. The proposed framework utilizes the automated data collection from skin displacement flow implementation to detect the severity of spatial changes in the skin.These spatial changes are captured via the magnitude and direction of the vectors in the resultant displacement field. This change monitoring is tested for surface and sub-surface skin image data and color view analysis. if any changes in skin detected means solution recommended medicine can be sent to medical shop . The patient do not even need to visit the stores once they can access the home where the druggists upload their drug lists data to server. Smart phones are becoming cheaper and are most popular around the globe. Thus this environment friendly 'pen-paperless' Android based application can be an efficient solution to save the druggists' and patient' time by reducing the extra time for drug requisition. The solution has been designed, implemented and testing to show the effectiveness of the solution.

## I. INTRODUCTION

The average annual number of adults treated for any skin cancer (nonmelanoma skin cancer and melanoma) increased from 3.4 to 4.9 million between 2006-2010 and 2017–2018 with the largest proportion representing keratinocytictumors, while the average number treated for all other cancers increased from 7.8 to 10.3 million. Cutaneous melanoma and non-melanoma skin cancers are initially diagnosed based on visual attributes of a lesion or mole. Cutaneous melanocytic lesions metastasize aggressively and the tumor thickness becomes a critically important prognostic factor. The visual examination of such suspicious lesions leads to a clinical biopsy of the affected skin and the cross-section of the skin tissue is examined by pathological assessment. However, this diagnostic process is timeconsuming, invasive and subjective to medical experience.

## II. LITERATURE SURVEY

Skin picture distinguishing proof has become perhaps the most requesting and appealing examination regions in the beyond hardly any year. Variety histogram based qualities are utilized to break down and order the psoriasis tainted skin pictures in arrangement to go to the indicative lengths. images in sequence to take the diagnostic measures. Skin images for cancers of different types are obtained from, of these images for BCC (Basal cell carcinoma), SCC (squamous cell carcinoma) and normal or harmless skin lesions are collected and database is created for testing purpose Next step in image processing is de-noising using wavelet tool. To remove low frequency or background noise from image, filtering is used. After de-noising the image, median filtering is applied to remove some hair like material from skin image, if present Thresholding is the simplest and most commonly used method of segmentation[1].A support Vector Machine with RBF kernel is used for the classification of images. The experimental results gave the encouraging results in an initial attempt for identification of psoriasis infected skin images. Classification of psoriasis skin diseases and their severity will be carried out. Image processing method is implemented in MATLAB, for skin cancer detection. In this paper, online database of skin cancer images is used for testing the method[2].Ho Tak Lau. Have worked on an automatic skin cancer classification. Available image is given to the system and it goes through different image processing procedure. Use full information is extracted from the image and then with the help of training and testing system classifies the image.Recognition accuracy of the neuralNetwork classifier is 90% Image examination framework to distinguish skin infections.Our framework catch picture from standard data set and put in to the framework to illuminate the client for forestalling the dangers connected to skin sicknesses. All the more momentarily, we present the Image examination framework to identify different skin sicknesses, where client will ready to take pictures of various moles or skin patches. Our framework will examine and handle the picture and characterizes the picture to typical, melanoma, psoriasis or dermo case based extricating the picture features[3]. In this paper, we present Image examination framework to determination various skin sickness utilizing measurable boundary investigation. Measurable examination is worried about investigation of arbitrary information. This framework is combo-model which is to be utilized to finding different skin illnesses all at once. The objective skin illnesses are skin disease, psoriasis and dermatophytosis. The illness conclusion and grouping is based on measurable boundary investigation. Measurable boundaries includes:Entropy, Texture list, Standard deviation, Correlation truth Depending on standard scope of boundaries skin illness will be determination and classified[4].

## III. PROPOSED METHODOLOGY

Skin demonstrating expects to foster versatile edges of skin finder. Fast detection using AI and microcontroller. The patient don't even need to visit the stores once they can access the drug to their home where the our project kit upload their drug lists data to server and they detect GPS location co-ordinates.Conveyance to their patient home. Smart phones are becoming cheaper and are most popular around the globe. Here two MQ2 sensor is used for detect the wound smell for different stages . And

ultrasonic patch used for healing the skin diseases and relay is used to activate the blue light, wireless device used for pair the physical device to android app. The wound smell is detected the SMS notification send to medical shop. And GPS live location send to the shop. They deliver the drug to the patient.

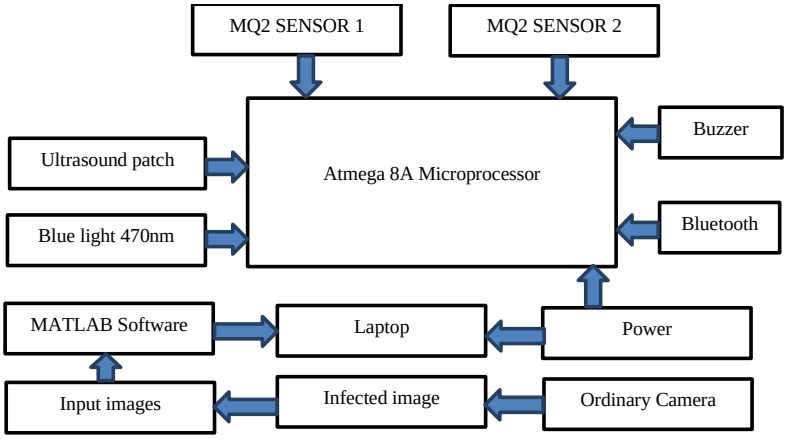



Fig 3.1 Hardware section

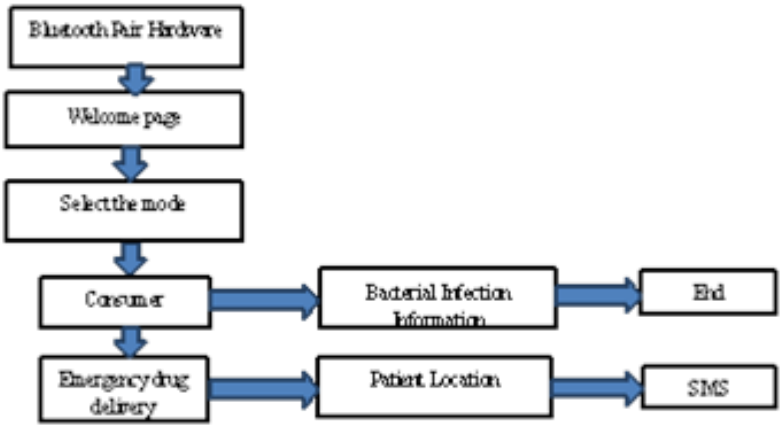



Fig 3.2 App structure

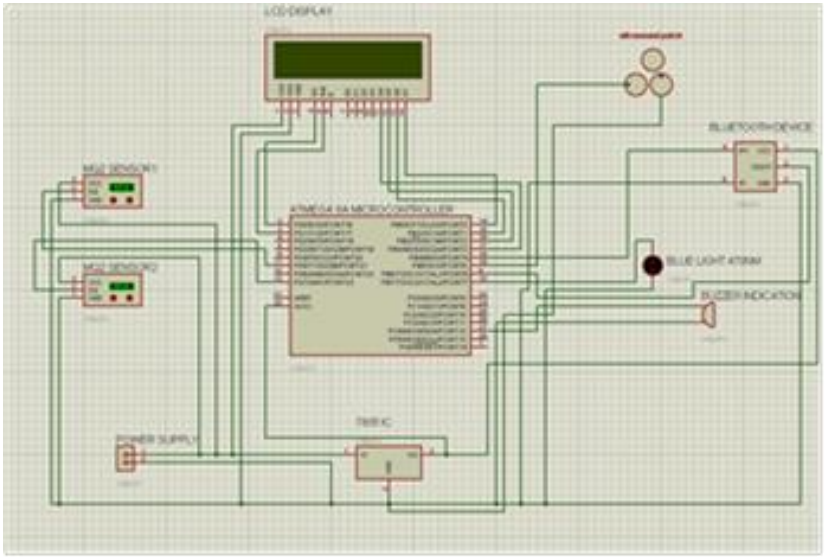


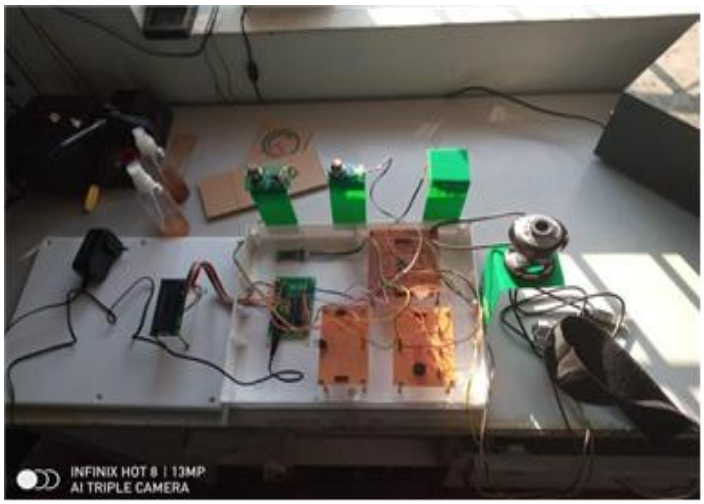
Fig 4.1 Circuit Diagram

## IV. WORKING

A P-N junction can convert absorbed light energy into a proportional electric current. The same process is reversed here (i.e. the P-N junction emits light when electrical energy is applied to it). This phenomenonisgenerally called electroluminescence, which can be defined as the emission of light from a semiconductor under the influence of an electric field The charge carriers recombine in a forward-biased P-N junction as the electrons cross from the N-region and recombine with the holes existing in the P-region. Free electrons are in the conduction band of energy levels, while holes are in the valence energy band. Thus the energy level of the holes is less than the energy levels of the electrons. Some portion of the energy must be dissipated to recombine the electrons and the holes. This energy is emitted in the form of heat and light. The electrons dissipate energy in the form of heat for silicon and germanium diodes but in gallium arsenide phosphide (GaAsP) and gallium phosphide (GaP) semiconductors, the electrons dissipate energy by emitting photons. If the semiconductor is translucent, the junction becomes the source of light as it is emitted, thus becoming a light-emitting diode. Nonetheless, when the intersection is converse one-sided, the LED creates no light and — assuming the potential is sufficiently extraordinary, the gadget is harmed.

A 4x zoom photo of an ultra-violet LED has been shown in picture. Unlike a laser, the color of light emitted from an LED is neither coherent nor monochromatic, but the spectrum is narrow with respect to human vision, and for most purposes the light from a simple diode element can be regarded as functionally monochromatic coherent nor monochromatic, but the spectrum is narrow with respect to human vision, and for most purposes the light from a simple diode element can be regarded as functionally monochromatic.

## V. RESULTS




In this system we have two parts software and hardware. Hardware consist of LCD display, camera, Microprocessor, Gas sensor, Blue light(470nm), Ultrasound patch, Bluetooth. Software parts are Matlab software and DWS application. The camera will capture the image and analysis the wound stages by using Matlab software through the computer. Bluetooth sends parameters to the DWS application. That will be

installed in our mobile. When we pair our mobile Bluetooth with kit Bluetooth we can send parameters. Through this app we can send enough information and location of the phone (by using GSM) to nearby medical shop.

## VI. CONCLUSION

A Computer based skin illness location framework is proposed. The diagnosing procedure involves Digital Image Processing Techniques for the characterization of contaminated skin. The special elements of the upgrade pictures were extricated utilizing HSVhistogram and SURF. In light of the elements, the pictures were delegated tainted skin and ordinary skin.

This system has got great exactness moreover. By differing the Image handling procedures and Classifiers, the accuracy can be improved for this framework. In spite of having some trouble, these strategies are exceptionally useful in clinical science. The information we have gathered will be useful in clinical field to see the unmistakable picture of the contaminated part in the skin.

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In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design and Implementation of Cleaning Robot Used in Hospital Inspection

**M.Ishaq Ajhar[1], D.Harish[1], N.Manivanan[1], T.S. Udhayasuriya[2]**

[1]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Professor and Head, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Technology is getting better and better day by day, Robots are substituted as an alternative of humans. In this era it is necessary that all sections of the society developed equally either it is space research , medical or automobile same thing applies on the domestic sector nowadays cleaning is completely substituted with robotic cleaners. This project presents the design and development hospital Cleaning Robot. It can perform tasks like cleaning without any help of humans. Many of the robotic appliances are being used extensively. Herethe cleaning technology completely works on the basis of RF Wireless communications. Here radio frequency has been used to provide wireless communication between the user and the robot. And also using the image processing to identify the bacteria and destroyed by passing UV rays.

## I. INTRODUCTION

Robot is an electromechanical machine and integrated for various purposes in industrial and domestic applications to replace humans. this project is to build a wireless control robot using RF device button instruction-based gripper arm. According to the instruction mounted on hand, it sends the commands which drives the motor to forward, backward, right and left. The robot is designed like if it detects an obstacle in its cleaning path, it changes it lane and move back, in its automatic mode. Obstacle detection and hurdle detection in the path of the robot are displayed on LCD [1]. The robot vacuum cleaner consists of spinning brushes, mopping, UV sterilization and security cameras for cleaning purpose [2]. An automatic floor cleaner robot has ultrasonic sensors to avoid obstacles and change its direction and suction unit that sucks in the dust in the room freely [3].

## II. PROPOSED METHODOLOGY

This project develops cleaning robot can perform cleaning task. Radio frequency have been used for wireless communication between remote and robot.

Four motors are used, two for cleaning, and two for wheels. Dual driver circuit used to drive the motors for cleaner. In manual mode, RF remote has been used to transmit and receive the information between remote and robot.

The whole circuit is connected with 12V power source by using anaconda software to identify the waste injections to clean the surround environment and passing UV rays for destroying the bacteria.

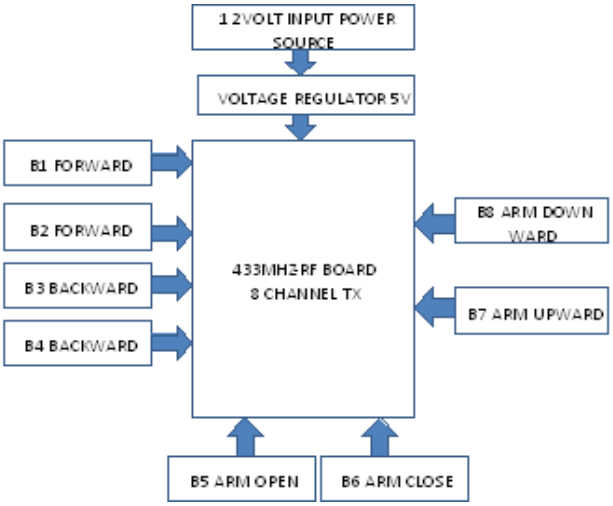


FIG 3.4.1 Transmitter block

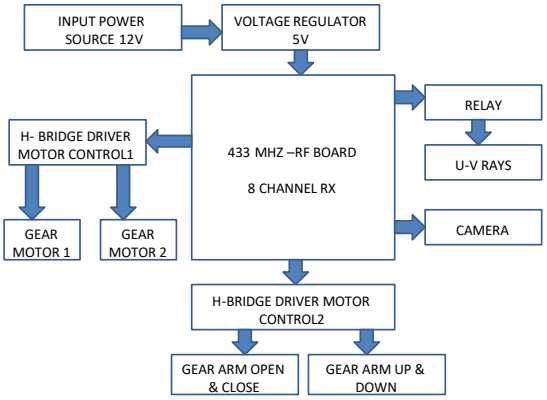


FIG 3.4.2 Receiver block

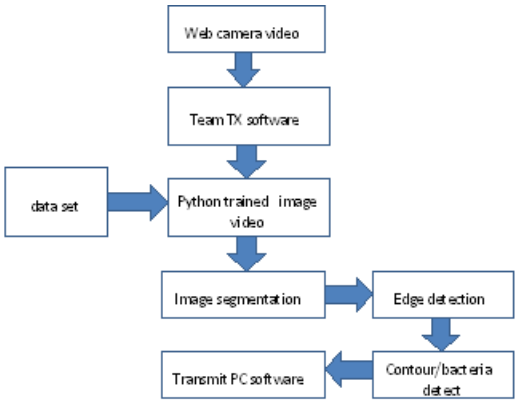


FIG 3.4.3 Software block

It was implemented by using 433MHZ Radiofrequency board with 8 channel transmitter and receiver system. This system module uses the driver motor control circuit 1, driver motor control circuit 2 and also act as relay module. In this driven motor circuit 1,it performs the motion using wheels followed by controlled switches such as forward, backward, left and right.

Next follows the driven motor control circuit 2, it performs the functions to prick the things up and dispose the things below by controlling the gripper system to specify functions as open, close, upward and downward. Atlast it uses the relay circuit to pass the UV rays whenever the contour/bacteria got identified in the hospital by using webcamera..In this system , we use the python software system whereas that will be trained to identify the image by implying the proper training skills .If the image is identified then it uses the image segmentation to process the image.Edge detection technique is used to identify the boundaries of object within the image.

This image will be obtained from webcameraand shifted to the pc system.It uses the 433HZ radio frequency receiver board to imply eight input functions such as the driven motor circuit 1 and driven motor circuit 2.The H-bridge driven motor circuit 1 used for moving the robot with sustained instructions. The motion can be controlled by following control switches that can be ordered as B1 and B2 these performs forward function, B3 and B4 performs backward function. Then the H-bridge driven motor circuit 2 controls four functions such as B5 and B6 respectively performs the robot arm open and close, then B7 and B8 respectively performs the upward and downward movements. The relay circuit is used to enable ultraviolet rays passing through the particular place whenever the bacteria or microbes get identified in the system through webcamera.

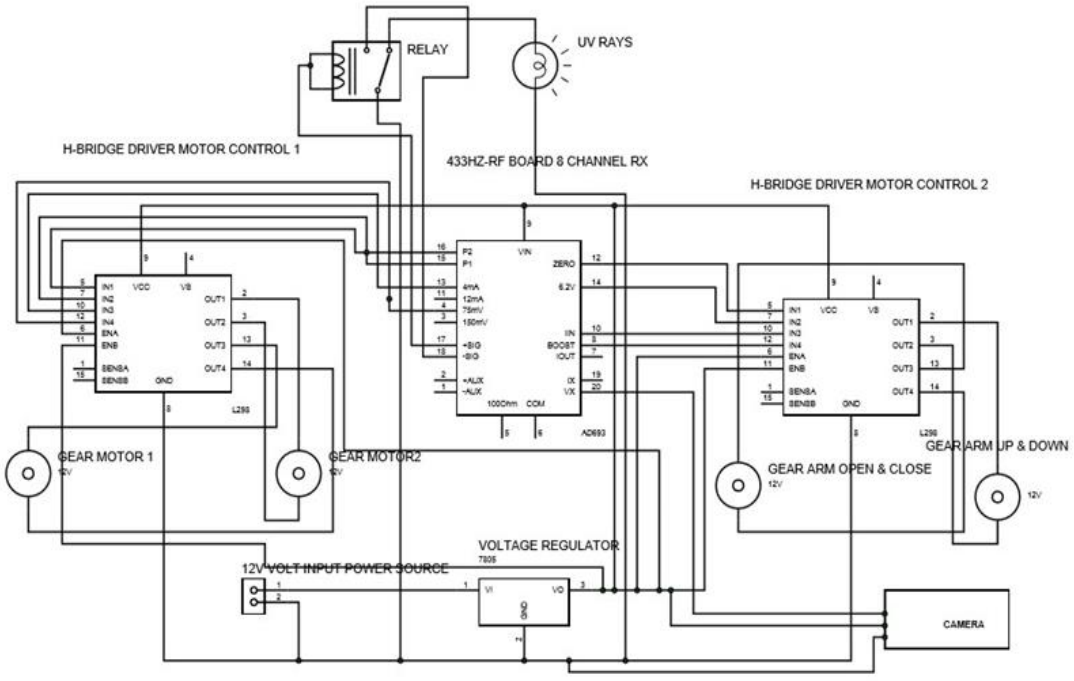


FIG.3.6.1 TRANSMITTER CIRCUIT

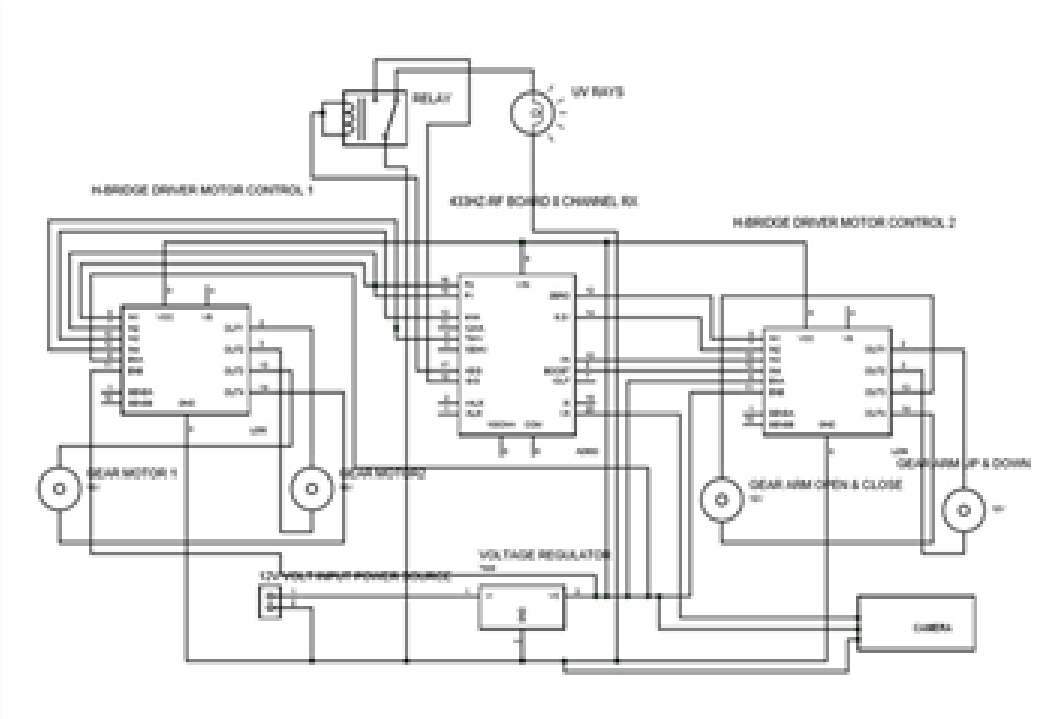


FIG 3.6.2 Receiver circuit

## III. RESULT AND DISCUSSION

OUTPUT

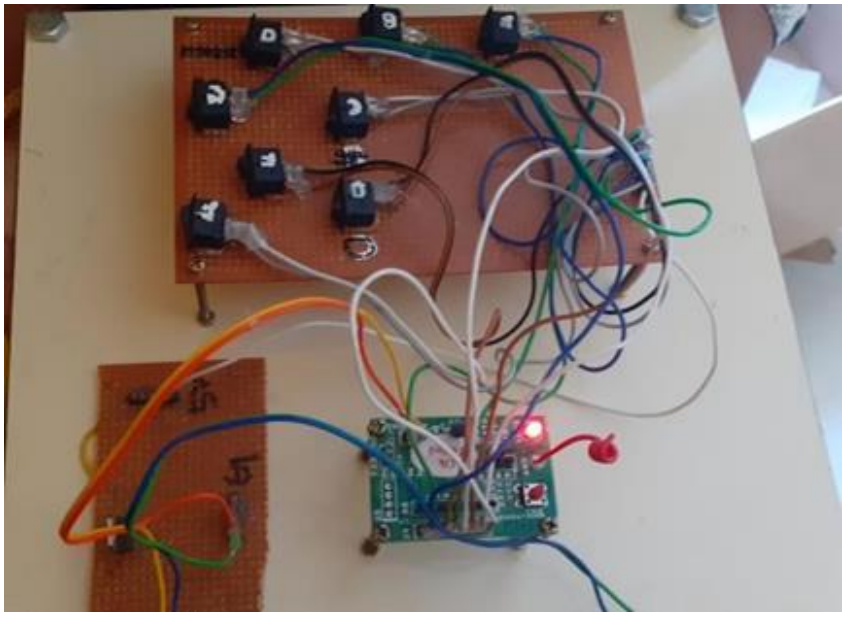

Fig 6.1 Remote of the robot

The figure represent the controlling board of the robot .The keys which are present here are open key, close key, forward key, backward key, up and down key.

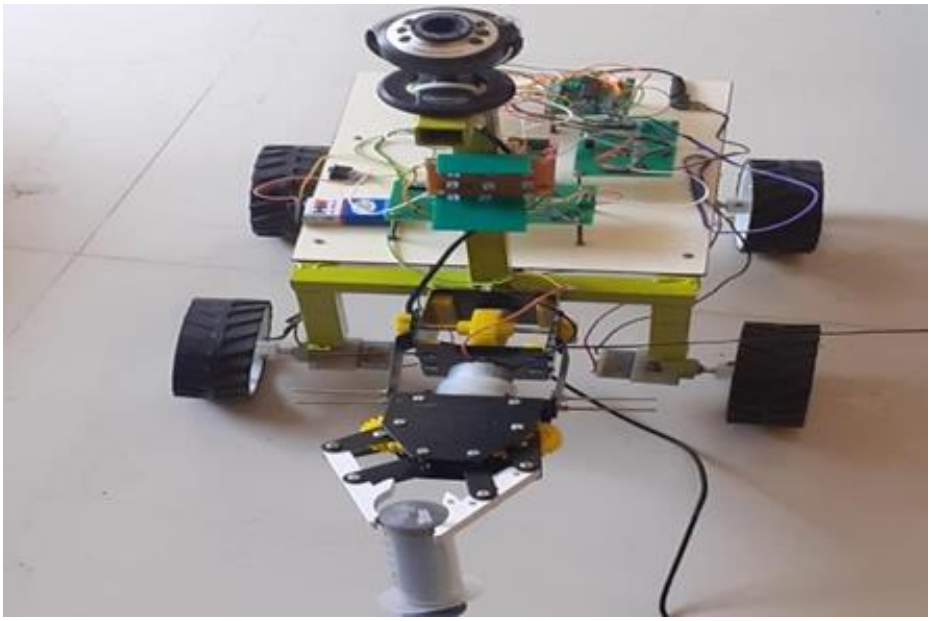

FIG 6.2 Sterilizing robot

These sterilizing robot perform its operation in an exact way to destroy the infective organism using image detection method and safe amount of UVrays is utilized here.

## IV. CONCLUSION

In this project, an robot has been developed which works according to RF device button instruction based. The robot moves wirelessly according RF device button instruction and h bridge instruction. Forward backward right left , arm up and down ,arm open and closed instructions received by RF transmitter. In future we also developed the automatic controlling the robot and voice commandbased instructions.

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In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# An Interactive Smart Mirror for E-Health Monitoring System

**Ganesh Babu P[1], Sathish V[2], Nithesh M[2], Kavin M[2]**

[1]Assistant Professor, Department of Bio medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

[2]UG Scholars, Department of Bio medical Engineering, Adhiyamaan College of Engineering, M.G.R Nagar, Hosur, Tamil Nadu, India

## ABSTRACT

People with their busy work tend to ignore the importance of health. To encourage people to keep track of their health and to overcome though to make regular visits to the hospital the Medical Mirror is proposed. The Medical Mirror is a novel interactive interface that tracks and displays a user's heart rate, weight, body temperature in real time. It is an approach to make common people to have access and control over their own physiological data so as to play a crucial role in the management of their health. However, current techniques for physiological data monitoring, this discourages regular use because the sensors can be uncomfortable or encumbering. This work proposes a new mirror interface for real-time measurements of pulse rate with sensors. These techniques also involve the use of individual equipment in the measurement of each health parameters of human body. Medical Mirror integrates all the measuring facilities at one place with a compatible user interface providing convenient for people to track their health condition. The measured data will be displayed in the mirror's LCD display. The Medical Mirror fits seamlessly into the ambient house environment, blending the data collection process into the course of day to day lifestyle. Clinical mirror will facilitate the User Interface. When people start using this technique they can be able to easily monitor their physiological condition by referring their data.

## I. INTRODUCTION

Digital medical devices promise to transform the future of medicine because of their ability to produce exquisitely detailed separate physiological data. As ordinary people start to have access and control over their own physiological data, they can play a more active role in managing their health. This revolution must take place in our day to day lives, not just in the doctor's office or research lab. However, current techniques for physiological monitoring typically require users to strap on more sensors. This dispirit standard use in light of the fact that the sensors can abnormal or hamper. In this work, we propose a new mirror interface for real-time, measurements of heart rate and body temperature and weight monitoring. Users can have the experience of health monitoring by simply looking into the Medical Mirror.

The main objective of Medical Mirror is to build a device which measures the most commonly measured body parameters such as Weight, Body Temperature, and heart rate. To design a device which will be easy to use and have a compatible user interface to display the measured parameters on the mirror itself. The health data's can be easily monitored.

## II. LITERATURE SURVEY

[4]W.Verkruysse, et al., Remote plethysmographic imaging utilizing surrounding light .The paper explains a novel method to measure human cardiac pulse at a distance. It is based on the information contained in the thermal signal emitted from major apparent vessels. To compute the frequency of pulse, we extract a line-based region along the vessel. Then, we apply fast Fourier transform (FFT) to separate points along this line of interest to capitalize on the pulse's of thermal propagation effect. Finally, we use an adjustable estimation function on an average FFT outcome to quantify the pulse. This signal is acquired through a highly sensitive thermal imaging system.[12]M.Garbey, N.Sun, A.Merla., I. Pavlidis,. Contact-free measurement of cardiac pulse based on the of thermal imagery. The Medical Mirror is an original intelligent point of interaction that tracks and shows a client's pulse continuously without the requirement for outer sensors. The current techniques for physiological monitoring typically require users to strap on bulky sensors, chest straps or sticky electrodes. They propose a new mirror interface for real-time, contact-free measurements of heart rate without the need for external sensors. Clients can have the experience of distant wellbeing observing by essentially investigating the Medical Mirror.[7]Paul Viola, Michael Jones.,. Quick Object detection using a Boosted Cascade of Manageable Features. Remote measurements of the cardiac pulse will provide comfortable physiological assessment without electrodes. This novel way can be applied to color video recording of the human face and is in view of programmed face following alongside blind source partition of the variety channels into free parts. Using Bland-Altman and correlation analysis, we can compare the cardiac pulse rate extracted from videos recorded by a basic webcam to an FDA-approved finger Blood Volume Pulse (BVP) sensor and achieved high accuracy and correlation even in the presence of moving ancient rarities. [9]Khurd Aishwarya .S, Shweta .S. Kakade, R. M. Dalvi, . Smart Mirror, Our approach and apply it to compute heart rate measurements from video images of the human face recorded using a simple webcam. Secondly, we demonstrate how this method can withstand motion artifacts and validate the precision of this methodology with a FDA-supported finger Blood Volume Pulse (BVP) estimation gadget. Thirdly, we show how this method can be easily extended for continuous heart rate measurements of multiple persons.

## III. PROPOSED SYSTEM

In this existing system the sensors are embedded on the patient body to sense the temperature and heartbeat of the patient. Two or more sensors are placed at home to sense the heat and the temperature of the room where the patient is staying. These sensors are associated with a control unit, which works out the upsides of the multitude of sensors

The proposed project is smart medical mirror for health monitoring. In proposed system we are using AVR microcontroller for controlling the device. Supply .The display device is connected with controller for displaying function of sensors .The heart beat sensor for heart rate monitoring.

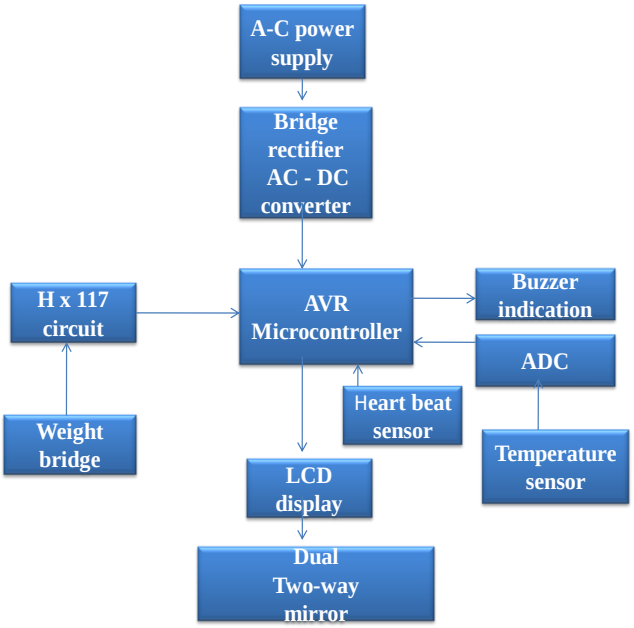


Fig 1: Block diagram for proposed system

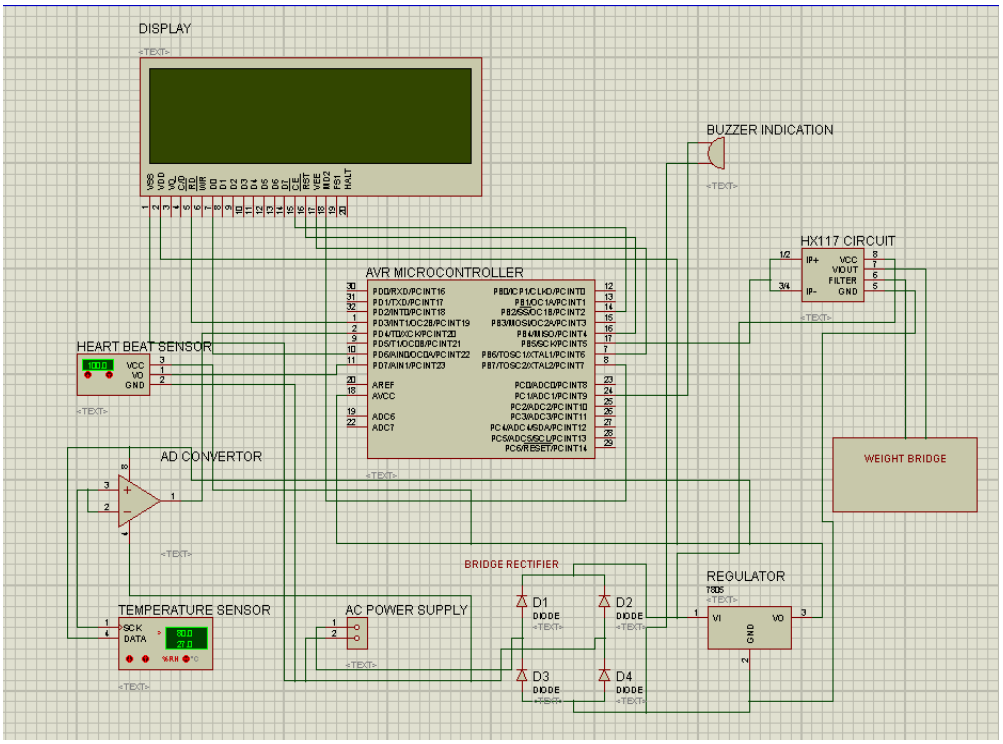


Fig 2: Circuit diagram for proposed system

Temperature sensor checking and it will interface with ADC convertor for simple worth is changed over into computerized esteem Weight bridge (load cell) used for calculating the body weight and the device is connected to Hx117 circuit interface with microcontroller. So that the user can easily monitor their heart beat and temperature and weight with help of smart mirror.

## IV. RESULT

The brilliant wellness reflect created was tried and the outcomes acquire that face acknowledgment framework had the option to accurately recognize the client and subsequently permit admittance to the client's authentic wellbeing data . In any case, in the event that the client was not perceived, the framework would give an alarm message for example "client obscure". When the client was perceived, the BMI and BIA examination was directed utilizing the data got from the gauge scale and calculation. The outcomes were shown on the mirror.

## V. CONCLUSION

This project work illustrates an innovative approach to pervasive health monitoring based on state of the art technology. The Medical Mirror fits seamlessly into the ambient home environment, blending the data collection process into the course of current scenario. For example, one can envision collecting health data and displayed in mirror. This interface is intended to provide a convenient means for people to track their health condition with nominal effort. Future scope of proposed work will be Non-contact measurement of Blood Pressure which can be done in the same way as pulse rate is calculated.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Power Efficient Lead Acid Battery Based Autonomous Military Surveillance Robot for Land Mine Detection System

**B.Perumal[1], R.Ajay[2], A.Gunapal[2], J.Vijay[2], R.Vignesh[2]**

[1]Head and Professor, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Land mines are designed to cover a large area of land mines to detonate land mines. Land mines have been identified and the scanned area is shown on a visual map with precision in millimeters. Additionally, money spent on wartime mines can be obtained and distributed by installing a mine identification robot, which can save lives and prevent human accidents. This project is proposed to have a model of a landmine (LDR) robot, which can be operated remotely using GSM technology. Human safety was addressed and a robot with special sensors was used to avoid obstacles. The Global Positioning System (GPS) operates, detects, and transmits current robot traffic. The system uses GPS to track the status of the mine and send an SMS message indicating the location of the mine hidden in the country. Roadmap, obstacle detection and avoidance algorithms were used to accurately control and navigate the proposed route by avoiding obstacles. The AVR microcontroller is used in this robot. The robot system is connected to a nearby detector that can detect a land mine and send an SMS notification to the control room using the GSM module. The robot's movement is performed by a DC motor. This project helps to save the lives of our soldiers and troops in areas where bombs are detonated by enemies.

**Keywords:** landmine detection robot, GPS and GSM technology (wireless communication).

## I. INTRODUCTION

A land mine is an explosive device that is hidden beneath or below the surface and is designed to destroy or disable enemy enemies, from counters to vehicles and tanks, as they pass by or near it. Such a device is usually detonated automatically by means of a pressure switch when the target is stepped on or driven over, although other blasting methods are used. A landmine can cause damage by direct impact, explosive disintegration, or both. The name comes from the ancient practice of digging for soldiers, in which tunnels were dug under enemy fortifications or for military formation. These lethal tunnels were initially closed to destroy the targeted target, but later they exploded and exploded to cause further damage. Today, in common parlance,

land mines are often referred to as weapons of mass destruction. Although many types of explosives *("IEDs")* can be technically classified as land mines, the word mine is usually reserved for manufactured goods designed for use by well-known military services, while the IED is used for temporary equipment assembled by military, rebel groups or terrorists. The use of land mines is controversial because they are as powerful as biased weapons. They can remain dangerous for many years after the end of the conflict, damaging the economy and the citizens. With the pressure of many campaign groups organized by the International Minerals Prohibition Campaign, the international organization's ban on their use led to the Convention on Prohibition of Use, Storage, Production and Transfer of Anti-Labor Mine and its Destruction. , also known as the Ottawa Treaty.

## II. LITERATURE SURVEY

[1] Bharath J, Automatic Mining Discovery Robot Using Microcontroller. The plan outlines the challenges facing the mines facing 70 countries. The purpose of this project is to eliminate land mines. The purpose of this paper is to design a robot prototype that can detect land mines and change locations, while allowing the operator to control the robot without a remote cable. This technology connects a metal detector circuit to a robot to search for land mines. The metal detector circuit is connected to a robot and left in the search area to find the metal parts used in the mines. The main advantage of this project is that we can make this robot cheaper and more efficient.

[2] This project describes an advanced sensor robot that has been cleared of bombs. The robotic transport system is based on a single simple structure using elements of pneumatic drive. The robot has a solid design and can carry up to 100 kg bombs in rough terrain. Because of the flexible possibilities of populations in obstacles, the robot can adjust the sensor function of the bombers while searching for mines. The block chain consists of a metal detector, an infrared detector, and an explosive chemical sensor. The robot is controlled using an on-board processor and a remote operator station in interactive mode. Test results for transport, control, and acquisition robots systems are presented. The main disadvantage of the robot is the weight factor due to the fullness of the sensor.

[3] The project was started from the brainstorming phase and the research phase and was introduced to the design or design phase. The ideas and concepts from the theoretical sections are built into the hardware components that are visualized with the prototype design and software programs are integrated into the system to test the experimental retention of structured concepts.

## III. EXISTING SYSTEM

- In this way the detonation of land mines is done by hand. This method causes more damage than fatal loss. The slain soldiers were left behind, while the wounded were delayed.
- A land mine is an underground explosive device used by the enemy and explodes when any work or vehicle is trampled or driven over.

- Damage caused by a landmine is deadly and that is why it is necessary to find land mines before military personnel or vehicles can accidentally step on them.

## IV. PROPOSED SYSTEM

- A landmine detector is actually a metal detector used to detect land mines. The system was placed on the ground to detonate a land mine.
- The program starts moving on the field. At the same time, a nearby metal detector begins to operate. The robot has an ultrasonic sensor mounted on the front of the robot that is used to avoid obstruction. When the ultrasonic sensor detects the presence of any obstacle nearby, it automatically adjusts the direction to the other side.
- Two IR sensors are used in this robot to detect obstacles on the left and right sides. When an obstacle is detected in a way the robot automatically changes direction.
- If a land mine is detected it means that GPS latitude and distance can be sent to the control room with the help of the GSM module. It finds the exact location and informs how far the proximate element is.
- GSM with Attention Command sends SMS to user. Once the land mine has been detected and the process is complete, the system will stop somewhere. The land mine was completely destroyed, saving many lives.

## ADVANTAGES:

- With the help of GPS, the area can be mapped accurately.
- Avoid interfering with land mines that could endanger their lives.
- Enables a recovery policy without human effort.
- Reduce mortality rates.
- Allows saving time.
- Provides comfortable, fearless and secure detection by land mines.
- It is one of the programs of life savior for the Gentiles.

## V. SYSTEM FUNCTION

### BLOCK DIAGRAM

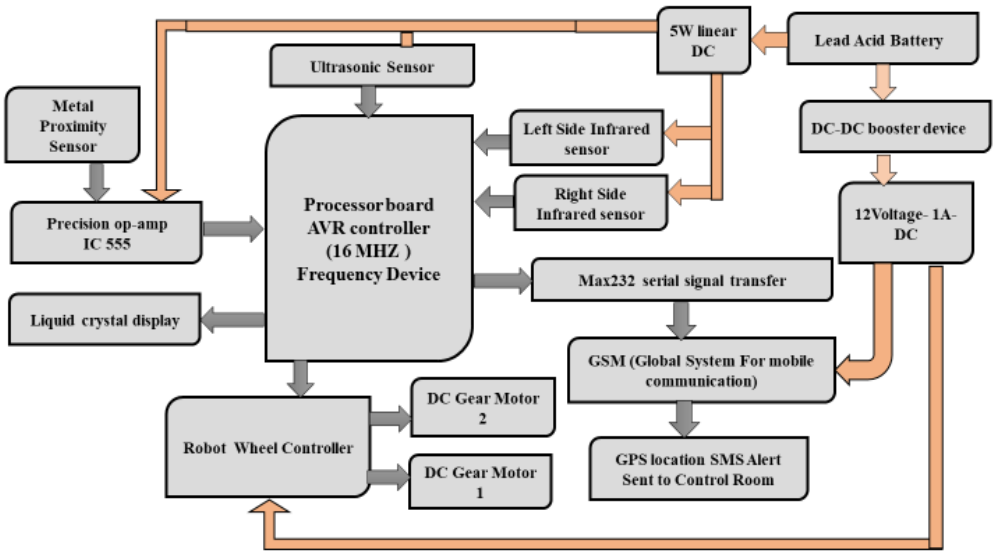


**Fig. No 1: BLOCK DIAGRAM**

### BLOCK DIAGRAM EXPLANATION

A block diagram is proposed for a robotic detection robot with GPS and GSM technology. The robot contains AVR control board blocks, metal proximity sensor, ultrasonic sensor, IR sensor, GSM module, GPS location, robot wheel controller, DC gear motors, lead battery acid, 5W liner DC. The proposed robot detected land mines and sent the GPS location to the control room using GSM technology. In this system lead acid battery is used for power supply. Battery power is amplified using a dc-dc booster device and 12v controls at 5v using a DC 5W liner device. Then the 5v DC line is supplied with the AVR processing board and all other blocks. The AVR control board will control the robot. DC gear motors are used in this block to connect robot wheels. The robot can be controlled by instructions from a controller. Ultrasonic and IR sensors will be used for detection and obstruction. The ultrasonic sensor will be located on the front side of the robot and the IR sensor is centered on the left and right side of the robot, if the obstacle is detected it means that the robot can avoid the obstacle and move on .A nearby metal sensor is used. To detect land mines, if land mines are detected locally, the longitude and latitude of the GPS location will be sent to the control room via GSM module.

## CIRCUIT DIAGRAM

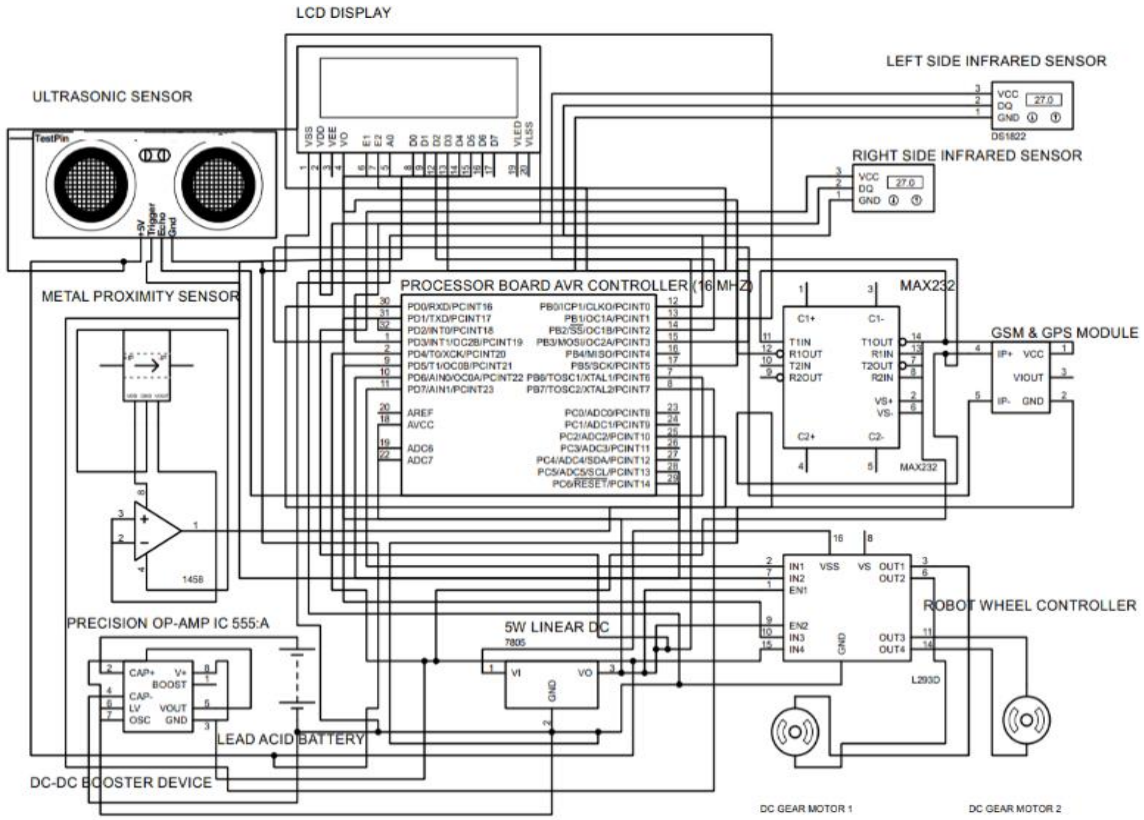


**Fig no: 2 circuit diagram**

## CIRCUIT DESCRIPTION

- The AVR control board is the heart of the circuit, controlling the entire region.
- Battery power is connected to the input pins of the DC-DC booster device to maximize power to 12v. 5W direct DC voltage that controls 12v to 5v. Then a 5v supply is given to the controller.
- Ultrasonic sensor has 4 pins. Echo, Trigg pins are connected to the control pins. 5v supply is connected to 5v supply. GND PIN connected to the ground.
- Metal proximity sensor is connected to the analog pin of the controller.
- The infrared sensor has 3 pins. 5v pin is connected to 5v supply. GND PIN connected to the ground. The exit PIN is connected to the digital PIN.
- Driver board that controls DC motors robots. Driver board instruction pins are connected to digital control pins.
- The GSM and GPS module is connected to the TX controller and the RX PIN.
- On the LCD screen the VSS PIN is connected to the floor, the VDD PIN is connected to 5v and the data PINs are connected to the AVR controller digital pins.

## VI. HARDWARE REQUIREMENTS

### PROCESSOR BOARD AVR CONTROLLER (16MHZ) FREQUENCY DEVICE

The low-powered Atmel 8-bit AVR RISC controller includes 8KB of compact flash memory, 1KB of SRAM, 512K EEPROM, and a 6 or 8 channel 10-bit A / converter D. The device supports 16 MIP output at 16 MHz and operates between 2.7-5.5. Basically, the microcontroller is embedded within the system ordering one function on the phone. It does this by understanding the data it receives from its I / O peripherals use their central processor. Endless information provided by microcontroller the receiver is stored in its data memory, where i the processor accesses it and uses the instructions stored on it program memory to delete input and input data. It then uses I /O peripherals to communicate and confirm the appropriate action.

### GPS & GSM MODULE

GPS *(*Global positioning system*)* is able to pinpoint your exact location on the earth anytime, anywhere in any weather. GPS has three components namely satellite, receiver, software. GPS receiver should know two things about satellite namely location and distance. If the land mine is not detected it means that GPS latitude and distance can be sent to the control room with the help of the GSM module. It finds a specific location and informs how far an element is nearby. GSM with Attention Command sends SMS to user. Once the land mine has been detected and the process is complete, the system will stop somewhere. The land mine was completely destroyed, saving many lives. In this project the GSM and GPS module is connected to the TX controller and RX PIN.

### INFRARED SENSOR

The infrared sensor emits and / or receives infrared radiation to sense its surroundings. The wavelength of these regions and their operations are shown below. Infrared distance 700 nm to 1400 nm. Infrared frequency range is higher than in the microwave and smaller than visible light. Visual and visual sensors, photo optics technology is used in the infrared environment as light is less complex than RF when used as a signal source. Visible wireless communication is done through the IR data transfer of short-distance applications. IR sensors are used in this robot to detect left and right obstacles. When an obstacle is detected in a way the robot automatically changes direction. When objects are found on the left side when the robot turns right and finds the robot on the side of the ride turn left.

### A Metal Detector Circuit using IC 555

A simple metal circuit drawing circuit project designed using IC 555, as you can see in the 555 timer circuits, these circuits receive metals and magnets. When the magnet is close to a pressure of 10mH, the frequency of o / p changes. This circuit can be powered from electricity, which can supply o / p DC voltage between 6V to 12V. So we can set 150 threshold range for metal detection.When the metal is close to coil L1, it produces an o /p oscillation frequency change, and then produces a buzzing sound.

### LCD DISPLAY

Liquid crystal displays a flat panel or other display of an electrically adjusted device. LCDs are used to test the effect of different modules connected to a microcontroller. In this project the LCD displays metal data and

when the robot changes its right or left direction it is displayed using IR sensor data. Suppose an object found before a robot can be calculated using an ultrasonic sensor and a distance displayed on an LCD.

### ULTRASONIC SENSOR

Ultrasonic transducers convert ultrasound waves into electrical signals or vice versa. These tools operate on a system similar to transducers used in radar and sonar systems, which test the features of a directed by translating echoes from radio or sound waves, respectively. The HC-SR04 Ultrasonic Sensor is the best the solution for object detected to get distance to robots.We can set a threshold range of 30cm and if objects are found the wide robot will stop and reverse and move forward in position.

### ROBOT WHEEL CONTROLLER (L293 DRIVER BOARD)

Motor Driver is a motoring module that allows you to control the performance speed and steering for two motors simultaneously .This Motor Driver designed and upgraded based on L293D IC. The L293D is a 16 Pin Motor Driver IC. This is designed to provide two options drive voltages from 5 V to 36 V. The driver board controls the engines in various situations such as moving forward or reversing and stopping the engine.

### DC GEAR MOTOR

DC gear motors are used in this block to connect robot wheels. The robot can be controlled by instructions from the controller. The driver of a car is a tool or a group of people machines that operate in a predetermined way electric car operation. In this project we are in using the DC car model as its provides the speed required for the robot to move and deliver high torque at rated speed still.

### LEAD ACID BATTERY

Acceptable power must be provided or required for it to work motors and corresponding rotation. Normal the required power supply varies from 3V to 24V DC. Batteries can also be used to operate robots. DC motor can be used to guide robots. Feel free to use lead acid battery. Lead acid batteries fall under the category of rechargeable batteries and secondary batteries. These batteries use lead peroxide and sponge lead to convert chemical energy into electrical energy.

### DC-DC BOOSTER DEVICE

Booster converter is one of the easiest ways to convert to switch mode. As the name suggests, it takes the input voltage and increases it or increases it. All of these include an inductor, semiconductor switch, diode and capacitor. What is needed is also a source of occasional square wave. This could be something as simple as a 555 timer or a dedicated SMPS IC like the famous MC34063A IC. We therefore understand that choosing an inductor is a good balance between inductance and peak current. With this information we can understand the legal way to design a boost converter. Its input voltage 10-18V, Output voltage 24V, Power output 12V.

## VII. RESULTS

Thus, this our project power efficient lead acid battery based autonomous military surveillance robot for land mine detection system was successfully implemented and tested. In this projectthe robot can be detect the landmines and send SMS notification to control room with GPS location by using GSM module. Thus, our

robot was automatically avoiding the obstacle based on the ultrasonic and IR sensor information. The hardware development model is given in the below the image.

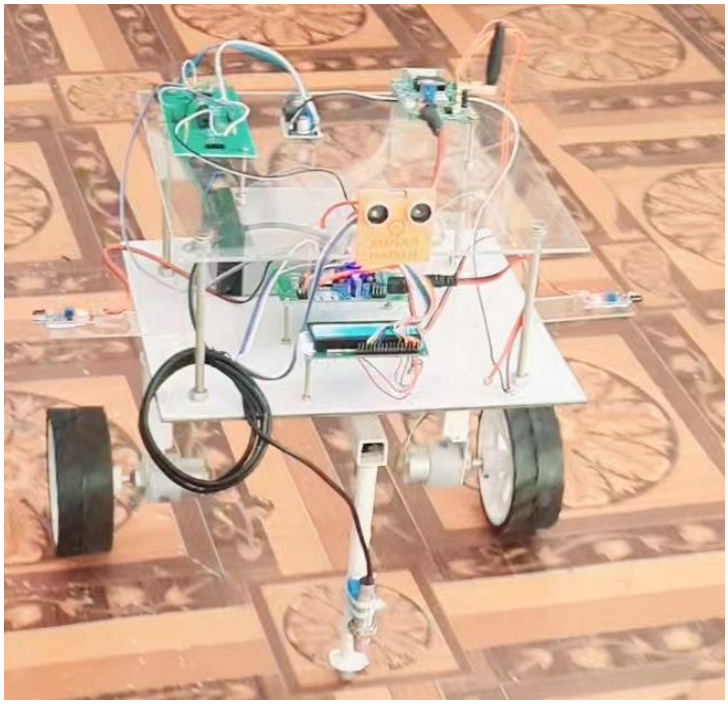

**Fig no: 13 :Land mine detection robot hardware model**

## VIII. CONCLUSION AND FUTURE SCOPE

A land mine is one of the most dangerous weapons used during World War II. It plays a very important role during the war and most soldiers lose their lives or their organs because they cannot see them. To prevent this, the robot can be used to detonate land mines and can be controlled by advanced technology such as AVR microcontroller, Metal detectors, GSM module and more. A metal detector is used to detect land mines and map them out or mark them directly. Then they can be easily dismantled with the help of a robot. This was obtained to save the lives of soldiers, civilians living near land mines and the economy of our country. It is a national project that acts as a life saver by avoiding human interference with land mines and only allows robots to detect and melt dangerous land mines and help save lives Some of the future scopes for this type of robots are detecting Plastic Mines and Land mine detecting drones which avoid obstacles on traveling in the ground and have wide range of sensing for mines. Lastly this land mine detecting robot is one of the greatest inventions for honoring our armed forces and their services to our nation.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# A Portable Robotic Arm for Bore Well Child Rescue System Using Load Based Buck-Booster DC-DC Converter to Battery

**B. Perumal[1], Aneeshwaran P[2], Jagadish R[2], Mohan Kumar M[2], Waseeque Shariff M[2]**

[1]Professor and Head, Department of EEE, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of EEE, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

In the current situation many incidents have been reported about boreholes turning into water of death. Many innocent children are trapped in these boring wells and lose their lives. The real purpose of the boreholes is to save lives, but these drilled wells have also begun to take many innocent lives. In many cases rescue operations are carried out with heavy equipment and a lot of male power involvement. Often, these rescue operations are extremely long, complex, and time-consuming. This project introduces a simple and effective way to rescue a child from a well. This method is easy to rescue a detained child. In the proposed way, the robot arm moves inside the source channel and moves its grip arm in accordance with the user instructions provided for radio frequency (HT12E and HT12D) with the help of wireless communication. Toxic detector sensor used to detect toxic gas in a well. Temperature and humidity sensor are used to monitor a child's body temperature. Computer hardware is connected to the TFT color display for display and control settings are used to control robot setup and sensor data updates using the think speak webpage online.

**Keywords:** Robotic arm for bore well, RF transmitter and receiver, wireless communication and online think speak webpage.

## I. INTRODUCTION

The number of boreholes and boreholes in India is now nearly 27 million, with boreholes at more than 50 percent. Growing water scarcity is a common problem in India. As the water level decreases day by day so many people are affected. Bored wells are built to meet needs. These boreholes were left closed after discovering that groundwater was scarce in the area. Bores leak water and later end up being left uncovered. Bored sources have begun to take the lives of many innocent people. Young children are unaware that the hole is slipping in and out. There is no safe way to escape from such dangers. In many cases the corresponding hole is dug and a horizontal path is made to reach the child. It took about 30 hours to dig the same hole, by which time the baby would have died. It is a time-consuming process, and it is also dangerous in a variety of ways. In addition, it requires a lot of energy and expensive resources that are not readily available everywhere. The child may have been injured inside the well. In many cases the rescue operation

is not completed successfully. Raising a child without the narrow limits of a bore source is also not very easy. In some cases a type of hook and grape is used to hold the baby's clothes and body. This can cause a sore on the baby's body. After studying all the cases we found a serious problem, and made such a robotic machine that could pass through a closed hole without support and hold the captive body for at least a short time. With this program, there is no chance of damaging the human body and other minor damage.

**OBJECTIVE**

- The main objective of this project is to design a rescue robot that can be controlled with the help of a wireless connection, which can enter the well and save the baby that has fallen into the borewell.
- View baby status by getting live images from the camera in the robotic system via PC.
- Monitor the presence of toxic gases near a well-fed baby to ensure the baby's safety and avoid breathing problems using the gas sensor.
- Rescue the life of an innocent child as soon as possible without wasting time digging another deep hole that may make the child deeper.

## II. LITERATURE REVIEW

Here the wheelbarrow machine is designed to fit inside the pipe and the legs are divided into circles and rows. The robot can adjust its legs according to the size of the pipe. The robot consists of an electric motor, switch pad and gear motor. The child's location is well borne with a USB camera and monitored on a PC. The LM35 temperature sensor and 16 * 2LCD are connected to the pic 16F877A microcontroller sensor and displayed on the LCD. **[**1**]**

Manish Raj explains that the width of the borehole is small for any adult and the light is dark between them, the rescue operation in that situation is challenging. The robot system that attaches the harness to the child uses the air arms when picking it up. The teleconferencing system is also connected to a robot to communicate with a child. **[**2**]**

John Jose Pottery describes a child care center that is trapped, provides oxygen and provides a supportive stage for raising a child. The first engine mounted turns the gear machine which pushes 3 blocks arranged at 120 degrees from one side to the source side. The lower shaft is rotated by 130 degrees with the help of a second motor, thus helping to determine the gap at which the lifting rod is adjusted by the third motor. When the width is adjusted, the front engine helps the lifting rod wrap its way through the gap to the bottom of the baby. When lifting the exhaust reaches a safe place below, an air compressor is used to pump air into the bladder attached to the end of the lifting rod through an air tube that runs down the middle of the lifting rod. One provides a safe environment for the child. The first engine is used in reverse to be able to disassemble the system. At the same time it is pulled out of the well using a chain or string. [3]

B.Barathi describes the design of a baby rescue robot. This robot is able to navigate inside the bore smoothly, according to the PC's personal comment and also select and position based on the architecture of the arm. This robot works with a PC with the help of ZigBee wireless technology and a wireless camera that provides

both audio and video signals to the TV. The high-energy LED light acts as a light source in the pipe when the light intensity is low. It is a low-cost human-controlled robot that is used to monitor and provide insight into the safe rescue of a child. [4]

In many cases the rescue operation is not completed successfully. Raising a child without the narrow limits of a bore source is also not very easy. In some cases a type of hook and grape is used to hold the baby's clothes and body. This can cause a sore on the baby's body. [5]

## III. EXISTING SYSTEM

- Robots are designed to assist people in rescue work.
- Rescue teams often follow the same hole procedure to save the baby.
- First the team will find the child's depth in the well using a rope.
- Mobile vehicles are used to dig a parallel hole near the piercing hole.

### DISADVANTAGES

- It takes a long time. By then the baby would die.
- Due to the lack of visibility the rescue team faces many difficulties.

## IV. PROPOSED SYSTEM

- In our proposed system, mechanical and electronic components were built like a robot. The robot holds a camera and a grip. It is to lift something safely to the source.
- While on a rescue mission, it is able to carry a medium-sized object with it. The robot plays an important role in rescue operations and in assisting rescuers in times of disaster.
- The robot will follow the user command given to control switches using a wireless connection. Machine construction is done using DC motors.
- The first engine is mounted on a machine that rotates 180 degrees from one to the other side of the source. The second DC car placed under the arm will perform open and closed operation with the help of the grip arm.
- The baby is viewed with a camera attached to a lifting device. Once the gap is detected, a DC engine is used to pull the child.
- The HT12 transceiver was used as an RF module to transmit and receive data. The HT12E transmitter receives input from the CH340 Nano type controller and sends data wirelessly to the HT12E receiver.
- The entire system control device uses a C-type CH340 Nano controller.
- Toxic detector sensor is used to detect toxic gas in a well. Temperature and humidity sensor are used to monitor a child's body temperature.
- Sensor data is updated on the thingspeak web page using a Wi-Fi device.

### Advantages

- All work will take less time to complete the action.
- The use of a camera helps to monitor the child's condition during a good bore.
- The presence of a gas sensor on the arm will help us to monitor the presence of toxic gas and thus avoid breathing problems for the baby.
- The system that appears in this program has many options such as audio record, and picture capture for many purposes.

## V. SYSTEM FUNCTION

### BLOCK DIAGRAM

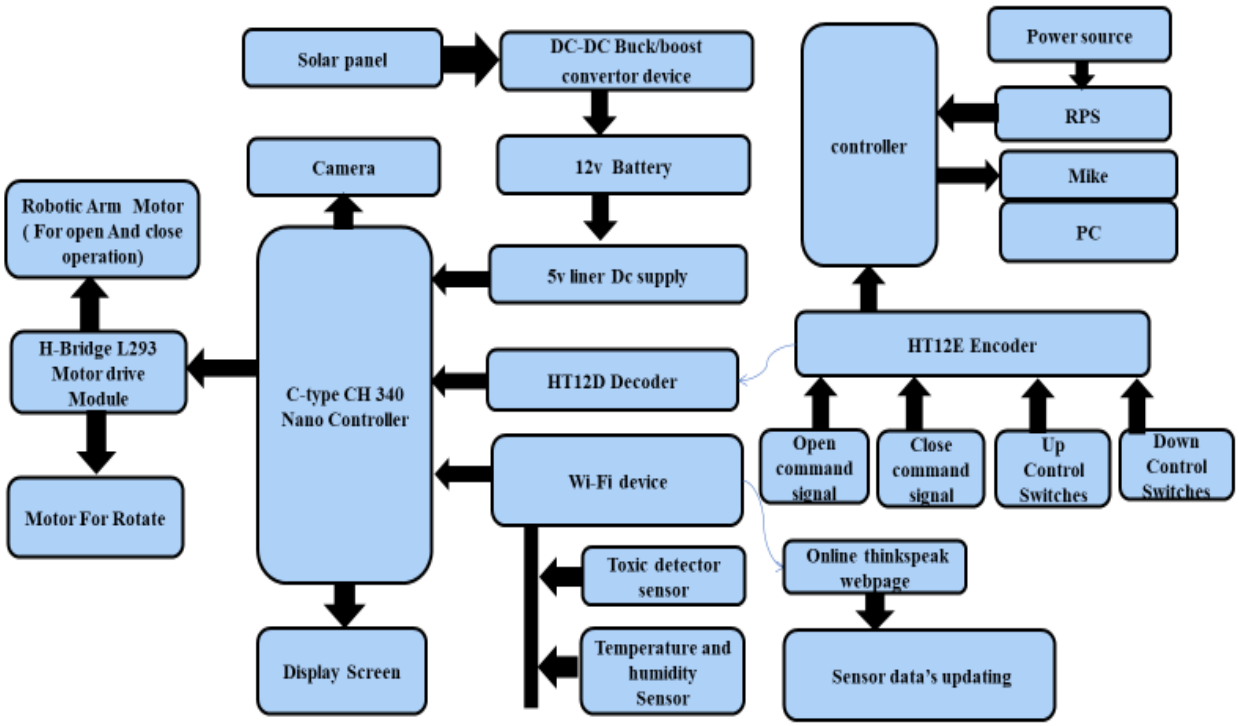


**Fig.No 1: BLOCK DIAGRAM**

### BLOCK DIAGRAM EXPLANATION

The above block diagram consisting of two parts transmitter side and receiver side.In this project the portable robotic arm is designed for child rescue from the bore well. In the receiver side C-type CH340 Nano controller is used for controlling.HT12E encoder and HT12D decoder is used for data transmitting and receiving the data wirelessly. The user can give instruction to robot by using control switches. The data can be transmitter to receiver side with the help of HT12E encode. In receiver side the controller will control the whole process. H-bridge l293 motor driver module is for connecting the robotic arm and gear motors. Camera is interfaced with the robot for monitoring the child. The input instruction received from the transmitter side by using HT12D decoder then the robot start to work get the instruction from the controller. The camera will

monitor the child in the bore well and viewed in the PC display. The robot gets rotated first and then the gripper arm will open and rescue the child based on the instruction from the controller. The power from the solar panel is interfaced with buck/booster device for voltage buck /boosting and then the boosted power will be stored in 12v battery. In the receiver side two sensors are used, the toxic detector sensor is used for detecting the any poisonous gas present inside the bore well. The child body temperature of the child is monitored by using temperature and humidity sensor. The sensor's connected to Wi-Fi device then wirelessly the data are updating online thinkspeak webpage.

## CIRCUIT DIAGRAM

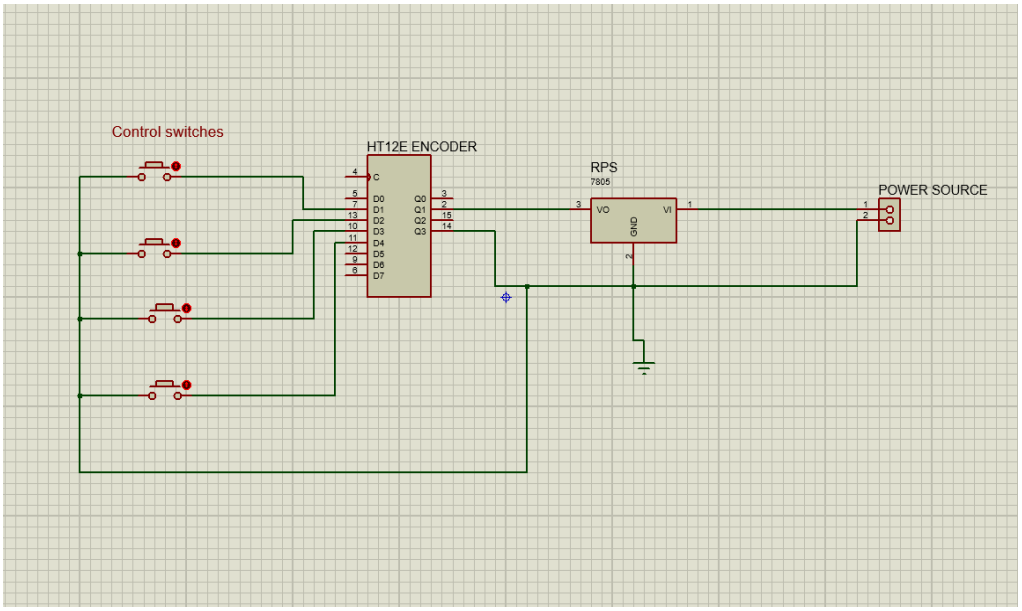


**Fig no: 2 circuit diagram for transmitter side**

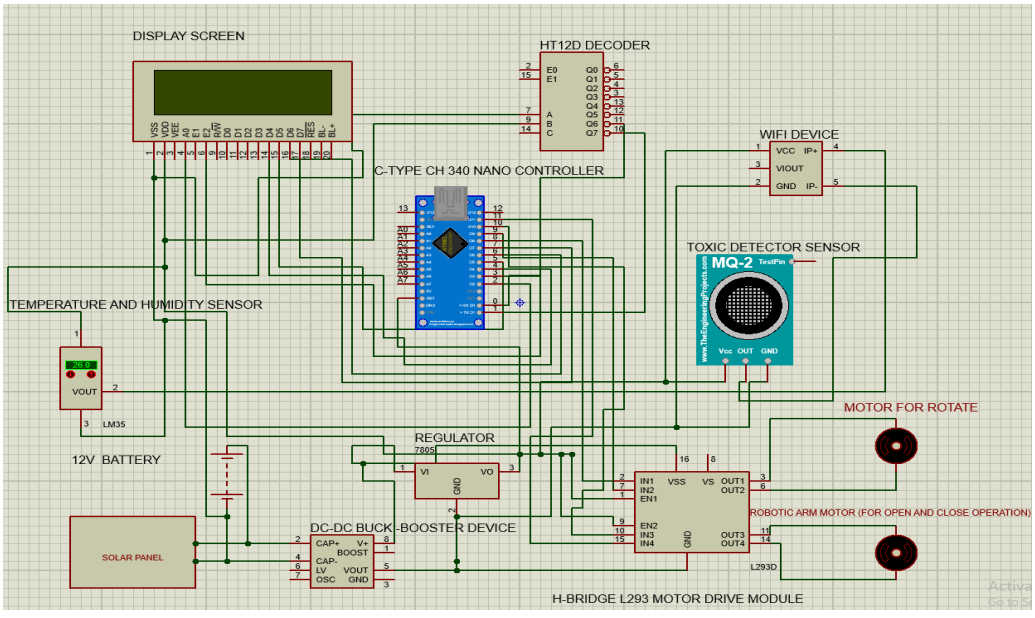


**Fig no: 3circuit diagram for receiver side**

## CIRCUIT DESCRIPTION

- This circuit consist of two parts, transmitter circuit and receiver circuit.
- In transmitter circuit control switches are connected controller.
- The supply from the main power source 12v is given to RPS (Regulated power supply) for voltage regulating 12v to 5v.
- In receiver circuit power source can be used from solar power is interfaced with buck/booster device for voltage buck/boosting, then the boosted voltage inputs connected to 12v battery.
- HT12E encoder device is connected with controller device for data transmitting.
- HT12D decoder device is connected with controller device for data receiving purpose.
- Wi-Fi device is connected to controller for online sensor data updating.
- Toxic sensor has 3 pins' pin is connected to 5v, GND pin is connected to ground, OUT pin is connected to Nano controller analog pin.
- Driver board is connected for controlling robotic arm. The motor and robotic arm is connected in driver board output pins. Instruction pins are connected in controller digital pins. Enable pins are connected to 5v.
- Temperature and humidity sensor has 3 pins.VCC pin is connected to 5v, GND pin is connected to ground, OUT pin is connected to Nano controller analog pin A0.

## VI. HARDWARE REQUIREMENTS

### C-TYPE CH 340 NANO CONTROLLER

The Nano board is designed in such a way that it is easy for beginners to get started with microcontrollers. This board is especially compatible with breadboard it is very easy to manage the connection. Let's start by empowering the Board. Here are a few basic features that you should consider when considering working on a large microcontroller board: • 14 of these pins are digital pins. • Nano has 8 analog anchors. • Contains 6 PWM pins between digital pins. • It has a 16MHz crystal oscillator. • It also supports various modes of communication, namely: 1.Serial Protocol. 2. I2C Protocol. 3. SPI Protocol. • It also has a small USB pin used for loading code.

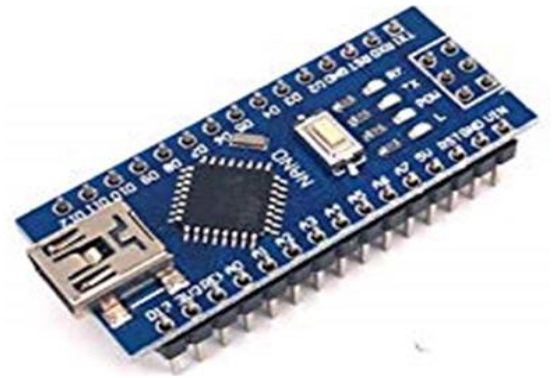

**Fig.no4: C-TYPE CH 340 NANO CONTROLLER**

**H-BRIDGE L293 Motor drive Module**

Driver board is used to control wheels and engines. In any electric engine, performance is based on simple electromagnetism. The current conductor produces a magnetic field; when this is applied to the external magnetic field, it will receive the same current strength as the conductor, as well as the external magnetic field. As you well know about magnetism as a child, the opposing polarities (North and South) are attractive, while the polarities (North and North, South and South) are chasing. The internal configuration of the DC engine is designed to use a magnetic interaction between the current carrying conductor and the external magnetic field to produce a rotating motion. In this project driver module controlled motor for rotation and robot arm motor (open and close operation).

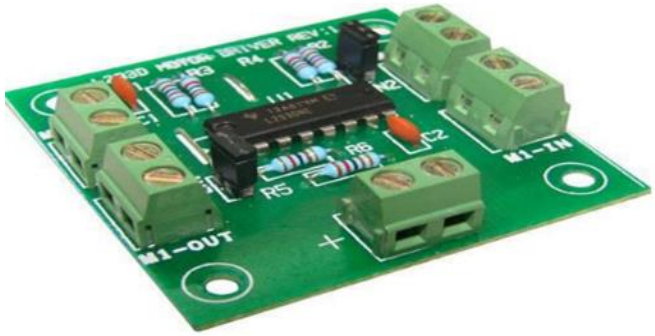


**Fig.no5**: **H-BRIDGE L293 Motor drive Module**

**GEAR MOTOR**

Geared DC motors can be described as a DC car extension that already has its Insight details downloaded here. Geared DC Motor has a gear assembly connected to the engine. The motor speed is calculated by rotating the shaft per minute and is called RPM .The gear coupling helps to increase the torque and reduce the speed. This Insight will check all the small and large details that make up the gear head as well as the performance of the geared DC motor.In this project one gear motor for up and down arm controlled and also used another gear motor open and close the arm.

**Fig.no:6: gear motor**

## GAS SENSOR

The MQ2 Detector is a device that detects the presence of various gases in space, usually as part of a safety system. This type of equipment is used to detect gas leaks and to connect to the control system so that the process closes automatically. The gas detector can also sound an alarm to users in the area of the leak, giving them an opportunity to exit the area. Here this toxic detector sensor is used to detect any toxic gas present inside the borewell


**Fig no: 7: gas sensor**

## LCD DISPLAY

The LCD screen saves energy and can be disposed of safely than CRT. Its low power consumption makes it suitable for use on battery-powered appliances. It is an electronic visual device made of any number of segments filled with liquid crystals and decorated before a light source (backlight) or display to produce color or monochrome images.in this project the sensor data are displayed.

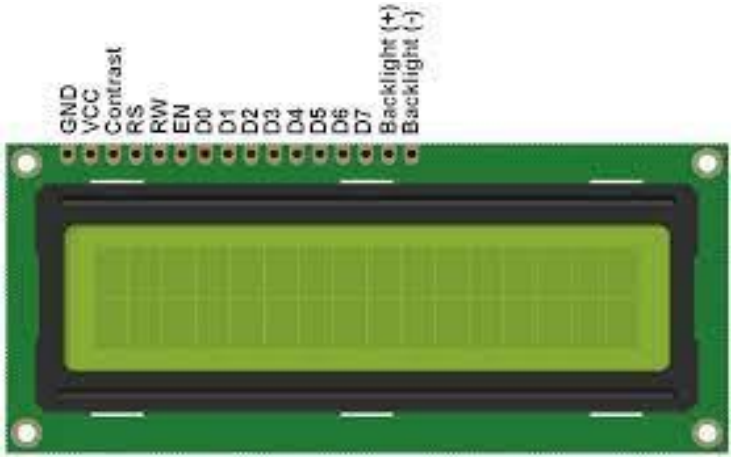


**Fig.no8: LCD Display**

## Wireless AV (Audio and video) Convertor

A webcam is a compact digital camera that works similarly to a standard digital camera but is designed to interact with web pages and other web pages. It captures real-time images with a small grid of light receivers, known as a combined charge device (CCD) from the location. The CCD converts the image into a digital

format so that the computer can access this data. Webcams do not have internal memory storage so they transfer data quickly to the host device via USB or another analog cable.

**Fig.no:9: camera**

**HT12D Decoder and HT12E Encoder**

RF modules are very small in size and have a wide range of operating voltage i.e. 3V to 12V. Basically, 433 MHz RF transmitter modules and modules you receive. The transmitter does not receive power when it sends sensible zero while has fully compressing the frequency of the network companied thus using very low power for battery performance. When rational is delivered the network company fully reaches 4.5mA and 3volts of power. Data is sent sequentially from the transmitter received by the tuned recipient. Transmitter and receiver are properly connected to two microcontrollers for data transfer.

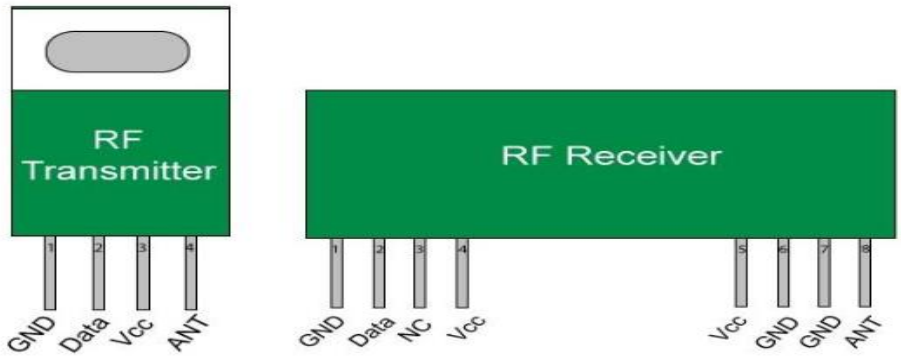


**Fig.no:10: ENCODER & DECODER**

**HUMIDITY SENSOR**

The DHT11 Heat and Moisture sensor incorporates a limited digital signal output with a temperature sensor and a humidity sensor. A highly efficient 8-bit microcontroller is connected. This sensor combines the opposite with the sensor of the NTC water temperature measurement devices. It has excellent quality, fast response, anti-distraction capability and high operating cost benefits.

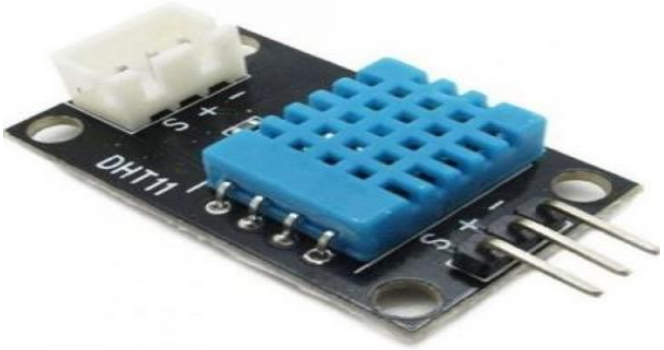


**Fig.no:11: Temperature and humidity sensor**

**30W BATTERY**

A lead-acid battery is the first type of rechargeable battery ever created. Compared with modern rechargeable batteries, lead-acid batteries have a relatively small capacity. Apart from this, their ability to provide high currents means that cells have a large amount of energy and weight. These features, as well as their low cost, make them attractive to use in cars to provide the high current power required by the starter motor.

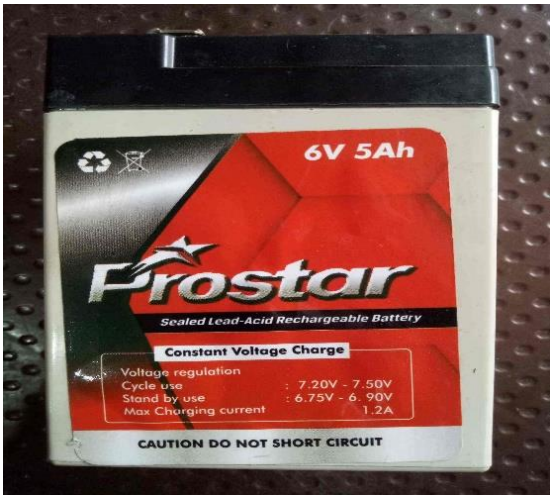


**Fig.no:12: 6V, 5Ah lead acid battery**

**SOLAR PANEL**

Solar panels made of photovoltaic cells convert solar energy into electricity. Photovoltaic cells are integrated between layers of slow-moving materials such as silicon. Each layer has different electronic components that provide energy when they are exposed to photons from the sun, forming an electric field.

**Fig.no:13: solar panel**

**DC-DC BUCK BOOSTCONVERTER**

A common development converter that can be used in many power systems, for example in DC controlled electricity, and in photovoltaic systems.Increase the input voltage of low DC to the maximum output voltage of the required DC load. The converter has two current operating mode, continuous current mode (DCM) and continuous current mode (CCM). In power applications, a standard boost converter is able to operate in any current operating system under modified power levels, and with each mode has different features.


**Fig.no:14: DC-DC boost converter**

**GRIPPER ARM**

Gripper module is a robotic arm designed specifically by Robomart. It can be used for a variety of 'selection and location' robots. Operates on DC Motor (9 to 12V DC). Switching to DC Motor rotation, produces Jaw Open & Close Action. The DC motor can be easily controlled with the help of DPDT Switch (manual mode) or with the help of any microcontroller and L293D Motor Driver module. Provide additional functionality for your robots by adding a fully functional Robot handle to it.

**Fig.no:15: Gripper arm**

**WIFI DEVICE**

ESP8266 is an easy-to-use and inexpensive device to provide internet connection to your projects. The module can work both as an access point (can create a hotspot) and as a channel (can connect to Wi-Fi), so it can download data and upload it online making Internet of Things as easy as possible. It can also download data

online using APIs which is why your project can access any information available online, thus making it smarter. Another interesting feature of this module is that it can be configured using Arduino IDE which makes it very useful.

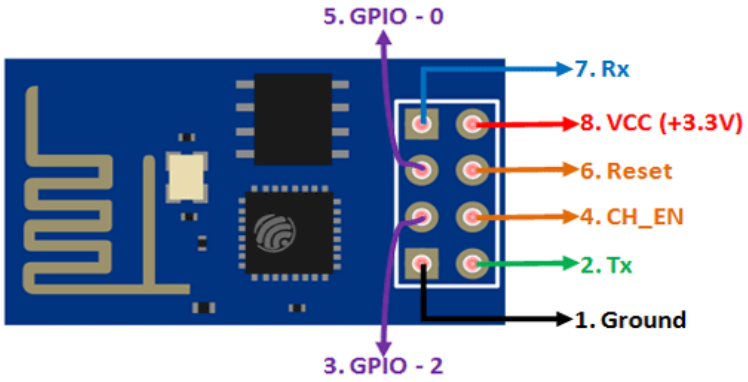


**Fig.no:16: ESP8266 pin diagram**

## VII. RESULTS

To design and implementation of a portable robotic heart for bore well child rescue system using load-based buck-booster to DC converted by battery. Implemented successfully

| Components | Input | Output |
|---|---|---|
| Battery | 12V | Child Rescue |
| Solar Panel | 12V | |

## VIII. CONCLUSION

A robotic rescue structure for robots in a borehole area is suggested here. By looking closely at those events and looking at the current situation we feel we need to build such a framework to save those innocent lives. Additionally, there is a whole new research site waiting to discuss a number of challenges related to mapping in an unfamiliar area, real-time telephone work in low light conditions, and manipulation program. Instead of technological advancement we can be very satisfied if it can accomplish the most important aspect of the project, which is to save lives.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Designing a Servo Motor Based Artificial Intelligence Robot for Detecting the Worm and Grasshopper in Agricultural Land

**M. Vimala[1], Aishwarya R[2], Haritha A[2], Sumithra C[2]**

[1]Assistant professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Agriculture plays a significant part in meeting humanity's necessities.. The rising of the world population, as well as the decrease in the number of workers in the agricultural sector, calls for rising need for food suppliers. We propose an unique agricultural robot based on artificial intelligence that can identify worms and grasshoppers without the need for human interaction in this project. The worm and grasshopper detection software system acts as a master device in this project, the robots are slaves. The robot is connected with master device through serial communication.If the robot detects the worm and grasshopper using ANN (artificial neural network) algorithm and the pesticide will be sprayed, and also if any critical problem means capture the image and send email to farmer through online by using IMAP protocol. The ANN algorithm will compare the captured image with the pre-stored image to find out the pest in images and also based on the plant size the camera will be adjusted by using pinion rack mechanism. Thus, this system ensures the pest-controlled environment in agricultural fields.

## I. INTRODUCTION

Grasshoppers and related insects such as locusts are pest insects and can damage crops and eco-systems. While grasshoppers are usually seen as individuals, they can gather in large groups and devastate vegetation. Grasshopper swarming behavior is uniquely found in both the nymph and adult stages; when they reach the adult stage, they can swarm in the air. They are highly diverse, in Inner Mongolia alone there are approximately 130 grasshopper species, and these vary within regional environmental sub zones. Of the 130 species there are three common types: the early-season species Dasyhippus barbipes, the mid-season species Oedaleus asiaticus, and the late-season species Chorthippus fallax,this high diversity makes recognition of individual species challenging.Furthermore, grasshoppers exhibit phenotypic plasticity, also known as polyphenism (the emergence of several phenotypes from a single genotype), which is a density-dependent physiological phase that is influenced by environmental factors. Grasshoppers are also known to adapt to environmental changes by changing their appearance and colour in response to changes in their social

standing and environmental stimuli. The diversity of insects and their responses to their surroundings make it difficult to distinguish them in common environments (grasslands), posing a substantial barrier to the use of image processing techniques for pest identification.

## II. LITERATURE SURVEY

[1]Zhou M, Liu. H and Wu. W has Development of a web-based geographic information system for crop pests and diseases management, We are planning on building up a product model framework for early vermin identification on the tainted harvests in. Pictures of tainted leaves are caught by a camera with container tilt and zoom and afterward prepared utilizing image processing methods to identify nearness of pests.

[2] Jayamala K. Patil and Raj Kumar have proposed application tests that are gathered by utilizing the inbuilt gadget camera with zoom. When the picture is gained the following stage is an image processing procedure so as to get the data about pests.

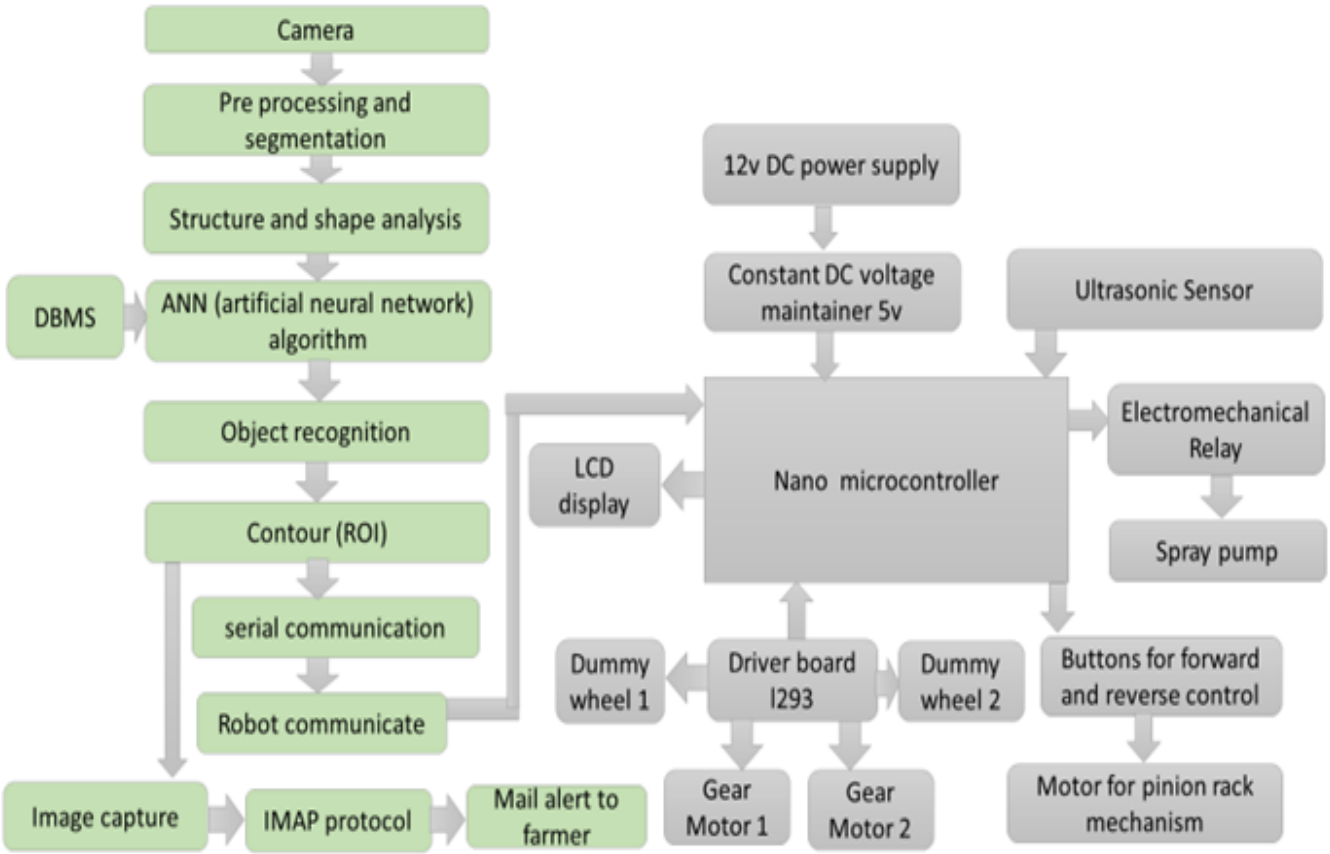
[3] S. Bani-Ahmad et al., have done accurate detection and classification of plant disease, detection of nuisances utilizing k implies calculation , yet K-means can just deal with numerical information and k-implies accept that we manage round groups and that each bunch has generally equivalent quantities of perceptions

[4] F. A. Carino, et al ., has designed a suction sampler for hoppers and predators in flooded rice fields. In the study of Carino, Kenmore and Dyck there are several sampling techniques and devices for pest management decision-making; the light trap, that involves varying size sample which is good for comparing seasonal and yearly catches of insects, but catches are subject to changes in insect behavior and do not catch none flying insects; the sweep net (catching insect using fishnet), is a fast method, very economical, and good for sampling arthropods staying in canopy of rice, but it has human error due to Variability and poor catch of arthropods at the base of the plant; tapping the rice, this is a sampling method Arthropods are collected at the base and stem of the rice using a collecting pan with soap solution or oil and water

## III. PROPOSED SYSTEM

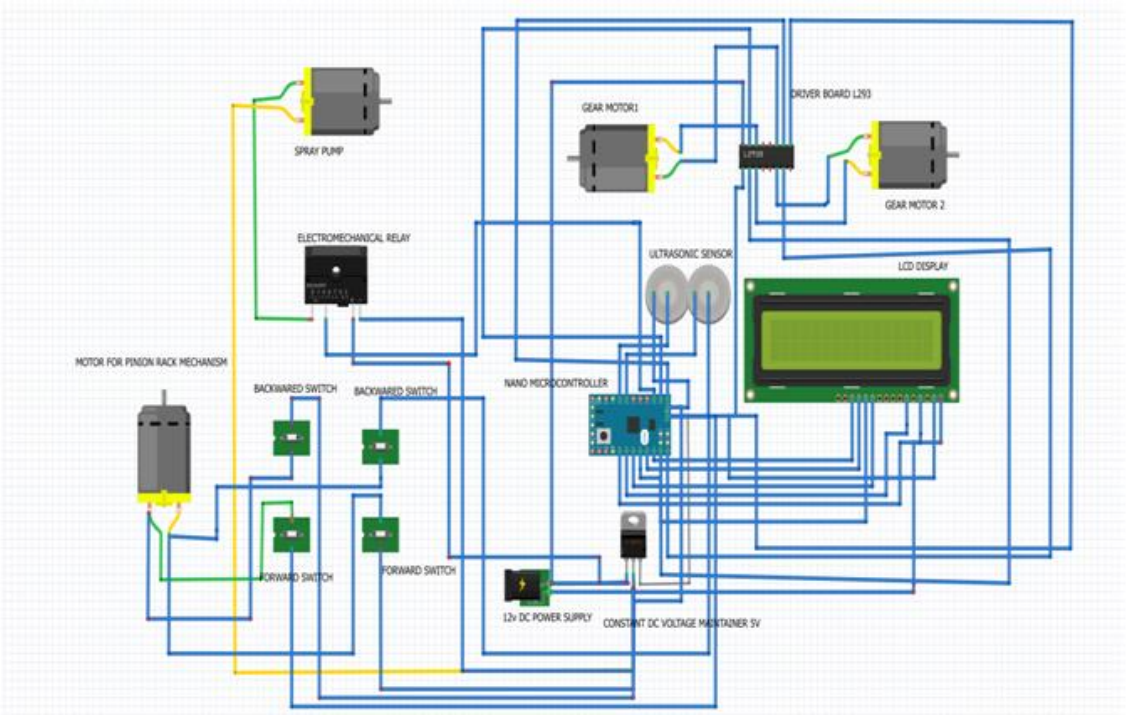
A unique agricultural robot based on artificial intelligence is offered in this system to identify worms and grasshoppers automatically without the need for human interaction.The worm and grasshopper detection software system acts as a master device in this project, the robots are slaves. The robot is connected with a master device through serial communication.The camera will be fixed in the robot for capturing the input image in the field, based on the plant size the camera will be adjusted by using pinion rack mechanism. If the robot detects the worm and grasshopper using ANN (Artificial Neural Network) algorithm.The input image from the camera will be preprocessed and compared with the images stored in the database. The sample images can be trained with ANN algorithm and the pesticide will be sprayed, and also if any critical problem capture the image and send email to farmers by using IMAP protocol.

## IV. BLOCK DIAGRAM AND DESCRIPTION




The above block diagram represents the agriculture robot for worm and grasshopper detection and controlling in the agriculture field. The robot is designed for detecting worms and grasshoppers in the agriculture field. In this project the worm and grasshopper detection software system acts as master device and robots act as slave devices. The robot connects with the master device through serial communication. In the robot the ultrasonic sensor is fixed in the front for detection of the obstacle. The camera will be fixed in the robot for capturing the input images, based on the plant size the camera will be adjusted by using a pinion rack mechanism. The camera will capture the input images, then in the preprocessing step the quality of the image is enhanced and the input images are segmented with background image. The worm and grasshopper images can be trained and stored in the database system. The ANN algorithm will detect the worm and grasshopper compared to the database. If worm and grasshopper is detected in the agriculture field the signal is sent to the robot with the help of serial communication, then the robot sprayed the pesticide automatically by activating the electromechanical relay and also if any critical situation means sending a mail alert to farmers by using IMAP protocol.

## V. CIRCUIT DIAGRAM AND DESCRIPTION




The Nano microcontroller is the main part of the circuit, it will be controlling the whole circuit.
The 12v supply from the power source is given to the DC voltage maintainer for voltage regulating 12v to 5v. Then 5v is given to the whole control circuit.Ultrasonic sensor has 4 pins. echo and trig pins are connected to the controller. Gnd pin is connected to ground,5V pin is connected to 5v supply pin.Gear motor 1 and gear motor 2 is connected to driver board output pins.IN1, IN2, IN3, IN4 pins are connected to controller digital pins.EN1, EN2 pins are connected to 5v.Relay is connected for pump for pesticide spray.Buttons switches are connected for controlling the motor in forward and reverse.

HARDWARE SPECIFICATION

Processor : INTELI5 (7thgeneration)
RAM : 4 GB RAM
Hard disk : 1TB
Monitor : 20’ color monitor

SOFTWARE SPECIFICATION

Front end : GUI
Back end : python
Software tool used : PyCharm
Platform : Windows 8

## VI. CONCLUSION AND FUTURE SCOPE

It presents a real-time grasshopper and worm detection robot. The framework can use AI techniques to detect and localize grasshoppers.

Grasshopper and worm is detected using ANN algorithm in artificial intelligence for image classification, color histogram and feature extraction. This developed robot system helps to save the cost and environment for the farmer in order to protect the crop. Time and accuracy were considered as important. By using the ANN algorithm, the process is going to work so efficiently to boost up the process and provide an effective outcome and clear one. In the future we can develop this AI based robot into a drone based one. AI will be easy to use for any type of crops. AI also has a future in animal farming. It can help with animal birth predictions, establish the best conditions to keep them, and define how to manage pastures for better grazing and final product quality. It might be the future for identifying plant diseases.

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# A Portable Electro Mechanical Ventilator Based on Double Cam Operation Integrated with Power Efficient Application

**S. Nandhakumar1, Deepan.P2, Ranjithkumar.B3, Prasanth.S4, Subash.S5**

[1]Assistant Professor, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

In an emergency, COVID-19 patients with serious respiratory failure are given a manual ventilator with BMV. This proposal presents a reduced form of an electromechanical ventilator based on a microcontroller and combined with a gear mechanism. An Ambubag is controlled using a gear mechanism that is commanded via a microcontroller and an Android app by delivering a control signal to the mechanical system, and the mechanism simultaneously compresses and decompresses the Ambubag based on this control signal. It's a self-inflating bag with a one-way valve at the intake and exit corners. By compressing the Ambubag, air is delivered, and by relaxing, air is taken from the environment via a mechanical scavenger. The wireless control signals are developed using an Android app, and it features control modes for adult mode based on age.the pace of breathing The gadget is in assist-controlled mode since the tidal volume for all unique control signals is fixed. The recommended device is small, portable, and capable of operating well. It might be sent to rural hospitals for urgent care at a cheap cost and with minimum risk. It can be operated by anybody since, unlike an ICU ventilator, it does not need the study or training of ventilation regulations. The proposed technology is risk-free, repairable, and requires little battery power. The high torque of the motors is measured using a 12-volt power supply. Our proposed solution is portable and simple to relocate. This portable ventilator technology enables rapid treatment in rural or general hospitals, as well as ambulances. A mechanical ventilator that is portablehas been created that may be utilised in emergency vehicles as well as as portable ventilation equipment for those who have respiratory difficulties.

## I. INTRODUCTION

In India, there are a total of 1,769 ventilators, implying that one ventilator is available for every 93,273 people. A lack of ventilators is one of the most pressing shortages confronting hospitals during the COVID-19 emergency. These gadgets, which can keep patients breathing when they can no longer do so on their own, may cost approximately $30,000 apiece. The design and construction of a low-cost portable ventilator might be a feasible solution to aid COVID-19 patients with pneumonia in India. The proposed low-cost ventilator

works by compressing a standard AMBU bag with a pivoting motor driving system, removing the requirement for a humanLow-power, portable ventilator technology that offers important ventilator functionality at a fraction of the cost of present versions. The manual resuscitator is an artificial breathing equipment that provides air to patients suffering from lung issues. Mechanical ventilation is typically regarded as a supportive therapy and is frequently used to save lives. Ventilators are one of the most significant equipment for keeping COVID-19 patients alive when they are in the most serious state. As the global demand for ventilators rises and there is a scarcity of ventilators in our country, as well as managing patients during this time, we designed a portable rechargeable battery-powered AMBU bag compressing machine that sends real-time cloud messages to doctors and other medical authorities.We created the prototype and are currently improving its performance by adding new features. It may be utilised in hospitals, Corona virus quarantine buses, isolation rooms, and rural communities in an emergency. The development of this project will efficiently address the scarcity of ventilators. This is a low-cost but efficient ventilation system.

## II. LITERATURE SURVEY

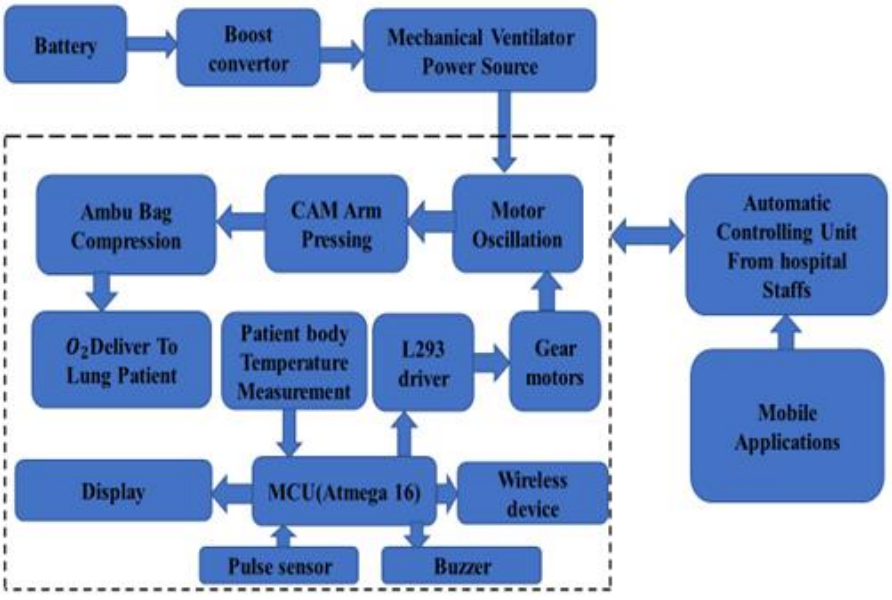
**[**1**]** A. M. Al Husseini, H. J. Lee, J. Negrete, S. Powelson, A. T. Servi, A. H. Slocum, and J. Saukkonen, present the work is based on the automation of BVM to construct an emergency portable mechanical ventilator, similar to the work by Husseini et al. But in present work, mechanical arms and servo motors have been used to actuate the BVM, whereas, Husseini et al. used cam mechanism for the purpose. The technique used in present work proves to be more effective as it permits programming the required compression pattern, while in cam mechanism the compression pattern is fixed and unchangeable. So, more controllability is achieved by implementing mechanical arms and servomotors to actuate the BVM. **[**2**]** S. Fludger and A. Klein described various types of portable ventilators and their historical developmentIn comparison to ICU ventilators, the notion of portable ventilators is relatively recent. The need to ventilate a patient while changing or moving from one location to another led to the development of portable ventilators. Ambubag is frequently unreliable or ineffective because to a lack of skilled workers. Portable ventilators were created for these reasons.**[**3**]** L. A. Geddeshas development both manual and mechanical artificial ventilation techniques Two manual artificial resuscitation methods, Sylvester's and Schafer's, as well as five mechanical devices for artificial ventilation, Bellows, the Pulmotor, the Iron Lung, Cuirass, and the Rocking Bed, are detailed in chronological sequence in this article. **[**4**]** R. M. Kacmarek "Past, Present, and Future of the Mechanical Ventilator They gave a historical overview of various mechanical ventilation systems. It's worth noting that artificial ventilation isn't a new or recent notion; it may be traced all the way back to Biblical times. However, it was not until the early 1800s when contemporary and automated equipment were available. A negative-pressure mechanical ventilator from the nineteenth century..[5] Abdul Mohsen Al Husseini, Hoen Ju Lee, Justin Negrete, Stephen Powelson, Amelia Servi, Alexander Slocum, JussiSaukkonen,"Designed and prototyped a low-cost portable mechanical ventilator for use in mass casualties and resource-poor areas." The ventilator compresses the Bag Valve Mask (BVM) with a cam arm to provide breaths, eliminating the need for

a human operator. They created a functioning prototype with assist control and an over-pressure alert; the device requires little power and can run for 3.5 hours on a single charge..[6] Narayan R, Venkateswarlu M, Jagadish M,The introduction of a basic, low-cost oral care programme in a surgical critical care unit resulted in a considerably lower risk of ventilator-associated pneumonia.

## III. PROPOSED SYSTEM

For controlling the device in our suggested system, we use an Atmega16A (MCU) 16-bit controller. The input voltage power supply from the battery is increased to 12 volts and then controlled to 5 volts using power regulators. The L293 motor driver is used to manage an AMBU bag equipped with a gear motor through a gear mechanism. A wireless gadget is utilised to receive signals from an Android application in order to regulate the mechanism. It has an Assist Control mode that provides instant breathing help in ambulances and hospitals. Some controlling support and mobile service with new technology enhances the device's smartness using a microcontroller controlling unit. The technique made use of an Ambu bag as a one-way valve and generated oxygen pressure. It has an air pressure sensor that continually detects the pressureof air in the brain circuit and display the patient body temperature and pulse data. A buzzer alarm is activated if the body temperature is abnormal. The CAM arm stands for Computer-Aided Manufacturing. The 3D printing system can design this arm. In order to operate the hardware device, we are developing an Android app for smart phones. It is small and consumes little electricity.

## IV. BLOCK DIAGRAM

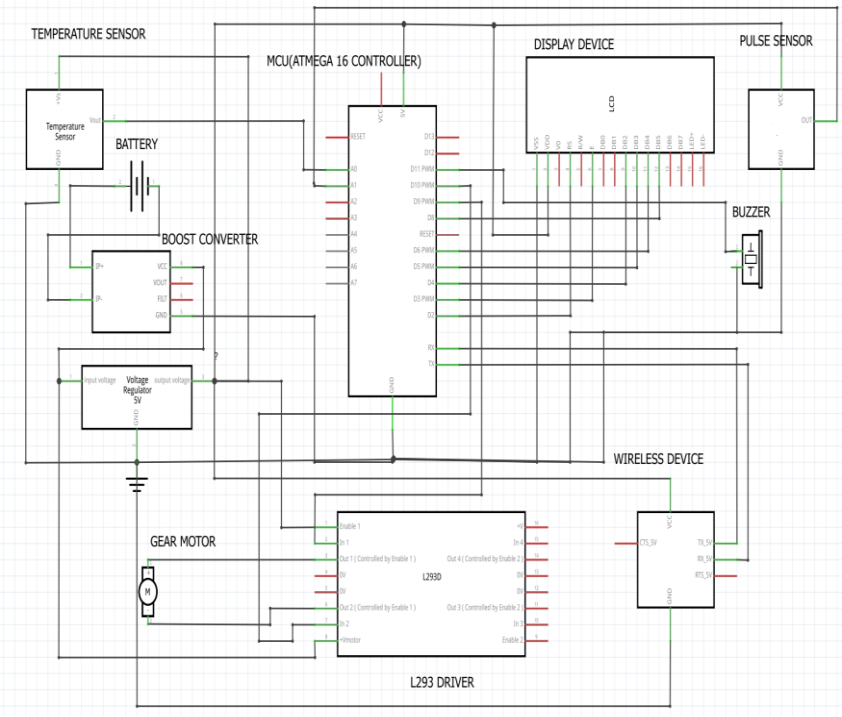


BLOCK DIAGRAM DESCRIPTION

The portable mechanical ventilator is implemented in this project. The blocks consist of this project is hardware ventilator and software mobile application.In this project the electromechanical ventilator is worked based on the controlling signals from the mobile application. This electromechanical ventilator is operated easily and safe.The portable ventilator is designed based on the gear mechanism with CAM arm. The MCU (Atmega 16) controller is used in this ventilator for controlling. The L293 motor driver is used to control AMBU bag with gear motor based on gear mechanism. Wireless device is used for receiving signal form android application for controlling the mechanism. CAM (computer aided manufacturing) arm is designed in 3d printing system for press the AMBU bag. The patient body temperature is monitoring by using temperature sensor and pulse rate can be monitored by using pulse sensor and displayed in the LCD display. If the body temperatureis abnormal condition means buzzer alert is activated. by using wireless device.

After that controller activate the gear motors connecting the driver board, the CAM arm start to compress the AMBU bag and deliver the oxygen supply to lung patient.

## V. CIRCUIT DIAGRAM AND DESCRIPTION




The above circuit consist the core components of Atmega 16 controller, display device, L293 driver, gear motor, temperature sensor, pulse sensor, buzzer, battery, booster converter.The supply from the battery is boosted to 12v by using booster converter and then 12v supply is converting to 5v with the help of voltage

regulator. Then the 5v supply is given to controller board. Display device is connected to controller digital pins like d2, d3, d4, d5, d6, d7 respectively.VSS is connected to ground, and VDD is connected to 5v.L293 is instruction pins IN1, IN2 is connected to controller digital pins.EN1 is connected to 5v supply. Gear motor is connected in driver board OUT1 and OUT2 pins. Temperature sensor has 3 pins GND, +V, VOUT pins. +V pin is connected to 5v supply, VOUT pin is connected to controller analogpin A0, and GND pin is grounded.Pulse sensor has 3 pins GND, VCC, OUT pins. VCC pin is connected to 5v supply, OUT pin is connected to controller analog pin A1, and GND pin is grounded.Buzzer has two pins, positive pin is connected to digital pin, negative pin is connected to ground.Wireless device has four pins. Wireless device is connecting to controller for transmitting and receiving the signal. TX and RX pin isconnected to controller RX and TX pin respectively. VCC pin is attached to 5V and GND pin is connected to ground.

## VI. ROLE IN THE DESIGN

µVision Keil provides IDE for 8051 programming& is very easy to use.When starting a new project, simply select the microcontroller you use from the Device Data base and the µVision IDE assigns all Compiler, Assembler, Linker, and Memory options. The database of the device is large which supports many ICs of the 8051 family. A HEX file can be created with the help of Keil which is used for burning onto chip. It has aefficient debugging tool which identifies most of the errors in the program. KEIL development tools in the 8051 Microcontroller Architecture support every level of Software developer from the qualified applications engineer to the student just studying about embedded software development. The KEIL C51 C Compiler for the 8051 Microcontroller is the most widely used 8051 C compiler in the world. It affords more characteristics than any other 8051 C compiler presented today. Language extensions in the C51Compiler give you full entry to all resources of the 8051.The C51 Compiler converts C source files into Reloadable object modules which contain full symbolic knowledge for debugging with the µVision Debugger or an in-circuit emulator. In supplement to the object file, the compiler produces a listing file which may optionally involve symbol table and cross reference information.

## VII. CONCLUSION AND FUTURE SCOPE

This project our final target was to make such a prototype of a mechanical ventilator based on Ambu bag with CAM arm pressing which will include some essential medical parameters measurement facilities with portability, lightweight, low cost, efficient, and telemedicine application. The parameters included are the tidal volume, air temperature, air pressure, and respiratory rate. These parameters are the output of our device and displayed in the liquid crystal display. The mobileapplication turns on at the condition of overpressure that exists in the air pathway of the brain circuit that alerts the hospital staff for immediate intervention to prevent the lung harm or overpressure of the patient's lung.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Invitro Evaluation of Antioxidant Potential of Rose Apple Mediated Synthesis of Magnesium Oxide Nanoparticles

**Dr. S.Chitra Sivakumar, M.Sc., M.Phil. Ph.D[1], S. Deepika[2], S. Kavitha Celcia[2], A.Lavanya[2], Y.Mamatha[2], B.Shilpa[2]**

[1]Assistant Professor, Department of Biochemistry, M.G.R.College, Hosur, Tamil Nadu, India
[2]Student, Department of Biochemistry, M.G.R. College, Hosur, Tamil Nadu, India

## ABSTRACT

Nanoparticles have found their base in recent times and nanotechnology has come forward in the limelight since 1970s, but the irony lies in the fact that it has been part of folk and traditional medicine since 1500 BC. With the advent of advance technologies, scientific knowledge have paved a way for research and development in the field of herbal and medicinal plant biology towards intersection of nanotechnology. Green synthesis of Magnesium oxide nanoparticles (MgONPs) are attracted because of their various applications. Biological methods for the synthesis of MgO NPs with the use of plant materials have not been extensively utilized. Magnesium oxide nanoparticles are widely used in industries due to their biocompatibility, biodegradability, and low cost. Keeping in view of all these things the present study aimed at the green synthesis of Magnesium oxide nanoparticles from the aqueous leaves extract of Syzygiumjambos(Rose apple) for the first time to the best of our knowledge and the study has evaluated the antioxidant potential of the synthesized Magnesium nanoparticles.

**Key words:** Syzygiumjambos, Magnesium nanoparticles,Antioxidant

## I. INTRODUCTION

Synthesis of Nano material is one of the major aspects of nanotechnology (Bansal & Suresh 2012). Selections of conventional methods have been engaged in synthesis of nanoparticles. But these conventional methods are inevitable with various limitations, which has upsurge the researchers to develop safe, eco-friendly alternative approaches in synthesis of nanoparticles among which biological systems have been engrossed and exploited as a chosen green principle process for synthesis of nanoparticles. Moreover, MgO nanoparticles have been mentioned in various applications (Liu *et al.*,2012). Keeping in view of all these things the present study aimed at the green synthesis of Magnesium oxide nanoparticles from the aqueous leaves extract of *Syzygiumjambos*(*R*ose apple).*Syzygiumjambos* has several common names, which include *Madhura Nelli,Malabar Plum*, *PanineerChampakka*, *Mountain Apple (champoo),chompu* or *chom-phu*. e.

## II. METHODS AND MATERIALS

*Syzygiumjambos*(Rose apple)leaves are chosen as the sample for the biosynthesis of the Magnesium oxide nanoparticles, identified and collected from the garden of our College,Hosur and has been authenticated by Dr. S. Soosai Raj, Assistant Professor, Department of Botany, St. Joseph's College, Trichy. Fresh and healthy leaves were selected, washed initially with tap water thrice. The leaves were cut into pieces and twenty grams of the leaves were accurately weighed, washedwith double deionized water to remove surface impurities. Then the leaves boiled with 100 mL of sterile double distilled water at 95°C for 20 min. With the help of Whatman No.1 filter paper, the aqueous plant extract was filtered. Finally, the filtered extract was cooled and stored at room temperature and can be used immediately for the biosynthesis of Magnesium oxidenanoparticles.

## III. SYNTHESIS OF MgONps

The aqueous extract was filtered through pal funnel with Whatman filter paper No 1 and about 10 ml of resulted filtrate transferred to 30 ml of a 1 mM Mg (NO3)2 solution on magnetic stirrer at 55°C temperature for 24 hours. A colour change into brownish colloidal appearance of solution indicates formation of nanoparticles. Next, solution was centrifuged at 15000 rpm repeatedly with subsequent distilled water washing and pallet then calcined in muffle furnace at 400°C to obtained MgONPs. The pellet formed was grinded and stored at 4°C for further analysis. (Gaurav Sharma *et al., 2*016). The following techniques were used to characterize the MgO nanoparticles which is synthesized biologically namely Visual observation,UV-Spectroscopy,Fourier Transformation Infra redspectroscopy,Dynamic Light scattering and Scanning electron microscopy.

Antioxidant Activity:The antioxidant activity of the synthesized Magnesium oxide nanoparticles were evaluated by using DPPH Radical scavenging assay. DPPH assay is based on the theory that a hydrogen donor acts as an antioxidant. The free radical scavenging effect is proportional to the disappearance of DPPH in test samples which shows a strong absorption maximum at 517 nm (purple).

## IV. RESULTS AND DISCUSSION

The results obtained in the present study are presented and discussed below. Figure-2 shows the UV-Visible spectrum of the formed MgONps exhibiting the maximum absorption peaks at about 285 and at 236 nm. Similar thing was observed in the study of (Rajgovind*et al.*,2017). The FTIR analysis of MgONps(Fig-3) suggested that they might surround by the any of these organic molecules such as polyphenols, alkaloids and terpenoids which are responsible for the reduction of Magnesium ions to Magnesium nanoparticles due to their capping and reducing capacity (Mohammad *et al.,*2019).

## V. CHARACTERISATION RESULTS OF MgONp UV-VISIBLE SPECTROSCOPY

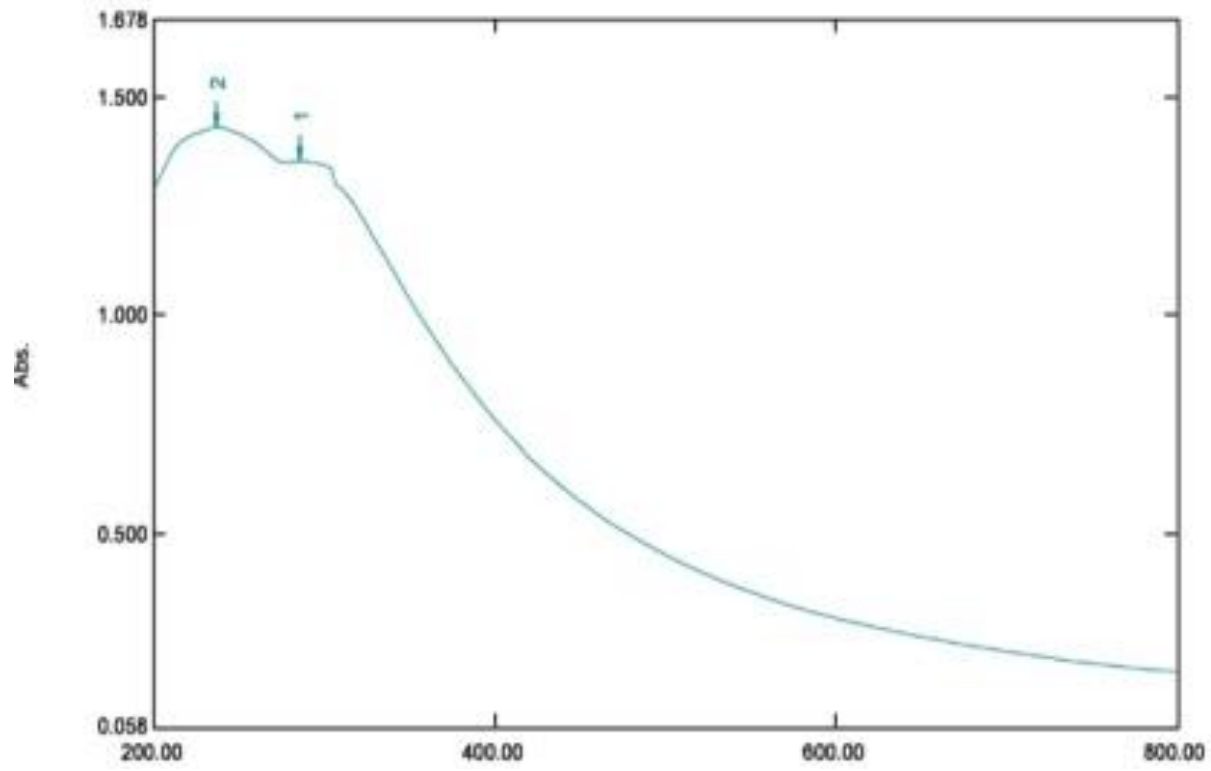


Fig-2 UV-Visible Spectrum of MgONp

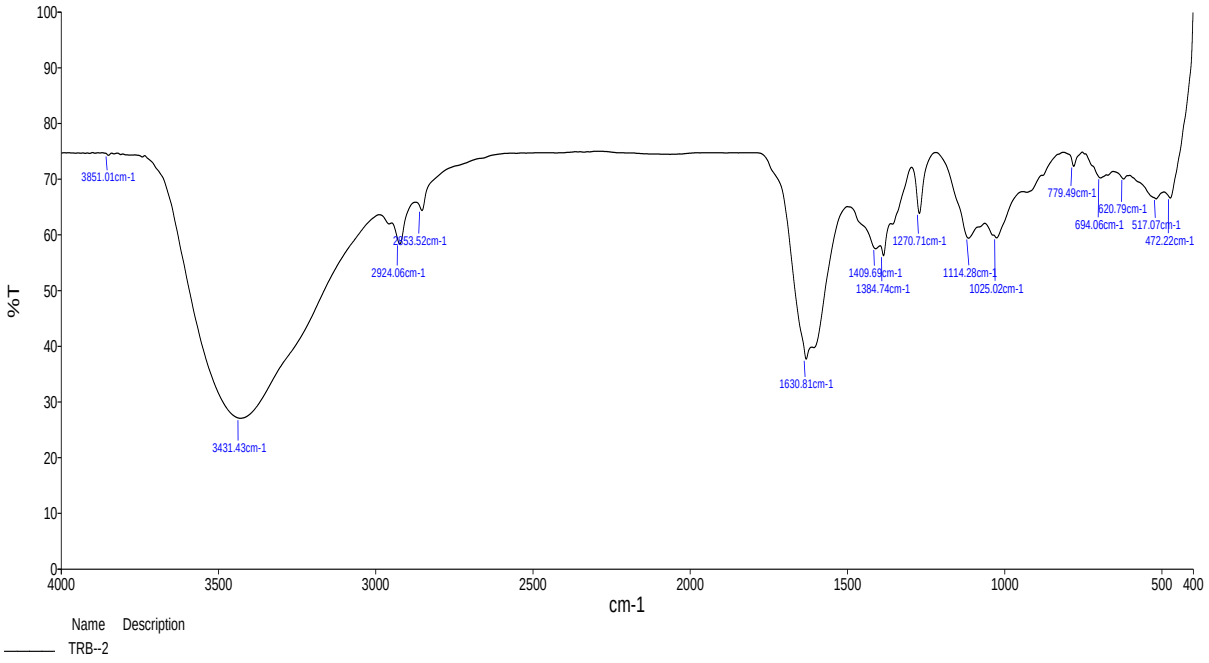


Fig-3 FTIR-Spectrum of MgONp

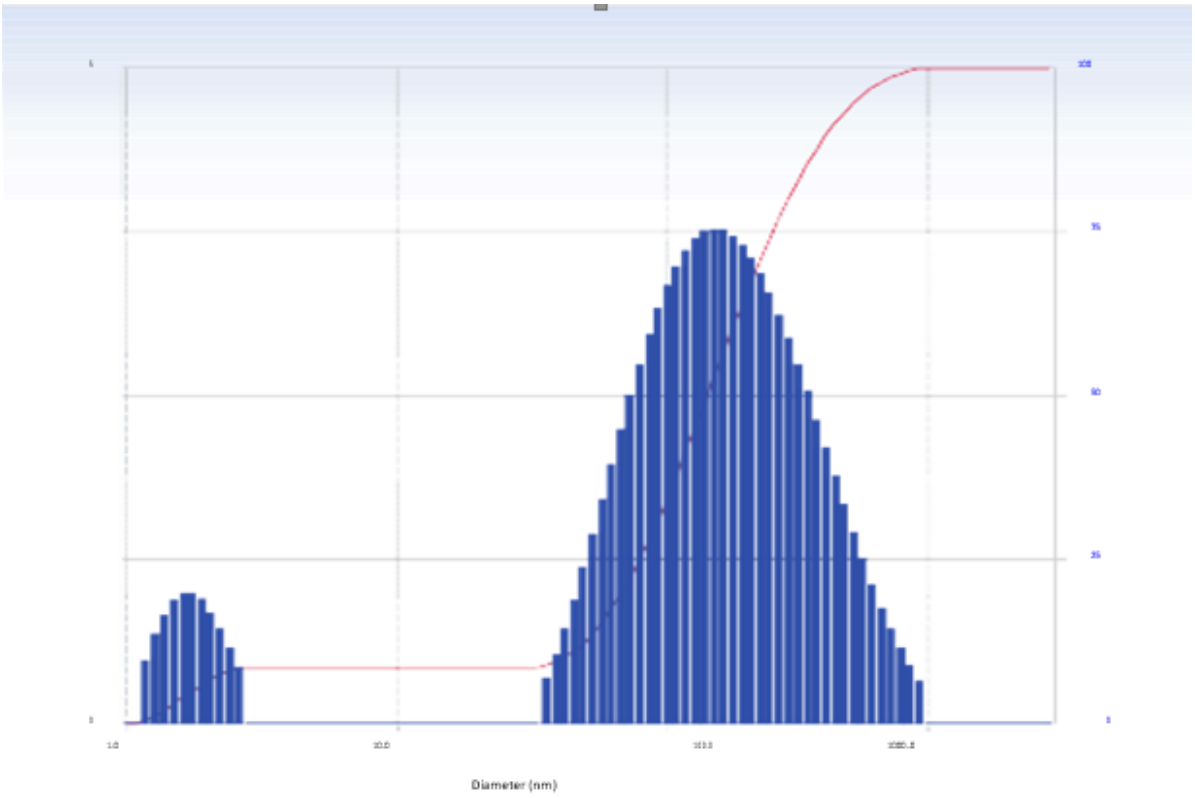


Fig-4 DLS of MgONp

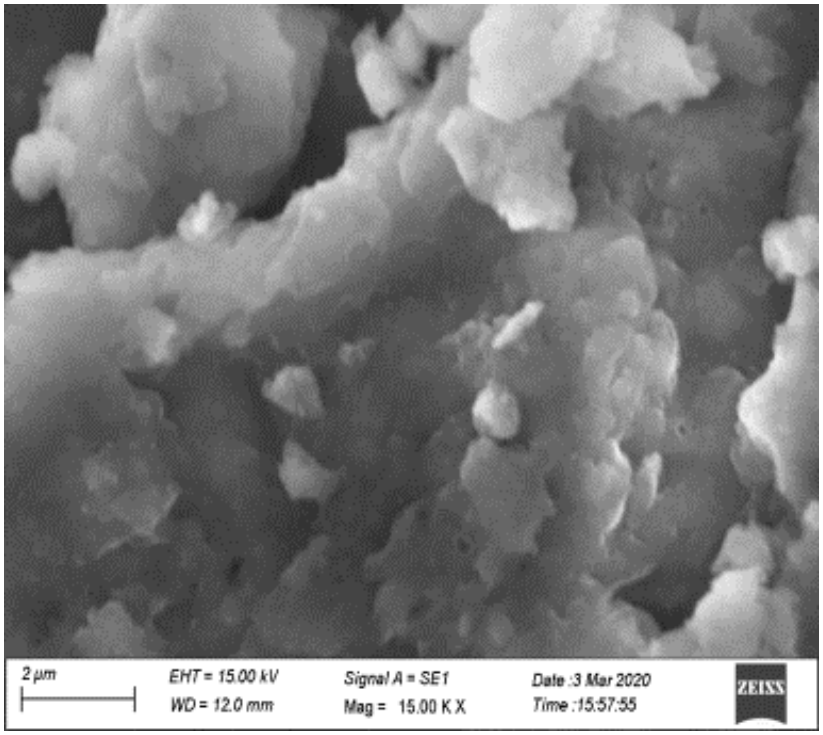


Fig-5 SEM analysis of MgONp

DLS analysis in figure-4 shows that the size of MgO nanoparticles was 205 nm . Figure-5 shows the spherical shape of MgONPs and are relatively uniform, found to be agglomerated and was similar to the earlier reports. (Mohammad Moslem *et al.*,2019).

## VI. ANTIOXIDANT ASSAY OF MAGNESIUM OXIDE NANOPARTICLES

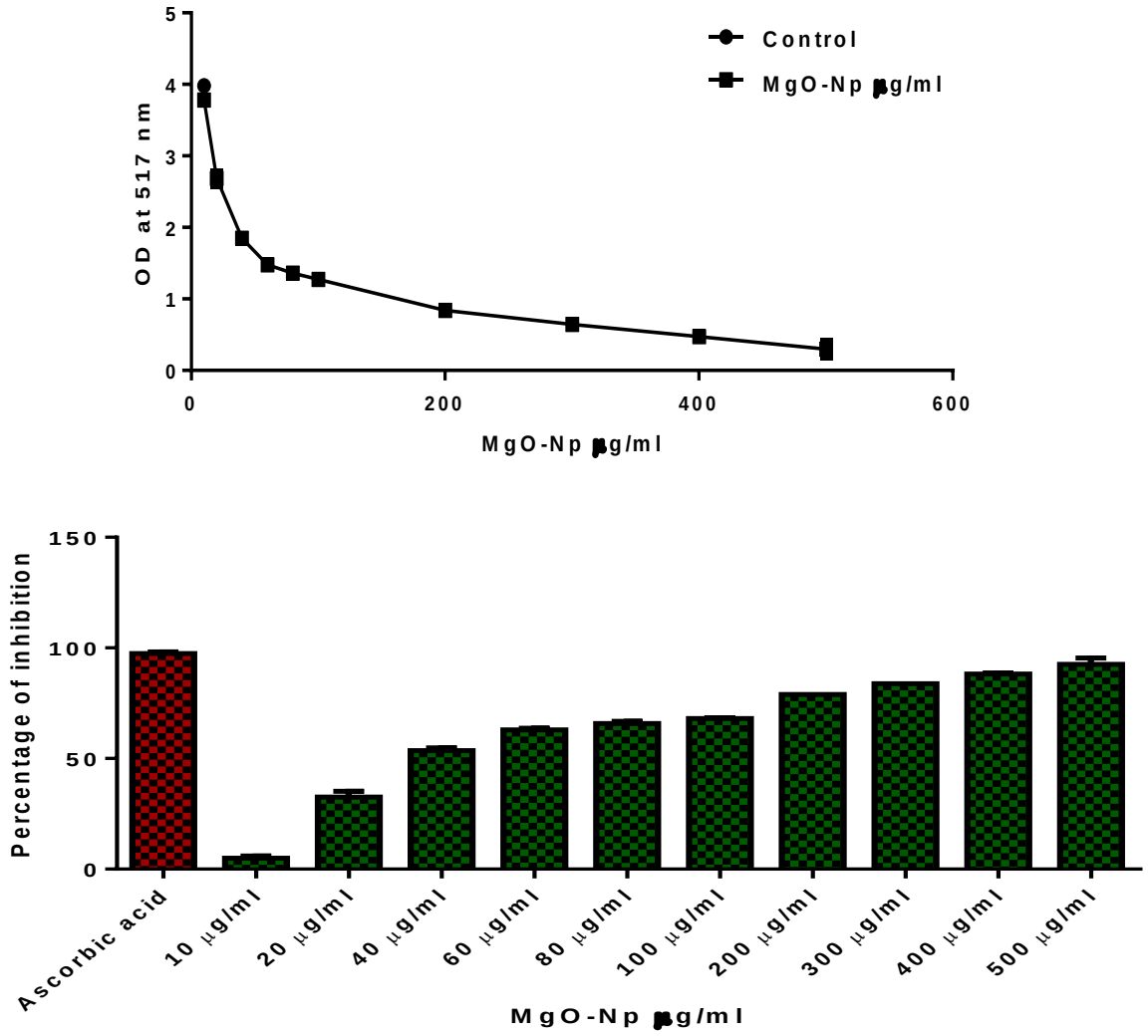


Fig-6 DPPH Assay and Percentage of inhibition of MgONp

The radical scavenging activity of MgO NPs was increased in dose-dependent manner. DPPH scavenging activity of MgONPs is significantly higher with IC50 46.30µg/ml when compared with control ascorbic acid.*Syzygiumjambos*exhibited a comparable antioxidant activity with that of standard ascorbic acid at varying concentrations tested (10, 20, 30, 40,50, 60…upto 500 µg/mL). A dose–dependent increase in the percentage of antioxidant activity was observed for all concentrations tested. DPPH assay used Ascorbic acid as the standard drug for the determination of the antioxidant activity.The concentration of ascorbic acid varied from 1 to 60 µg/mL. Ascorbic acid at a concentration of 10 µg/mL exhibited a percentage inhibition of

52.74% and for 60 µg/mL 99.86%.. Similar reports were observed for the antioxidant activity of magnesium nanoparticles obtained from *Cordia dichotoma by (Pankaj et al., 2013).*

## VII. SUMMARY AND CONCLUSION

In this present study, the leaves of Rose apple, was taken to investigate their potential for synthesizing Magnesium oxide nanoparticle. The Magnesium naoparticles synthesized were confirmed by their change of yellowish colour due to the phenomenon of surface plasmon resonance. The characterization of the synthesized copper oxide nanoparticles was done by UV-Visible spectroscopy,FTIR, DLS and SEM. Thus in the present study the Magnesium oxide nanoparticles were successfully synthesized by using Rose apple leaves for the first time and has proved the antioxidant potential of Magnesium oxide nanoparticles which provides cost effective, easy and proficient way . In conclusion, this greener approach toward the synthesis of MgONps using plant leaf material, has many advantages such as ease with which the process can be scaled up, economic feasibility, environmentally gentle and renewable, there is no need to use high pressure, energy, temperature and toxic chemicals.

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Evaluation of Invitro Thrombolytic Activity of Moringa Oleifera Flower Extract

**Mrs. K M Sudha M.Sc. M.Phil[1], S Praveen[2], N Murali[2], N Raghu[2], P Suresh[2]**

[1]Assistant Professor, Department of Bio Chemistry, M.G.R College, Hosur, Tamil Nadu, India

[2]PG Students, Department of Bio Chemistry, M.G.R College, Hosur, Tamil Nadu, India

## ABSTRACT

In many developing countries, a large population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs.

Natural medicines have come from various source materials including terrestrial plants, terrestrial microorganisms, marine organisms, and terrestrial vertebrates and invertebrates. Hence the point of the present research is to find out the thrombolytic effect of Moringa oleifera flowers. This formulation may be a source of powerful natural medication. In the present study the aqueous extract of the Moringa flowers was taken into consideration for testing the potential of Thrombolysis. The aim of the present research is to investigate the thrombolytic potential of Moringa oleifera flowers under in vitro conditions.

## I. INTRODUCTION

Thrombosis can be either venous thrombosis or arterial thrombosis, according to where thrombus presents in the body.

Venous thrombosis occurs in the veins and Arterial thrombosisdue to its association with atheroma rupture, occurs in the arteries. The blood stagnation may also cause this type of thrombosis. There are multiple causes for stroke, including hemorrhage, embolus and ischemia in the brain. Myocardial infarction which isassociated with ischemia may also be caused by a thrombus in the coronary artery. Cell death and myocardial infraction occurs when there is reduced oxygen supply to the heart cells, as a result of the blockage.. When the majority of the blood vessel is blocked, the oxygen supply to the body is reduced and results in increased production of lactic acid.Additionally, in some cases the blood clot may break free and travel around the body, a process known as embolization Abnormal flow or stagnancy of the blood may lead to increased risk of thrombosis, it is necessary that movements are made usually , particularly if suspected individuals are likely to be at rest for long periods of time, such as in bed or on an airplane.For people at high risk of venous thromboembolism, heparin can be administered to reduce risk of pulmonary embolism, although this is associated with higher susceptibility to bleeding due to the reduced efficacy of the clotting factors. Therefore, heparin offers greater use in the treatment, rather than prevention of thrombosis.

## II. LITERATURE SURVEY

A blood clot (thrombus) develops in the circulatory system which consolidates a mechanism in human body to repair the injured blood vessel (Lillicrap et al., 2009). If thrombus is formed when it is not needed, this can produce significant consequences (Wedro, 2007) like embolism, ischemia, heart attack, stroke, and so forth. When blood clotis formed embolism occurs inside a blood vessel or an artery and remains there which fully or partially block blood supply to a part of body resulting potentially severe consequences. For example, a pulmonary embolism leads in explicable breathing difficulty, hemoptysis, and chest pain when one or more arteries in lung are blocked by embolus (Kasper et al., 2005).

Clarification Thrombolytic therapy is a treatment to get rid of problems raised due to blood clot or thrombus to renovate function to the affected area (Perler, 2005). Thrombolytic agent ,which is also known as clot buster, has saved untold lives. Thrombolytics afford longer-term benefits for survivors,who have just a 5% mortality rate at one year (Jackson, 2005). Thrombolytic agent is commonly used for ( Makris, 2009). venous thrombosis, (Wedro, 2009). pulmonary embolism, (Shapiro, 2003). myocardial infarction, arterial thromboembolism, acute ischemic stroke .

Basic Pharmacology of Thrombolytic Drug: Thrombolytic agents can be classified according to their generation. Thrombolytic drugs rapidly lyse thrombus by catalyzing the formation of the serine protease plasmin.

Several types of thrombolytic drugs are commonly used worldwide. Their pharmacology are summarized below.

Streptokinase is a protein (but not an enzyme in itself) produced by various strains of h-hemolytic streptococci having a molar mass of 47kDa and is made up of414amino acid residues. It exhibits maximum activity at a pH of approximately 7.5 and its isoelectric pH is 4.7. (Banerjee, *et al.,*2004). This protein is single chain polypeptide that combines with the pro activator plasminogen .This enzymatic complex prompts the alteration of inactive plasminogen to active plasmin and, thus, exhibits fibrinolytic activity.

Urokinase is a human enzyme synthesized by the kidney that directly converts plasminogen to active plasmin .Urokinase has high molecular weight of 5400 Daltons. It consists of three domains: the serine protease, the kringle domain, and the growth factor domain with 411 residue protein (Jankun, *et al.,* 1999). Plasmin has naturally occurring inhibitors that prevent it from working properly. However, because urokinase and the streptokinase proactivator complex have no inhibitors, they can be used clinically. These activators protect the plasmin generated inside a thrombus from plasma anti plamins, allowing it to lyse the thrombus from within.

## III. MATERIALS AND METHOD

The Moringa blooms were picked and washed with tap water first, then distilled water, before being shade dried. It was powdered after drying. The soxhlet device was used to make the aqueous extract. The residue

collected was weighed and then stored in tiny vials as aliquots intherefrigerator for further use.Standard procedures were used to check for the presence of bioactive components in the extract.

When crude extract was combined with 2ml Millon's reagent, a white precipitate formed, which turned red after gentle heating, indicating the presence of protein.

When crude extract was heated with 2ml of Ninhydrin 0.2 percent solution, a violet colour developed, indicating the presence of aminoacids and proteins.

2ml of Fehling A and Fehling B reagents were mixed together and added to crude extract before being gently heated. The presence of reducing sugars was indicated by a brick red precipitate at the bottom of the test tube.

When crude extract was heated with 2ml Benedict's reagent, a reddish brown precipitate appeared, indicating the presence of carbohydrates.

The crude extract was combined with 2mL Molisch's reagent and thoroughly mixed. After that, 2ml of concentrated H2SO4 was gently poured along the test tube's side.

The presence of carbohydrate was shown by the appearance of a violet ring in the interphase.

2ml of iodine solution was added to the crude extract. The presence of a dark blue or purple colour denotes the presence ofCrude extract was mixed with 2ml of 2% solution of $FeCl_3$. A blue-green or black coloration indicated the presence of phenols and tannins.

Concentrated HCl was added drop by drop to a mixture of crude extract and a few shards of magnesium ribbon. After a few minutes, a pink scarlet colour developed, indicating the presence of flavonoids.

The crude extract was combined with 2 mL of a 2% NaOH solution. When a few drops of diluted acid were added, the strong yellow colour turned colourless, indicating the presence of flavonoids.

In a test tube, crude extract was combined with 5ml distilled water and briskly shaken. The existence of saponins was assumed based on the production of stable foam.

## IV. TEST FOR GLYCOSIDES

### Liebermann's test

The crude extract was treated with 2 mL chloroform and 2 mL acetic acid. The mixture was chilled with ice. H2SO4 in a concentrated form was added. A colour change from violet to blue to green indicated the existence of steroidal nucleus, i.e. glycone component of glycoside.

### Salkowski's analysis

To the crude extract, 2 mL chloroform was added. Then 2ml of concentrated H2SO4 was added slowly and carefully shook. A reddish brown colour showed the presence of the steroidal ring, i.e. the glycone component of the glycoside.

Keller-Kilani Crude extract was mixed with 2 mL glacial acetic acid and 1-2 drops of FeCl3 solution at a concentration of 2%. The liquid was then transferred to a test tube containing 2ml of concentrated H2SO4.

## V. TESTINVITRO THROMBOLYTIC ACTIVITY

The thrombolytic activity of Moringa flowers was done by following the methods of using streptokinase (SK) as a standard reference.

### Streptokinase (SK) Solution Preparation

Lyophilized (Streptokinase) vial of 15, 00,000 I.U., was taken and a 5 ml of sterile distilled water was added and mixed together from which 100µl (30,000 I.U) was used for in vitro thrombolysis.

### Blood collection

Whole blood (3 ml) was drawn from healthy human volunteers (n = 10) without a history of oral contraceptive or anticoagulant therapy. 500 µl of blood was transferred to ten alpine which are already weighed tubes to form clots.

### Thrombolytic assay

Blood sample (500µl) was distributed in pre weighed sterile micro centrifuge tubes and incubated at 37°C for 90min for clot formation. After clot formation, the serum was finely aspirated without disturbing the clot and the tubes were again weighed to determine the clot weight. (SarkerR,Sharmin et al., 2012) .The clot weight of the sample was calculated using the formula,

(Total clot weight = Weight of tube containing clot – Weight of empty tube).

Each eppendorf tube containing clot, then add 100 µl of plant extract. On the other hand, as a positive control, 100 µl of streptokinase and as a negative non thrombolytic control, 100 µl of distilled water were separately added to the numbered control tubes. All the tubes were then incubated at 37°C for 90 minutes for observation. After incubation, fluid obtained was removed and tubes were again weighed and the difference in weight after clot disruption is observed. Calculate the difference obtained in weight taken before and after clot lysis was denoted as percentage. The test was repeated thrice and the percentage of clot lysis was calculated by using the formula:

[Percentage of clot lysis = (weight of released clot /clot weight) × 100]

### Maximum clot lysis with respect to concentration and incubation of time

Various concentrations of flower extracts i.e. 200µl/ml, , 400µl/ml, and 600µl/ml were tested at various time intervals including; 24hrs, 48hrs and 72hrs duration of incubation at 37°C for maximum clot lysis (Elumalai A, 2012).

## VI. RESULTS AND DISCUSSION

**Fig-1 Collection of sample –*Moringa flowers***

The above Figure-1 shows the flowers of *Moringa* which was chosen for the present study.

Figure -2 shows the prepared aqueous extract of the *Moringa* flowers for further analysis.

The results of phytochemical analysis of *Moringa* flowers,are shown in Table.1. The qualitative phytochemical analysis exposed the presence of secondary metabolites such as alkaloids, flavonoids, steroids, cardiac glycosides, terpenoids, tannins, saponins, reducing sugars, anthraquinones, phenols, carbohydrates in the aqueous extract. Presence of phytochemicals was indicated by the positive (+) sign. Aqueous extract of *Moringa* flowersshowed the presence of higher levels of phytochemicals.

| TEST | AQUEOUS EXTRACT PLANT |
|---|---|
| ALKALOIDS | ++++ |
| FLAVONOIDS | ++++ |
| STEROIDS | + |
| CARDIAC GLYCOSIDES | + |
| TERPENOIDS | + |
| TANNINS | +++ |
| SAPONINS | ++ |

| | |
|---|---|
| PROTEINS | ++ |
| PHENOL | ++++ |
| CARBOHYDRATES | ++ |

Table-1: Phytochemical Screening of Moringa Flowers

The blood is collected from healthy volunteers for the thrombolytic assay. The *Moringa* flower extract is added to the eppendorf tubes containing blood.

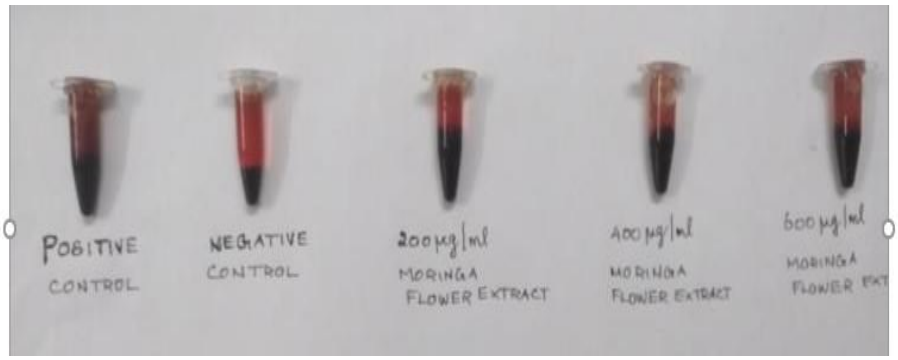


Fig-3 Formation of Clot

The above Figure-3 shows the formation of clot of all the test samples along with the positive and negative control.

**Fig-4 Clot Lysis by Streptokinase (Positive control)**

The above Figure-4 indicates the Clot Lysis of Streptokinase (Positive control).

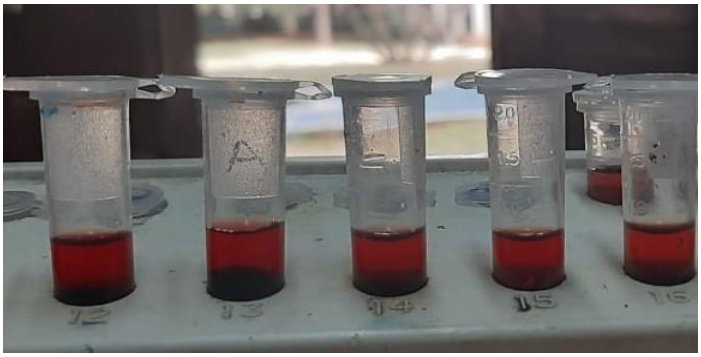

**Fig-5 Clot Lysis of Moringa Flower extract**

The above Figure-5 shows the clot lysis done by the extract of *Moringa* flowers.

Atherothrombotic diseases like Myocardial or cerebral infarction(Lee, 1995) occur owing to the development of thrombus that causes hindrance in the passage of vessels ( Apu AS *et al.,* 2013). In the present study the aqueous extract of the Moringa flowers was taken into consideration for testing the potential of Thrombolysis.

**Table-2 Invitro Thrombolytic activity of Negative control and Positive control**

| Compound | Incubation time | Clot lysis |
|---|---|---|
| Standard (Streptokinase) | 24 hrs | 51% |
| | 48 hrs | 81% |
| | 72 hrs | 86% |
| Control (Water) | 24 hrs | 1.09% |
| | 48 hrs | 1.15% |
| | 72 hrs | 1.23% |

Table-2 represents the % of clot lysis by the streptokinase which was used as the positive control and water which was used as the negative control .Streptokinase has showed maximum 85%of clot lysis in 72 hrs and 80 % in 48 hrs of incubation.This value is almost similar to the thrombolytic study done in *Bougainvillea Spectabilis* leaf extract.(Sikandarkhan sherwani 2013). The control has least fibrinolytic activity as 1.09%,1.15%,and 1.23% of clot lysis at different time of incubation .

**Table-3In vitro Thrombolytic activity of *Moringa* Flower extract**

| Concentration of *Moringa* Flower Extract | Incubation time | Clot lysis |
|---|---|---|
| 200 µg/ml | 24 hrs | 21% |
| | 48 hrs | 35% |
| | 72 hrs | 37% |
| 400 µg/ml | 24 hrs | 42% |
| | 48 hrs | 44% |
| | 72 hrs | 49% |
| 600 µg/ml | 24 hrs | 58% |
| | 48 hrs | 61% |
| | 72 hrs | 65% |

Table-3 indicates the in vitro thrombolytic of flower extract of *Moringa oleifera* at different concentrations. The results indicated maximum of 65% clot lysis at 600µg/ml in 72 hrs of incubation and minimum 21% of clot lysis at 200µg/ml in 24hrs incubation respectively.

The earlier studies have anlaysed thrombolytic activity in the *Moringa* leaves and they reported only limited percentage at 30 % of clot lysis.(Mohammad Shahria 2012).Only few literature are there about the thrombolytic activities of Moringa leaves ,and

Moringa flowers are not yet reported alone. From the findings it was clearly evident that noticeably concentration of flower extract enhanced in the clot lysis in dose dependent manner along with the incubation time factor. In many reports of *Bougainvillea species* also similar observations were observed with

clot lysis ability. The process behaved to be a complex and not known absolutely even today (Elumalai *et al.,2012).*Some studies indicates that thrombolytic activity probably due to the disease composition of plant extracts like phyto constituents including such sources of alkaloids flavanoids tannins and terpenoids (Dwinedi*et al.,* 2012).Thus the present study has made an successive attempt in analyzing the thrombolytic activity of *Moringa oleifera* flowers.

## VII. CONCLUSION

The present study aims at the evalution of invitro thrombolytic activity of *Moringaoleifera* flowers. The flowers are commonly available and has various medicinal benefits. For the present study aqueous extracts of *Moringa* flowers was prepared. The extract was subjected to phytochemical analysis and the results showed the presence of bioactive compounds. Blood was collected from 10 healthy volunteers and allowed to clot for about 90 minutes of incubation. After that the serum was completely removed and the clot weight was calculated. To the clot three different concentrations of the flower extracts were added namely (200 µl,400 µl,600 µl) and then the percentage of clot lysis for each of the extract was analysed by using streptokinase as positive control and water as negative control. The attempt was made successful maximum clot lysis of 65% was observed at 600 µl concentration in72 hrs of incubation. The concentration of aqueous flower extract and incubation time were directly proportional to the clot lysis . Thus, in the present study we have proved the thrombolytic potential of *Moringa* flowers.To our knowledge , this study is the first to report this thrombolytic activity in this flowers.

In future, with further research and cell viability test and invivo studies this approach finally may have important implications in the treatment of cardiovascular diseases which is increasing at alarming rate. Since the drugs used for the carviovascular diseases are not economical and not accessible to the greater action of society ,application of this study may be a boon for them .

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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Sandal Leaves – Assisted Synthesis of Copper Oxide Nano Soap and Its Bactericidal Activity

**Chitra.S[1], Manoj G[2], Yuvaraj A[2], Sakthikumar C[2], Ravikumar S[2], Varunkumar S[2]**
[1]Assistant professor, Department of Biochemistry, MGR College, Hosur, Tamil Nadu, India
[2]Student, Department of Biochemistry, MGR College, Hosur, Tamil Nadu, India

## ABSTRACT

The development of nanotechnology is creating the interest of researchers towards synthesis of nanoparticles because nanoparticles are being widely applied in the medical field. Copper ions and its derivatives has been used for different medical applications like to prevent infection, ulcers etc. The aim of the present study was to biologically synthesized Copper oxide nanoparticles using Santalum album leaves and characterizing it with the help of UV-Visible spectroscopy, FTIR, DLS, and SEM. The prepared Copper oxide nanoparticles impregnated soap formulation proved an efficient and good bactericidal activity, which will be very useful in clinical applications.

## I. INTRODUCTION

In ancient medicine, sandalwood oil has been treated as antiseptic and astringent, and for the treatments such as headache, stomachache, and urinary and genital disorders. In India oil, emulsion, or paste of sandalwood is used for treatment of inflammatory and eruptive skin diseases. It was also in the traditional Ayurveda medicine as a diuretic, mild stimulant, and for smoothing the skin. The leaves and bark were used to treat dandruff, lice, skin inflammation, and sexually transmitted diseases. Sandalwood oil has been used in traditional medicine for treatment of bronchitis, common cold, skin disorders, general weakness, fever, infection of the urinary tract, inflammation of the mouth and pharynx, liver and gallbladder complaints.In addition, different in vitro and in vivo parts of the plant have been shown to possess antimicrobial and antioxidant properties,attributed to sesquiterpenoids, shikimic acid.

The biological procedures, which is considered as an alternative to chemical and physical methods, provides an ecofriendly method of synthesizing nanoparticles.

Moreover, this method does not require expensive, harmful and toxic chemicals. Metallic nanoparticles with desired shapes, sizes, contents and physicochemical properties can be synthesized. Synthesis can be done in single step using biological organisms such as bacteria, actinobacteria, yeasts, molds, algae and plants, or their products. Molecules in plants and microorganisms, such as proteins, enzymes, phenolic compounds, amines, alkaloids and pigments can perform nanoparticle synthesis by reduction.

With the materials present in the plant extract, such as sugar, flavonoid, protein, enzyme, polymer and

organic acid, acting as a reducing agent, takes charge in bioinduction of metal ions into nanoparticles (Park *et al.*, 2016). Copper nanoparticles researchers worked with plant extracts, some specific plant parts or whole plant for the green synthesis (Amal kumar etal.,2011). Many of them reported that extracts from plants like Nerium oleander (Gopinath etal.,2014), Punica granatum (Pawan kaur etal., 2016), Aegle marmelos & Ocimum sanctum (Vasudev kulkarni etal., 2014), Zingiber officinale (Shubankari etal.,2013) efficiently yielded copper nanoparticles on green synthesis and so were used for the same. In recent years, Cu nano particles have attracted much attention of researchers due to its application in wound dressings and biocidal properties (Borkow G., 2010), potential industrial use such as gas sensors, catalytic process, high temperature superconductors and solar cells (Li Y., 2008). Copper, zinc, gold, magnesium, silver, and titanium nanoparticles are of particular interest because of their antibacterial properties against *Bacillus subtilis* and *Staphylococcus aureus*, applications in medicine, dental materials, water treatment, sunscreen lotions, and coatings (Easom *et al.*,1994, Wunder*et al.* 2010).

A major warning factor to human health is water contamination by microbes. The number of disinfectant procedures has increased because some microbes are resistant to older antimicrobial agents. Copper nanoparticles have been used as a disinfectant for wastewater Copper nanoparticles incorporated on carbon, polymers, sepiolite, and polyurethane foam come up with effective antibacterial activity. Copper nanoparticles provide high affinity for surface active groups of bacteria and have been used for *B. subtilis*. At present the metal nanoparticles are used as a preservative agent in food and cosmetic industries. New proportions of metallic nanoparticles is being used for different commercial applications mainly cosmetics, pharma coating materials and food preservatives. The nanosized metal particles such as gold, silver and platinum are widely being used for various commercial products such as shampoo, soap, detergent, and shoes. The chemical ingredients are synthetic, and it may cause side effects to human being.

Nanomaterial types are already in use, inclusive of nanoemulsion, nanoparticles of minerals available in natural environment, such as titanium dioxide (TiO2), zinc oxide (ZnO), alumina, silver, silicon dioxide, calcium fluoride and copper.

The unique properties and behaviour of nanomaterials says that nanotechnologies could absolutely transform industry and everyday life. In composition of cosmetics, Titanium dioxide (TiO2) and Zinc Oxide (ZnO) nanopigments are the necessary compounds used as highly efficient UltraViolet-filters. Due to these properties, they are extensively used in sunscreens. In regard of this the present study has aimed at the production of copper nanoparticles using sandal leaves and tried an attempt in preparing soap impregnated with the nanoparticles.

## II. MATERIALS AND METHODS

### A. PREPARATION OF AQUEOUS EXTRACT

Fresh and healthy leaves were selected, washed initially with tap water thrice. The leaves were cut into pieces and twenty grams of the leaves were accurately weighed, washed with double deionized water to remove surface impurities. Then the leaves boiled with 100 mL of sterile double distilled water at 95°C for 20 min. The extract is filtered using filter paper named Whatman No.1. Finally, the filtered extract was cooled and

stored at room temperature and can be used immediately for the biosynthesis of copper oxide nanoparticles.

## B. SYNTHESIS OF COPPER OXIDE NANOPARTICLES

In the preparation, 10 mL of the prepared aqueous leaves extract was added to 10 mL of Fehling's solution. After 10 min, the colour of the solution turned from blue to brick red, showing the formation of cuprous oxide nanoparticles .Then, the solution is continuously stirred in room temperature for 4 days. The product was washed with distilled water three times with equal time intervals and finally the product was washed with 100% methanol. Then, it is dried at room temperature for further analysis. The procedure was repeated to obtain the bulk amount of the nanoparticles and stored in a dry condition in eppendorf tubes for further analysis.

## C. CHARACTERISATION OF COPPER OXIDE NANOPARTICLES

For characterization of the green copper oxide nanoparticles following methods were necessary by means of which we can confirm the production of copper Oxide Nanoparticles. It is possible to have an idea of its size distribution profile and surface morphology from the results of the characterization analysis. The following techniques were used to characterize the copper nanoparticles which is synthesize biologically.

1. Visual observation
2. UV-VIS spectroscopy
3. Fourier transformation IR spectroscopy
4. Dynamic light scattering
5. Scanning electron microscopy

## D. PREPARATION OF SOAP AND IMPREGNATION OF COPPER NANOPARTICLES

For the preparation of soap,165 gm of NAOH was accurately weighed and taken in a glass beaker and was added to 380 ml of distilled water and stirred well. Allowed to cool down. After cooling one litre of pure coconut oil is slowly added to this solution and stirred with a glass rod frequently till a colloidal state was attained. At this stage the solution was transferred into a paper cups to get a shape. After this it was kept undisturbed till it was solidified into a soap. Similarly at the colloidal state 100 mg of the green synthesized copper nanoparticles was added slowly and stirred well After thorough mixing it was poured into the paper cups for solidification.Thus the soaps were impregnated with CuONps to form copper nano soap.

## E. BACTERICIDAL ACTIVITY OF SOAP AND COPPER NANO SOAP CULTURING AND PRESERVATION OF MICROORGANISMS

The Conventional Well Diffusion method was used to determine the antibacterial activity of biologically prepared CuONps which is a screening test generally done for verifying bactericidal activity of samples. For performing the experiment, cultures of five test bacterial strains namely *Staphylococcus aureus* (Gram positive), *Bacillus subtilis*(Gram positive),*Escherichia coli* (a Gram-negative bacterium), *Pseudomonas aeruginosa* (Gram-negative), *Serratia rubidaea*(Gram-negative)were collected from the laboratory of

Microbiology Department, M.G.R. College, Hosur. The strains were grown and preserved in the culture media following standard procedures.

## F. ANTIBACTERIAL ASSAY BY WELL DIFFUSION METHOD

Antibacterial activity were assayed by using standard well diffusion method against human pathogens namely five test bacterial strains namely *Staphylococcus aureus* (Gram positive), *Bacillus subtilis*(Gram positive),*Escherichia coli* (a Gram-negative bacterium), *Pseudomonas aeruginosa* (Gram-negative), *Serratia rubidaea*(Gram- negative). Bacterial strains grown on nutrient broth at 37°C for 24 hrs were maintained in the laboratory under sterile conditions. Nutrient agar media was used to perform sensitivity assay (Wagner, 1996). Fresh overnight grown cultures of the bacteria were spread on Nutrient Agar containing Petri plates and with a sterile cork borer 1mm holes were punched in the medium. Solution containing CuO nanoparticles at two different concentrations namely 20 and 40 µl and 10µl of Erythromycin (10mg/ml) was inoculated in the wells and the plates were incubated at 37°C for 24 hrs and the diameter of zone of inhibition in mm produced by the nanoparticles were observed and compared with those produced by the positive control namely Erythromycin(10mg/ml).

## III. RESULTS AND DISCUSSION

The leaves of *Santalum album* was chosen for the present study to synthesize Copper oxide nanoparticles. Aqueous Extract of sandal leaves was prepared and Fehling's solution was added to the aqueous extract leading to the formation of Copper Nanoparticles. The bio reduction of the fehling's solution using aqueous leaves extract was monitored and the appearance of reddish brown colour indicates the formation of copper oxide nanoparticles. Initially the leaves extract of *Santalum album* was pale green in colour. But after the addition of fehling's solution the colour gradually changes from pale green to dark green and finally to brick red colour on stirring over magnetic stirrer continuously. The appearance of reddish brown colour indicates the reduction of copper sulphate and formation of CuONps.

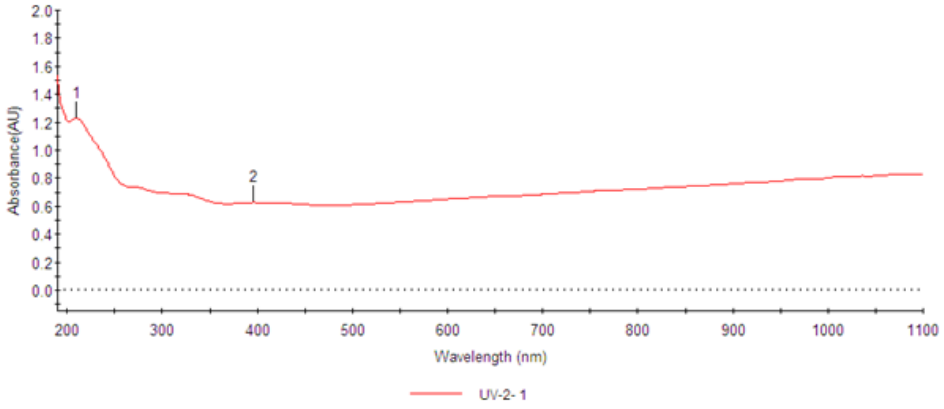


**Fig-1 UV-Visible Spectrum Of Cuonp**

Figure-1 shows the UV-Visible spectrum of the formed CuONps exhibiting the maximum absorption peak at about 210 nm. In the spectrum, The peak at 210 nm are due to surface plasmon absorption of copper oxide.

The surface plasmon absorption in the copper oxide nanoparticles is due to the collective oscillation of the free conduction band electrons which is excited by the incident electro magnetic radiation .This type of resonance is seen when the wavelength of the incident light far exceeds the particle diameter. Surface plasmon absorption band with a maximum at 210 nm indicates the formation of CuONps.

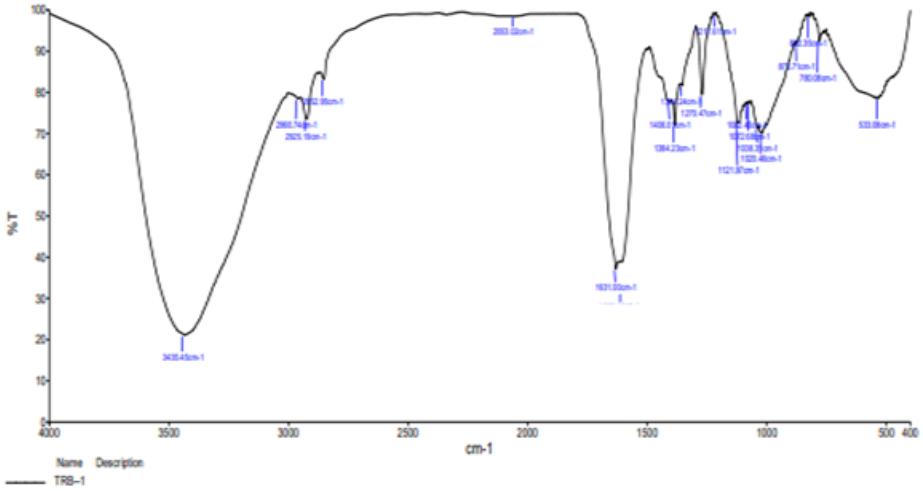


Fig-2 FTIR-Spectrum of CuONp

FTIR measurement of **plant** extract and copper nanoparticles are shown in Figure-6 respectively. The FTIR analysis is used to recognize the capping, reducing and stabilizing capacities of the leaf extract. In a Fig-10(a), aqueous flower extract showed the peaks at 3435 $cm^{-1}$, 2980 $cm^{-1}$, 2825 $cm^{-1}$, 2852 $cm^{-1}$, 1631 $cm^{-1}$, and 1406 $cm^{-1}$ etc.,These corresponding peaks were due to presence of alcohol OH, C=H stretching with vibration, C=C Alkene group, Amide bending and aromatic stretching group.Similar reports were reported by earlier studies. The chemical constituents present in leaves extract such as Flavonoids, alkaloids and fatty acids are responsible for the reduction of copper ions to copper nanoparticles due to their capping and reducing capacity.

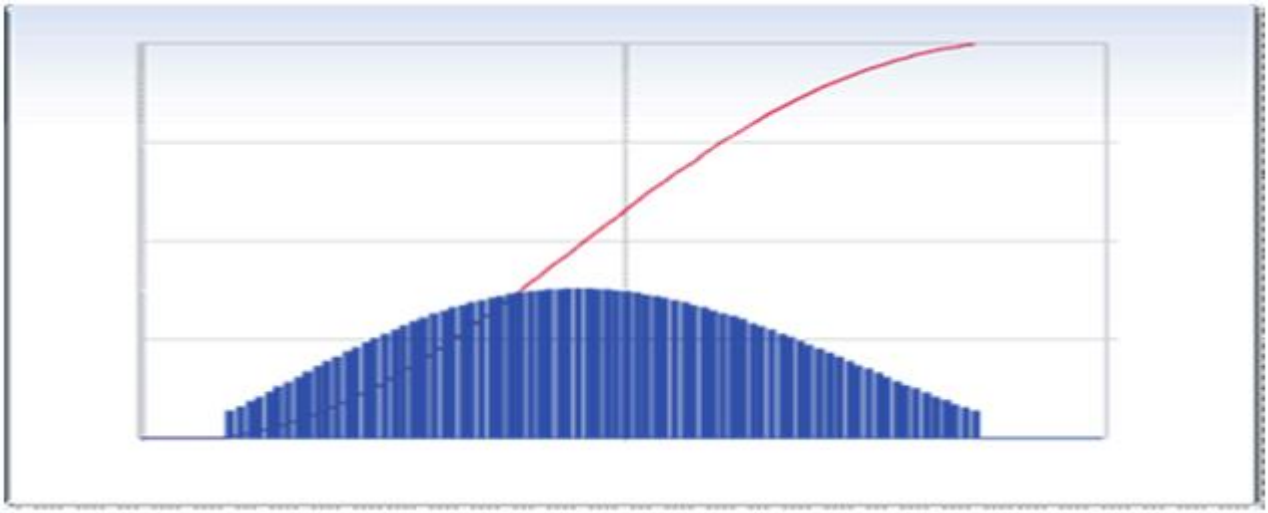

Fig3. Dynamic Light Scattering of CuONp

The following results as shown in Figure-3 shows the particle size analysis of the green synthesized CuO nanoparticles. The synthesized nanoparticles are of spherical shaped and have a size of about 12.4 nm. . The values are very closely related to earlier reports done by (Saif etal., 2016) in their research .

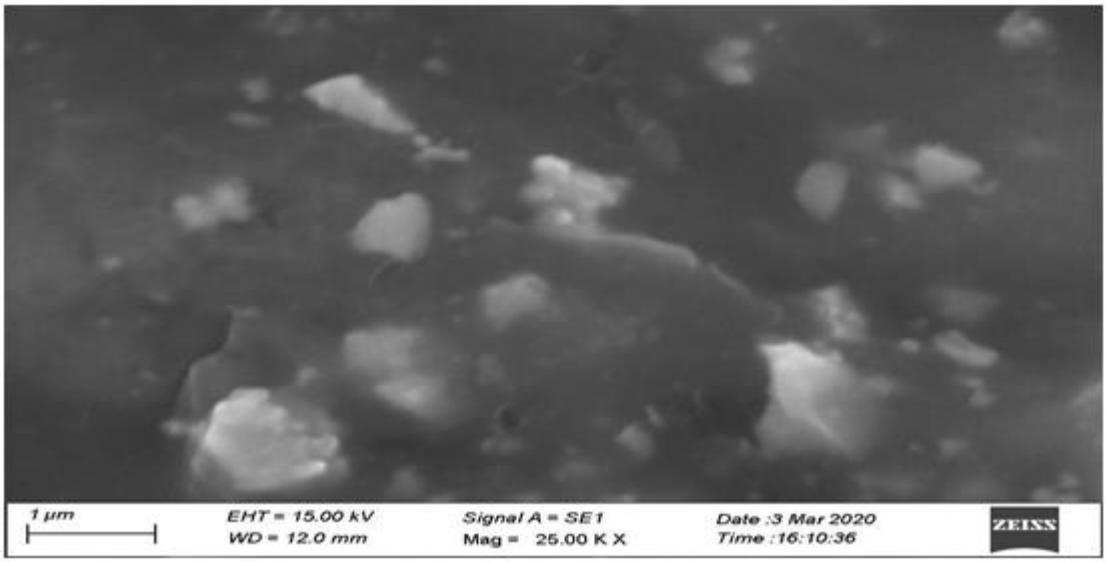


Fig-4Scanning Electron micrograph ofCuONp

The surface morphology and size of the nanoparticles were obtained by Scanning Electron Microscopy (SEM) analysis. The Figure-4 shows the SEM results of CuONPs synthesized. It was shown that spherical and relatively uniform and powdered shape of the copper oxide nanoparticles was confirmed in the range of 87-276nm.


Fig-5 Preparation of Soaps

The above Figure-5 shows the prepared ordinary soaps and the soaps impregnated with synthesized copper nanoparticles. Ordinary soap was white in colour, and the copper nanoparticles impregnated soaps were light greyish in colour. These soap particles were tested against five bacterial strains for finding the bactericidal activity.

## BACTERICIDAL ACTIVITY OF COPPER OXIDE NANOPARTICLES

Table-1 & 2 shows the comparative measurement of zone of inhibition of the ordinary soaps and copper nano soaps against the bacterial species.

## ZONE OF INHIBITION

Table-1-Bactericidal activity of Ordinary Soap

| S.No | organisms | Concenteration | | |
|---|---|---|---|---|
| | | Positive C control | 20 µl soap | 40µl soap |
| 1 | *Staphylococcus aureus* | 27mm | 11 | 20 |
| 2 | *Bacillus subtilis* | 26mm | 12 | 22 |
| 3 | *E scherichia coli* | - | 16 | 1 14 |
| 4 | *Pseudomonas aeruginosa* | 13mm | 10 | 1 12 |
| 5 | *serratia rubidaea* | 10mm | 12 | 1 13 |

Table-2-Bactericidal activity of Copper Nano Soap

| S. No | Organisms | cocenteration | | |
|---|---|---|---|---|
| | | Positive control | 20µl soap | 40µl soap |
| 1 | *Staphylococcus aureus* | 25mm | 10 | 11 |
| 2 | *Bacillus subtilis* | 24mm | 10 | 12 |
| 3 | *Escherichia coli* | - | - | - |
| 4 | *Pseudomonas aeruginosa* | 10mm | - | - |
| 5 | *Serratia rubidaea* | 10mm | - | - |

Fig-6 *Staphylococcus aureus*

Fig-7 *Bacillus subtilis*

Fig-8 *Escherichia coli*

Fig-9 *Pseudomonas aeruginosa*

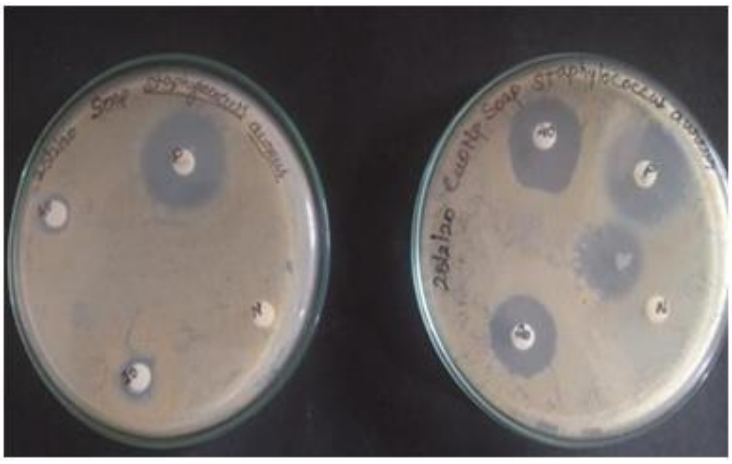

Fig-10 *Serratia rubidaea*

Results showed that CuONPs demonstrated excellent antimicrobial activity against a range of bacteria. The diameter of inhibition zone can reflects magnitude of susceptibility of microbes. The strains vulnerable to CuONPs exhibited larger zone of inhibition, whereas resistant strains exhibit smaller zone of inhibition. According to zone of inhibition *Staphylococcus aureus* and *Bacillus subtilis* exhibited moderate sensitivity equal to that of Erythromycin standard towards Ordinary soap. On the other hand, the remaining strains

namely *Escherichia coli, Pseudomonas aeruginosa and Serratia rubidaea* were resistant towards ordinary soap. But the copper nano soap showed excellent bactericidal activity against all the species. *Staphylococcus aureus* and *Bacillus subtilis* showed significant zone of inhibitionnmaely 20 mm and 22 mm at 40 µl concentration similar to that of Positive control whereas *Escherichia coli* showed 16 mm as zone of inhibition, *Pseudomonas aeruginosa* and *Serratia rubidaea* showed more or less similar zone of inhibition to that of Positive control. Thus, the prepared Copper oxide nanoparticles impregnated soap formulation proved an efficient and good bactericidal activity, which will be very useful in clinical applications in future and has provided a good platform for the new research. This is the first trial of synthesizing green synthesized copper nanosoap to the best of our knowledge.

## IV. CONCLUSION

Nanoparticles by using biological sources. It is gaining attention due to its cost effective, environmental and large-scale production possibilities. In this present study, the leaves of Santalum album, was taken to investigate their potential for synthesizing copper oxide nanoparticle. The copper nanoparticles synthesized were confirmed by their change of colour to dark red due to the phenomenon of surface plasmon resonance. The characterization of the synthesized copper oxide nanoparticles was done by UV-Visible spectroscopy, FTIR, DLS and SEM.The functional group present in the leaf extract was confirmed by FTIR analysis. These functional groups were mainly responsible for the reduction of copper metal ions into copper nanoparticles From the SEM results it was shown that the synthesized CuoNps were spherical and was about 12-15 nm. Thus, in the present study the copper nanoparticles were successfully synthesized by using *Santalum album* leaves for the first time and has proved the bactericidal potential of copper nano soap which provides cost effective, easy and proficient way. In conclusion, this greener approach toward the synthesis of CuO nanosoap using plant leaf material, has many advantages such as ease with which the process can be scaled up, economic viability, environmentally benign and renewable, there is no need to use high pressure, energy, temperature and toxic chemicals. Applications of ecofriendly CuO nanoparticles in bactericidal, wound healing and other medical and electronic applications are potentially exciting for their large-scale synthesis. Toxicity of CuO nanoparticles on human pathogen bacteria opens a door for new range of antibacterial agents.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Integrated Real Time Self-Driving Car PWM Speed Control Based on Speed Limit Zones Symbols

**M.Sukanya1,Abinash.G.S2,Ajithkumar.L3,Jeeva.M4,,Guruprasad.S5**

[1]Assistant Professor, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

The majority of existing systems to control self-driving car speed have a fixed speed control mechanism, which is insufficient in high-alert areas. This system's controlling component eliminates all human interaction while merging mechanical and electronic technologies. Based on this, the motor's speed is reduced to the speed restriction zone symbols allocated to that zone. This study provides a revolutionary character recognition system based on artificial intelligence that can contribute in the development of Intelligent Speed Adaptation. The speed limit character is extracted from the traffic scene by this system. The speed limit digits are then retrieved and identified using the SIFT algorithm, which has been trained for this purpose. This system contains hardware implementation that will control the speed of the car based on the observed speed limit in speed control zones such as hospitals, school zones, and other areas where people are expected to congregate. Thus, by extracting images from the video, this image processing-based auto-pilot system recognises the digits of the speed limit in the roadside boards from live video streaming. The movie is transformed from 25 frames per second to 1 frames per second to extract the images, which are then scanned to recognise the characters included in those images. The modulation technique used to control the speed of the DC motor is pulse-width modulation (PWM). It was discovered that the recognition accuracy was 98 percent, indicating clearly the strong robustnes

## I. INTRODUCTION

Much research has been conducted in recent years to develop real-time traffic monitoring systems for managing roadway traffic flow, preventing accidents, automatically providing lights, and so on. Existing approaches use roadside line scan cameras for speed estimation and employ algorithms that differ from ours. We share some of the preliminary findings from our ongoing research effort on the subject of real-time estimation of moving vehicles using video pictures in this project. Any digital video camera that captures images in the visible light spectrum can be used to determine the speed limit. The correctness of the calculated speeds is affected by the frame sampling rate, geometric and radiometric resolutions, and distortion

levels of the camera's optical system. Models and solutions toThe methods used to estimate speed differ depending on the applications and their end goals. When investigating applications for vehicle speed control difficulties, two major domains are distinguished: traffic surveillance and driver assistance systems, sometimes known as intelligent vehicle systems. In general, traffic surveillance systems include applications that require global information on the general traffic status of the roadways rather than individual automobiles travelling on the roads. Estimating the speed of traffic flow on a roadway at various times and dates, for example, falls into this category, as does determining traffic density, timing of traffic lights, signalization works, and so on. On the other hand, several applications require speed information for each location on traffic scenes. In addition, driving assistance systemsand intelligent vehicle systems also require individual speeds of vehicles.

## II. LITERATURE SURVEY

[1] G. Loy and N. Barnes.,Road sign detection based on shape for a driver aid system, Shape-based detection approaches, on the other hand, use the unique appearance of speed-limit signs (circular shape) to detect them. The circular Hough Transform (HT) is the preferred approach for circular signs, however it takes more calculation time and memory. The Radial Symmetry Detector (RSD) was invented by Loy and Zelinsky.). [2] N. Barnes and A. Zelinsky.,Real-time radial symmetry detection for speed signs, Barnes and Zelinsky have demonstrated that the RSD algorithm can manage noise while maintaining high detection rates and real-time performance. Aside from colour and shape identification methods, some studies have used MSERs to detect traffic signs..[3] R. Malik, J. Khurshid, and S. N. AhmadColor segmentation, shape analysis, and template matching are used to detect and recognise road signs. Template matching or learning-based categorization approaches are commonly utilised during the recognition stage. Malik et al. demonstrated a traffic sign recognition module based on template matching. Artificial Neural Networks (ANNs) and Support Vector Machines (SVMs) have been extensively researched for learning-based classification. Convolutional Neural Network (CNN) has recently been utilised to recognise traffic signs and has great accuracy; nevertheless, massive computer resources are normally required either in the training or test phases.

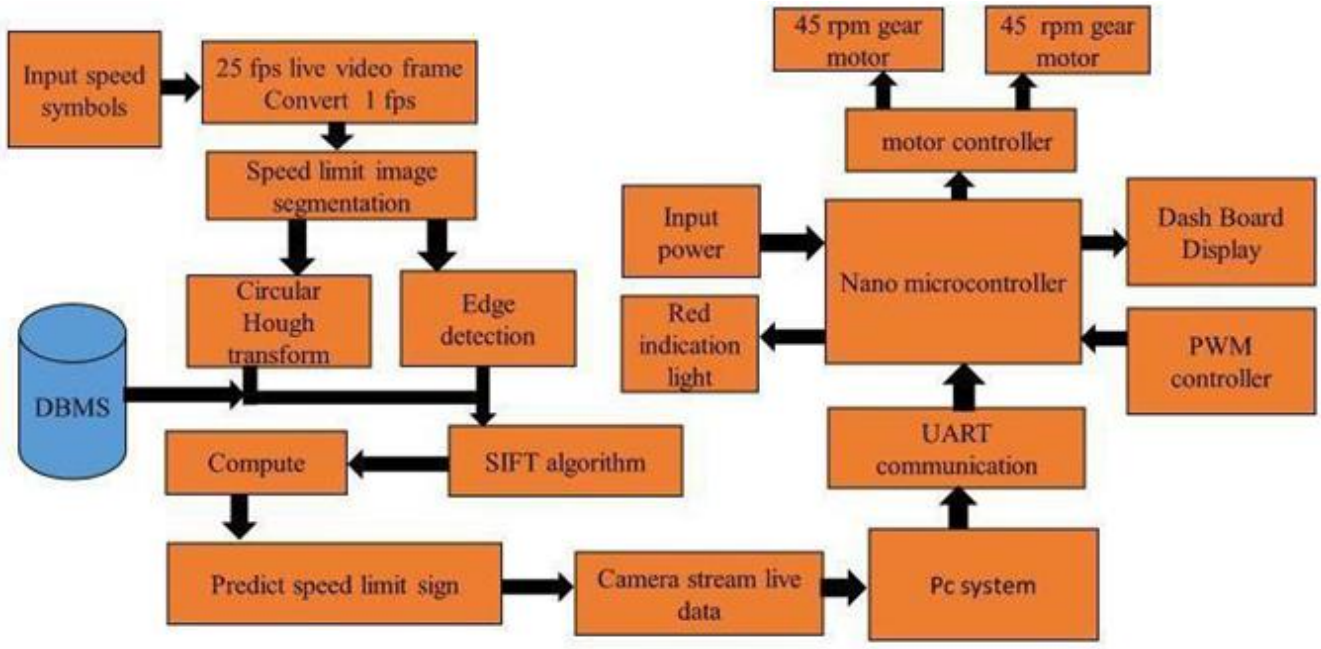
**[4] Aghajan, H.; Cavallaro, "A. Multi-Camera Networks: Principles and Applications"** In this paper, we examine the problem of real time speed estimation of one moving vehicle from side view video images. The proposed solution to this problem may be used directly for traffic law enforcement to prevent the drivers from exceeding the speed limits. Furthermore, the proposed methods may also be used within a sensor network for active driver assistance and security systems. We are currently developing an intelligent sensor network to be used for both driver assistance and for automatic mobile vehicles. Side view images and the proposed methods will be an important part of this network.**[5] Koller, D.; Weber, J.; Malik, J. Robust multiple car tracking with occlusion reasoning.** For this purpose, each pixel of the successive frame images are subtracted such that $I(x,y,t) - I(x,y,t + \Delta t)$. The absolute value of this subtraction operation is used. In order to eliminate the object shadows, some other operations are often performed on the segmented images.**[6] Melo, J.; Naftel, A.; Bernardino, A.; Victor J.S. Viewpoint independent detection of vehicle trajectories and lane geometry from uncalibrated traffic surveillance cameras.** The starting point of many works for traffic

surveillance applications are based on the segmentation of the moving objects, and for this purpose background subtraction methods are mostly used.

## III. PROPOSED SYSTEM

Based on a live video frame, the suggested speed-limit sign identification technology. The first stage, preprocessing, improves the input video frame camera by converting the 25fps live video frame to 1 fps. The recognition stage extracts Hough transform features from candidate regions and feeds them to a SIFT algorithm, which determines the class of a speed limit sign. Hough transform characteristics will be extracted from the candidate region during the recognition stage. Because speed limit signs have prominent circle forms and high-contrast edges, Hough transform features are ideal for capturing these qualities. Following the computation of Hough transform features, the obtained feature vectors will be sent into the SIFT algorithm for categorization of speed limit signs. If the speed limit is known, the speed can be constrained by hardware configuration The driver motor will manage the speed restriction in hardware based on the speed limit signs with red light indicator.

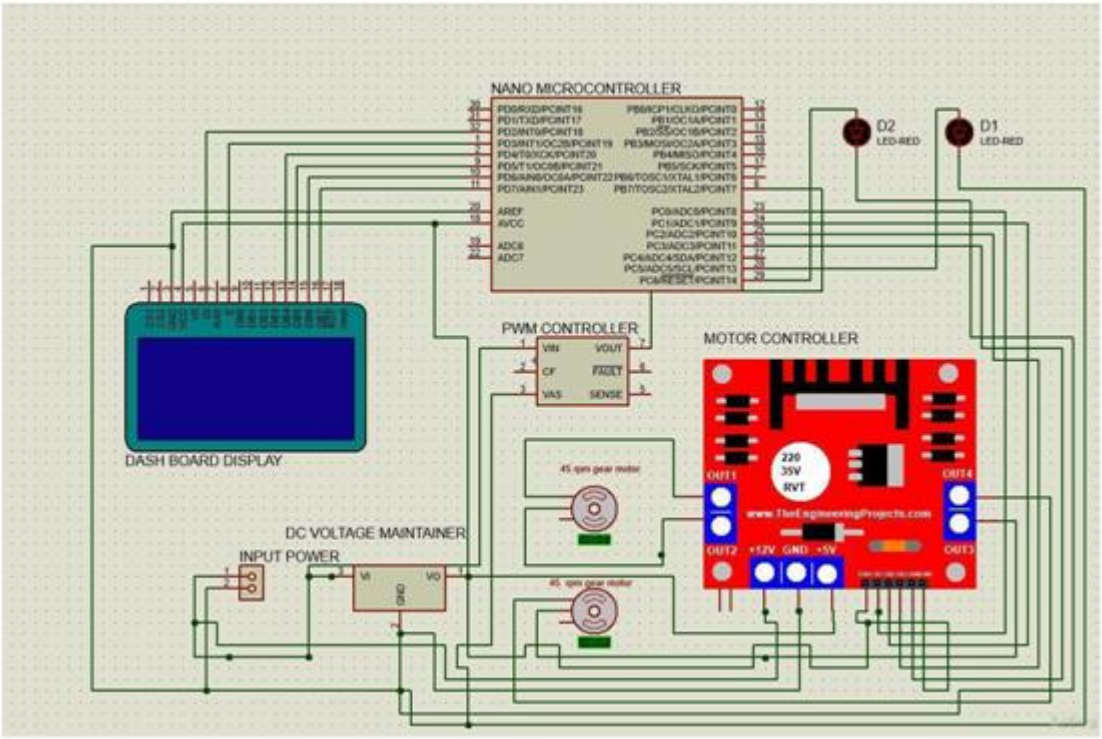
## IV. BLOCK DIAGRAM




The accompanying block diagram includes both software and hardware components. The software component for recognising speed limit signs is based on the SIFT 7 algorithm. PWM speed controller is used to control the speed of the vehicle. The camera may capture the input speed restriction sign live video, and then the preprocessing stage improves the input video frame camera, and the 25fps live video frame is

transformed to 1 fps. The photos of speed limit signs can then be separated from the background in the following phase. The candidate region's Hough transform features will then be extracted. Because speed limit symbols have prominent circle forms and high-contrast edges, Hough transform features are ideal for capturing these properties. Following the computation of Hough transform features,The obtained feature vectors will be used by the SIFT algorithm to classify speed limit signs. The images of speed limit signs are trained and saved in the database. After comparing the input to the database, the SFIT algorithm will forecast the speed limit sign. If a speed restriction sign is spotted in the software, the signal is sent to the hardware via UART communication; the controlling board Nano is the main piece of hardware for controlling. When the controller receives a signal from the software, the PWM controller is enabled. When a speed limit sign is recognised, it is displayed on the display device and the speed is limited using a PWM speed controller with a red light indication.

## V. CIRCUIT DIAGRAM AND DESCRIPTION




This circuit is made up of the following components: Nano Controlling Board, 45 rpm gear motors, (PWM) motor controller, Dash Board Display, LED light, Input power, and 12V Input. Power is supplied to the DC Voltage Maintainer for voltage regulation from 12V to 5V, and the 5V supply is subsequently supplied to the controller. The two 45 rpm gear motors are connected to the motor controller output pins, and the EN1,EN2 pins are connected to the 5v power supply. The instruction pins IN1,IN2,IN3,IN4 are linked to the digital pins of the Atmega 328 controller. 9 • The dash board display is connected to the Controlling Board Atmega328 controller digital pins d2,d3,d4,d5,d6,d7, and GND is connected to ground, while the supply is

connected to a 5v supply. The positive terminal of an LED light is connected to the controller, while the negative terminal is connected to ground.

HARDWARE REQUIERMENTS

| Specifications | Arduino Uno | Arduino Nano |
|---|---|---|
| Processor | ATmega328P | ATmega328P |
| Input Voltage | 5V / 7-12V | 5V / 7-12V |
| Speed of CPU | 16 MHz | 16 MHz |
| Analog I/O | 6 / 0 | 8 / 0 |
| Digital IO/PWM | 14 / 6 | 14 / 6 |
| EEPROM / SRAM [kB] | 1 / 2 | 1 / 2 |
| Flash | 32 | 32 |
| USB | Regular | Mini |
| USART | 1 | 1 |

## VI. EDGE DETECTION

Edge detection methods for finding object boundaries in images Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.Common edge detection algorithms include Sobel, Canny, Prewitt, Roberts, and fuzzy logic methods.

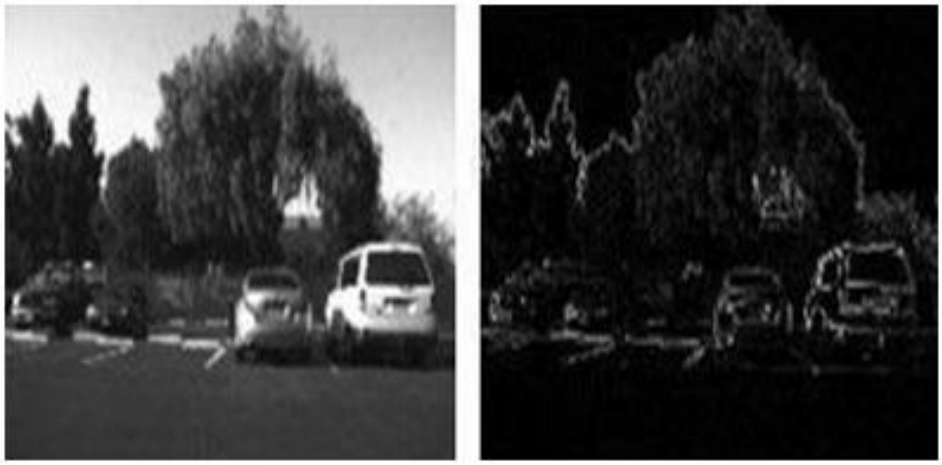


Image segmentation using the Sobel method.

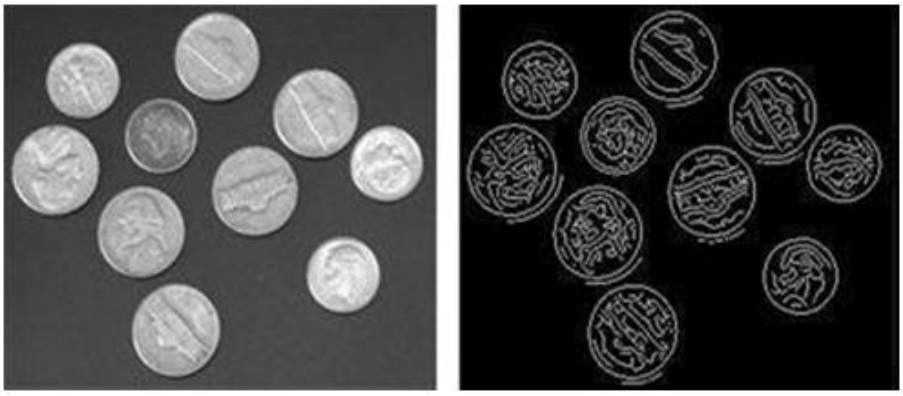


Image segmentation using the Canny method

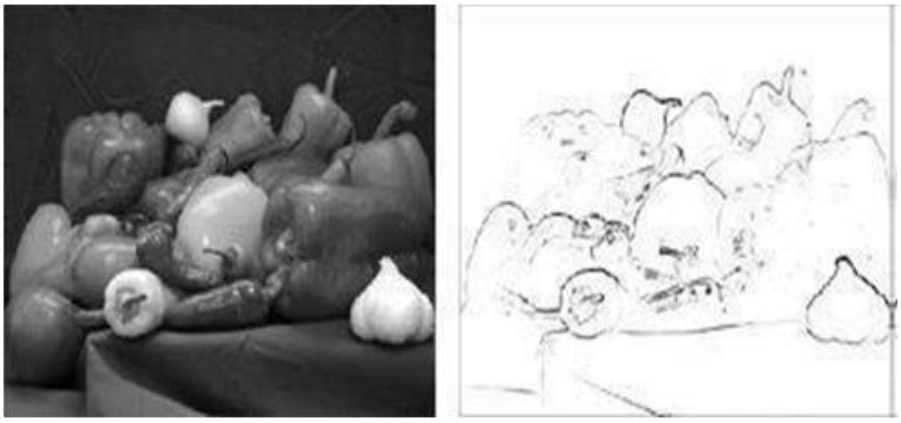


Image segmentation using a Fuzzy Logic method

## VII. CONCLUSION AND FUTURE SCOPE

In this project, we explained how to manage a vehicle's speed in real time based on the speed restriction displayed on a road sign board. The device will calculate the speed limit using an image processing technique based on artificial intelligence. The estimated speed had been determined to be accurate. Because traffic sign boards are circular in shape, the circular Hough transform is an effective technique for detecting information. The car's speed will be managed by a Nano microcontroller that is interfaced with the hardware and will drive the vehicle accordingly whenever it receives a serial signal from the system software. Real-time video monitoring and video conversion into image frames will ensure that the speed of the machine is under control.Vehicles will be more reliable and will function at the proper time, reducing the loss of human lives in road accidents caused by vehicles exceeding the speed limit in that particular traffic scene.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Photovoltaic Cell-Based Fisherman Border Crossing and Weather Alert System Using GSM Module

**B. Tamil Selvi1, Jayabhuvana A2, Madhumitha M3**

[1]Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Countries with the International Marine Time Boundary Line (IMBL) will always have security issues and ongoing life threats for fishermen whose primary source of income is fishing. Even if a peninsular nation like India has its boundary limit in the ocean, the inhabitants of these coastal regions rely on fishing for a living, and they cross borders due to negligence or not understanding their country's boundary limit. So, our project is designed to avoid such accidents and to alert fishermen about border crossing limits. Additionally, the border crossing limit information will be sent to the control room via HC-12 transmitter, and the received information will be viewed in terminal software based on the latest RSSI, Weather, and GPS technology.one of the most important considerations in fishing Numerous fisherman lose their life as a result of a lack of awareness about the weather and prediction. As a result, we developed a gadget called Weather Predictor and Land Locator for Fishers, which will assist these fishermen to some extent. In typical climatic conditions, the information from the sensors is displayed on the LCD display, and the ADXL sensor is used to continuously monitor the water wave, and if the water wave is out of condition, it will alert the fisherman by activating the buzzer and also send SMS to the control room with GPS (latitude and longitude) area of the pontoon via GSM communication. This initiative will assist fishermanTo some extent, they can protect their life. Every person's life is valuable, and engineers must collaborate to improve the lives of those who assist us live comfortably. The solar panel power source is stored in a battery, and this electricity is utilised to power the gadget.

## I. INTRODUCTION

India seaside nations are isolated by their sea borders. In Tamil Nadu about 20,000 vessels make spinning in the Bay of Bengal. The main goal is to provide an egalitarian user-friendly environment for Indian fishermen to tackle hazardous situations via engine control. This project provides a constant solution to this problem by protecting Indian fishermen from risky situations and crossing the maritime boundary, saving their lives and improving fisherman safety. The system is built with GPS and GSM in mind. Based on the signal strength,

this RSSI-based Wi-Fi gadget can monitor fisherman border limits at any point the fisherman crosses the Indian border. It is a major depression issue that causes problems for both people and their economic expenditures. The device will give the signal that determines the border crossing limit information repeatedly.will broadcast to the control room using the HC-12 transmitter and receiver device The hardware interacts with a microcontroller, an LCD display, a GSM modem, and a GPS receiver.While comparing the previous maritime restricted positionand current position and result will be the latitude and longitudinal degree of the boat's location is determined if the boat nearer to the restricted zone the alarm will turn on. In typical climatic conditions, the information from the sensor's will be displayed in the LCD display and the ADXL sensor is used continuously monitoring the water wave, if the water waves are un condition it willalert the fisher man by activating buzzer and also send SMS to control room with GPS (latitude and longitude) area of the pontoon by using GSM communication. The controlling unit viewed the border crossing limit data in terminalsoftware and alert to the fisherman through the alarm. The transmission units end the position of the boat in the sea to the base station through the HC-12 wireless transceiver.

## II. LITERATURE SURVEY

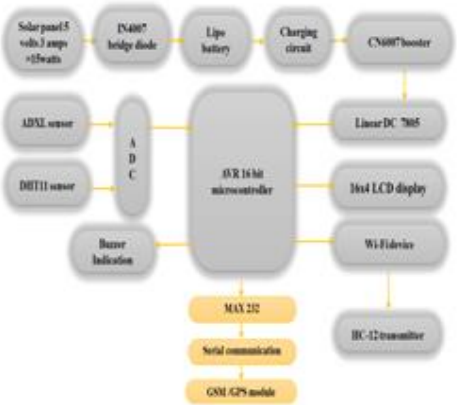
[1]. PamarthiSatyanarayana et.al.Islands, peninsulas, and coastal countries all have water or ocean borders. The majority of individuals in coastal areas work in the fishing industry. Some ships also transport visitors. Many people, particularly fisherman, violate boundaries without realising it. One of the grounds for cross-border cruelty is this. They are being kidnapped, and their boats are being taken. It can sometimes result in the loss of life. The manual measurement of border lines and coordination with the navy are major issues. The major goal of our study is to prevent such accidents and to warn those on board about boundaries..[2] Vignesh M**, et.** InThe author anticipates the use of a GPS tracking system in this strategy. The position of the boat is determined using GPS, and the speed of the boat motor is controlled in an emergency. The user receives the alert message (fisherman). The advantage is that the fisherman is using the GPS72h, which is equipment used for sea navigation and gives the fastest and most precise technique for mariners to navigate, measure speed, and establish location, and this system permits greater levels of safety and efficiency. The downside here is that the border warning is only communicated to the fisherman and not to the control station..[3] R. Dinesh Kumar et.alPeople near the border can use the application to find the best route to their destination. The signal will be delivered to border security forces, who will function as the server for all other gadgets controlled by persons aboard ships. The programme will notify the server of the location of the devices and advise them of any issues that arise as a result of opponent forces in ships. This can be used as an incident management application to help avert confrontations in a variety of circumstances. This is mostly processed for Tamil fisherman working along the borders. This device will come with an automatic alarming mechanism that will notify you if there are any problems.

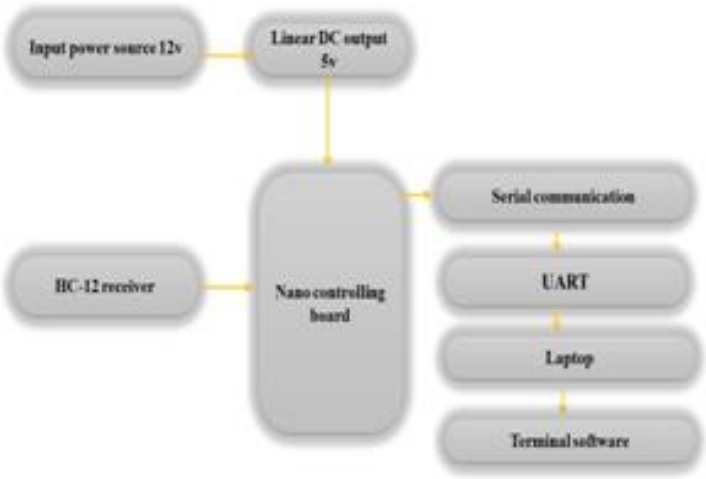
[5] D. arunvijay et al "design of border alert system for fishermen using gps"In this method the author uses the pre-determined values of latitude and longitude points of the maritime border shown in the fig 2.1; this is stored in the microcontroller. When the boat approaches the border, boats position (latitude and longitude) is

measured using GPS and compared with the stored value, if it exceeds then the boats seems to be crossed and alert message is sent to the fisherman. The advantage is accuracy range is high with the use of GPS. But the drawback is the memory required saving each point of latitude and longitude is more [6]. Ninawe, A.S.; Indulkar, S.T.; Amin, A. Impact of climate change on fisheries. In Biotechnology for Sustainable Agriculture Argued that oceans and seas are the most affected by the process of change caused by global warming as they represent a large portion of our planet and have rich biodiversity. Indeed, a temperature increase of only a few degrees gives rise to hydrological events that cause change in the physical and chemical characteristics of water.

## III. PROPOSED SYSTEM

We created and built a system that can notify fisherman of border crossings and weather conditions. It is made up of basic components such as an AVR microcontroller, a wireless HC-12 transmitter and receiver device, a temperature and humidity sensor, an ADXL sensor, a GSM/GPS module, and an LCD display. The system is made up of a transmitter and a receiver device. A sensor and an HC-12 transmitter device comprise the transmitter device. The DHT11 sensor can measure temperature and humidity. The data will be continuously monitored, and information about weather conditions will be displayed to fishermen on an LCD panel. The ADXL sensor is used to monitor ocean waves. If the water wave situation is unequal, the buzzer will sound and the sensor information with GPS will be sent to the fisherman.GSM connectivity will be used to send the location to the control room. Creating virtual boundaries to monitor the border crossing limit for fishermen. We establish a restriction here that is monitored based on RSSI received signal strength data. If a fisherman crosses the boundary limit, the alarm will sound and the border crossing information will be sent to the navy control room via the HC-12 transmitter device. The receiver device is located in the navy control room and will continuously receive transmitted information using the HC-12 receiver device and display border crossing information in terminal software. The Nano controller board will be in charge of the reception device. The solar energy is stored in a battery, which is then connected to a regulator and activated by an AVR microprocessor.

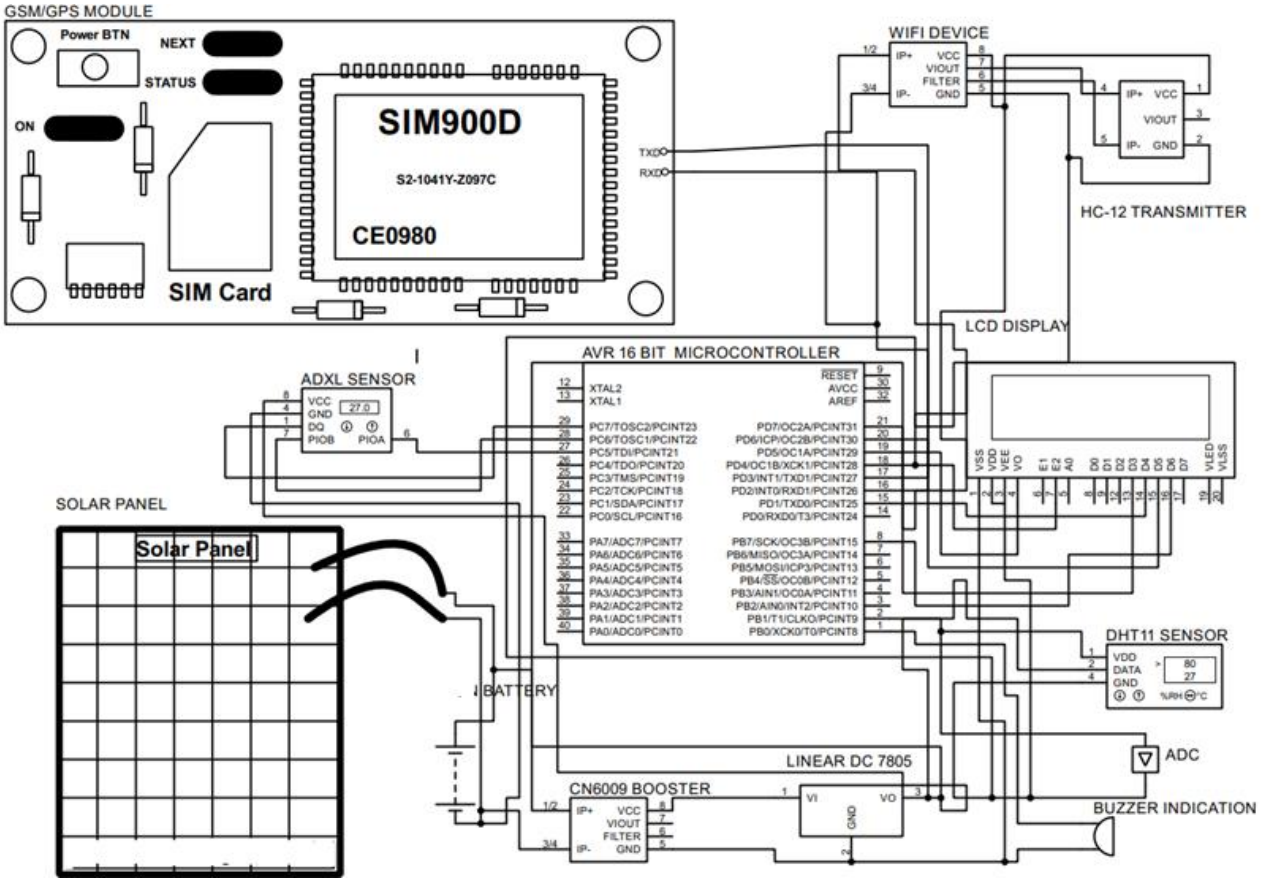





This project is made up of two blocks: transmitter and receiver. The transmitter and receiver devices for the fisherman will be put in the control room. The transmitter block is made up of sensors, an LCD display, and GSM/GPS components. The AVR 16-bit microcontroller is utilised to control the entire device on the transmitter side. The solar panel can be used to provide power. The electricity generated by the solar panel can be stored in the battery and then enhanced using the CN6009 booster device. The boosted 12v supply is linked to a linear DC converter for voltage conversion from 12v to 5v, and the supply is then delivered to the controller to activate the device. The ADXL sensor is used to monitor ocean waves. If the water wave situation is erraticIt will alert the fisherman by triggering the buzzer, and sensor data with GPS location will be communicated to the control centre via GSM communication. The weather will be continuously monitored by the DHT11 sensor and alerted to the fisherman via the LCD display. The RSSI technology will be used to continuously monitor the fishing border crossing limit.

if the fisher man crossing the border limit the device will alert the fisher man by activating the buzzer and also the information send to control room by using HC-12 transmitter device. In the receiver block the Nano controller is used for controlling, the transmitted information can be received by using HC-12 receiver device. The received fisher man border crossing information can be viewed in the laptop by using terminal software.

## IV. CIRCUIT DIAGRAM AND DESCRIPTION




Components of the transmitter and receiver circuit include a solar panel, a battery, a CN6009 booster, an ADXL sensor, an AVR 16-bit microcontroller, a linear DC 7805, a DHT11 sensor, an LCD display, an HC-12 transmitter and receiver device, a wi-fi device, a GSM/GPS module, and a Nano controlling board. The electricity from the solar panel is stored in the battery, then connected to the booster input pins, and finally to the regulator for voltage conversion from 12v to 5v. The controller is then powered by a 5V supply. The ADXL sensor has five pins. The VCC pin is connected to the power supply. The GND pin is connected to the ground. Controller analogue pins are connected to output 3 pins. The DHT11 sensor data pin is connected to the controller digital pin, while the VCC pin is connected to the power supply. The GND pin is connected to the ground. Data pins are used in LCD displays.connected to digital pins d2, d3, d4, d5, d6, d7 of the controller The supply pin is connected to vdd. The VSS pin is grounded. The HC-12 transmitter has four pins. The VCC pin is connected to the power supply. The GND pin is connected to the ground. The remaining two pins are linked to Wi-Fi. The receiver circuit is controlled by the Nano controlling board. In the Hc-12 receiver device, the VCC pin is connected to the power supply, the GND pin is connected to the ground, and the remaining pins are connected to the Nano controller RX pin for data reception.

## V. ADXL SENSOR


The ADXL345 Accelerometer Module consists of the ADXL345 Accelerometer IC, Voltage Regulator IC, Level Shifter IC, resistors and capacitors in the integrated circuit. Different manufacturers use a different voltage regulator IC.

ADXL345 IC from Analog Devices is the core component of this module. The ADXL345 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±16g.

## VI. CONCLUSION AND FUTURE SCOPE

Thus, fisherman can readily identify national sea borders, preventing them from entering neighbouring borders and providing a weather alert system. The system rapidly and simply generates high accuracy and precision values of border crossing restriction information by utilising RSSI signal strength. It also assists fisherman in informing them of surrounding meteorological information and water wave conditions, as well as sending SMS to the control room via GSM connectivity. The project places a significant priority on fishermen's safety. It is both cost effective and dependable.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
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Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Solar Power Based Automatic Plastic Waste Collecting Robot Using Background Subtraction-Based Computer Vision Algorithm

**M.Sukanya[1], E.Nareshkumar[2], M.Vijay[2], S.Sakthivel[2], M.Giribabu[2]**

[1]Assistant Professor, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

[2]Student, Department of Electrical and Electronics Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

## ABSTRACT

Garbage waste is a big issue in global attenuation. In this scenario, an autonomous robot capable of navigating sand, collecting cans, and carrying them to a box held at the back of the vehicle was implemented. Road cleaning trucks are employed all over the world nowadays to ensure the safety and satisfaction of road users. Developing rubbish collection robots is now being researched as an efficient solution to the road problem. Due to the challenges in manually cleaning the road, we developed technology that identifies waste using a camera. The trash plastic bottle is then retrieved by robot. The spinning mechanism is in charge of the collection procedure. PLA plastic, often known as polylactic acid, is a type of vegetable-based plastic. This is a thermoplastic aliphatic polyester that is utilised as the principal natural raw material in 3D printing. PLA is a completely biodegradable thermoplastic polymer made from renewable basic ingredients.

## I. INTRODUCTION

In today's world, automation plays a critical part in all industrial applications, yet proper sewage disposal from enterprises and households remains a difficult problem. In India, systems are typically open, resulting in the disposal of solid waste, which creates blockage. Drains are utilised for proper waste disposal, and unfortunately, there may be a hazard to human life during the cleaning of blockages in the drains, or it can create major health difficulties due to underlying illnesses such as malaria, dengue fever, and so on. To address this issue while also saving human lives, we developed the "Automatic Surface Cleaning System." We designed our project such that we could control it effectively. the disposal of garbage in conjunction with regular filtration of drains, the elimination of solid waste in order to minimise blockage in drains and encourage continuous flow of drainage water, hence reducing the threat to human life Robotics is one of the fastest growing industries, and robots are now utilised wherever working conditions are tough, dangerous, frequently recurring, or otherwise limiting. Sewage cleansing is a serious issue that our country is now dealing with. Sewage travels at one metre per second across roughly 5,600 kilometres of sewer pipes in

metropolitan areas. According to reports, almost 23,000 men and women die in India each year as a result of various types of sanitation labour. Cleaning automation has the potential to save thousands of lives.

## II. LITERATURE SURVEY

**[1]** Mr. Saurabh, S. Satpute1, Mr. Vitthal R. Darole, Mr. Pravin, M. Khaderao, Mr. Pankaj, B. Hiralkarl Automatic Sewage Machine.This project is to replace the manual work in drainage cleaning by automated system. We know that water has a great importance in human being life, the water flow in drain full of wastes like polythene, bottles etc. The drains get blocked due to these wastes in water. Now a day's even through mechanical machine plays a vital role in all industrial applications in the proper disposal of sewages from industries and commercials are still challenging task. Drainage are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockage in the drainages. The government also spends too much money to clean the drainages.**[2]**Osiany Nurlansa, Dewi Anisa Istiqomah, and Mahendra Astu Sanggha Pawitra AGATOR **"**Automatic Garbage Collector as Automatic Garbage Collector Robot Model" .Nowadays, the environment problems arise in many towns in Indonesia. These problems come along by developing activities such as construction of houses, offices, and other business areas. The Environment problems occur due to several reasons; they are the low budget allocation on environment management and public awareness in protecting the environment. The Environment issue which comes up from year to year and still cannot be solved is about garbage and waste from various places dispose into rivers. Those garbages can clog water flow, induce the water become dirty, smelly, and often over flow so then give effect floods. This research aims to design and make AGATOR (Automatic Garbage Collector), a rotor robot model as automatic garbage collector to counter accumulation of garbage in the river which has no flow effectively and efficiently.

**[3]** M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar, Dr. N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arunkumar Design and fabrication of remote-controlled sewage cleaning machineThe motive of the project is to automate the sewage cleaning process in drainage, to reduce the spreading of diseases to human. The system has a wiper motor that starts running as soon as the set-up is switched on. Two power window motors are connected to the wheel and it is driven with the help of the remote-control set-up. The process starts collecting the sewage wastes by using the arm and it throws back the waste into the bin fixed in the machine at the bottom. An arm is used to lift the sewage and in turn a bucket is used to collect them. The set-up runs even in sewage area with water (limited to a particular amount) so that the wastages which floats on the water surface also gets collected. The garbage which affects the drainage is also picked up and removed. This system has limited human intervention in the process of cleaning and in turn reduces spreading of diseases to mankind.

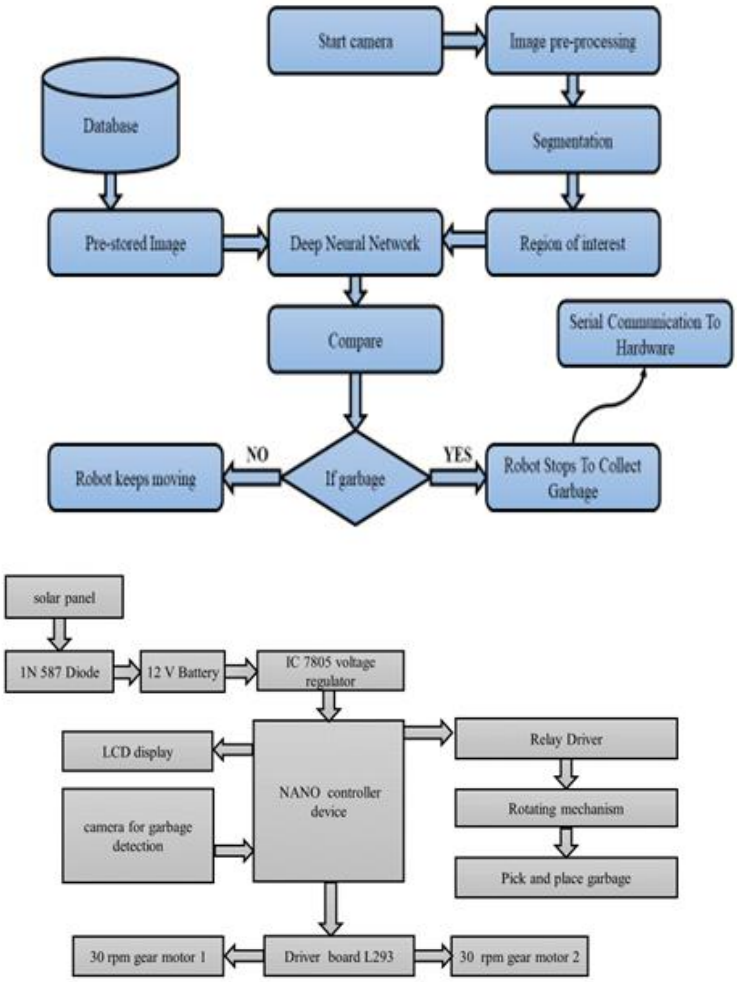
## III. PROPOSED SYSTEM

The discarded plastic bottle will be collected and kept in a container using the proposed approach. It functions as a self-contained robot. Image processing techniques will be used to detect the presence of waste in front of the robot. When waste is spotted, the robot comes to a halt and the programme sends a command to the controller, which sends a signal to the driver board, which activates the motor to efficiently collect the garbage. Because the robot will be utilised in open regions, there will be more opportunities for the system to collect a large amount of solar energy, which will be used to improve the system's performance.

### ADVANTAGES:

- Using computer vision to detect rubbish will yield more accurate results.
- The use of solar energy as an input energy source makes the robot an environmentally friendly system.
- In some circumstances, efficiency may be improved as well (1 robot can do the work of several men).

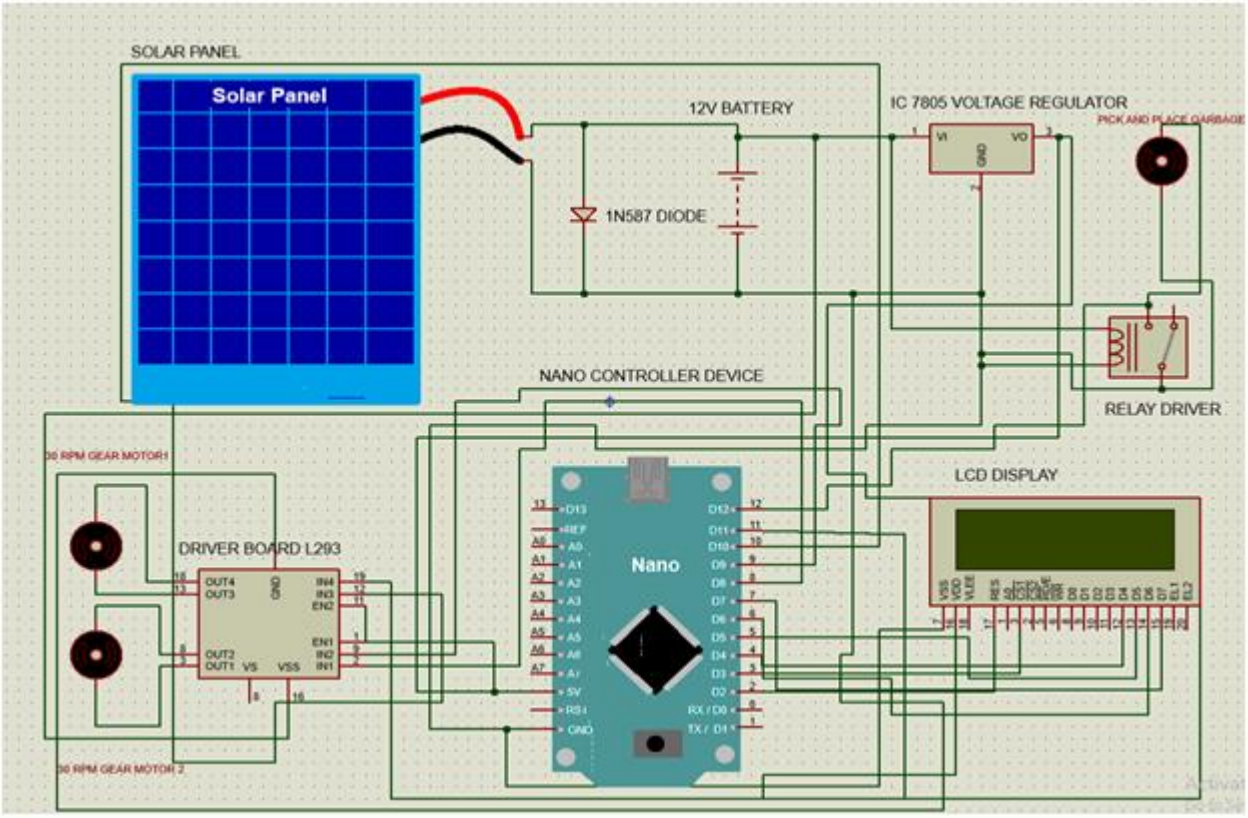
Fig 1. SOFTWARE BLOCK DIAGRAM



## BLOCK DIAGRAM DESCRIPTION

In this project, an autonomous plastic collecting robot is used. Using a computer vision system, this autonomous robot will collect and store plastic garbage. The robot in this system is meant to gather plastic and store it in a container. This robot is controlled using a nano controller. The L293 driver board connects to the controller board to receive instructions from the Nano controller, and the robot is operated depending on the instructions from the controller. A rotating device is used to collect and deposit plastic garbage, which is subsequently placed in a container. Our built robot works in the outdoors and is powered by a solar panel. The battery stores the power generated by the solar panel. The power will then be used to power this robot. The camera is linked to the controller in order to detect plastic garbage using a deep neural network technique based on background removal. Once the plastic garbage is spotted, the software sends a signal to the hardware control board, the controller issues instructions to the robot, and the robot begins to operate. The spinning mechanism of the robot will be used to gather plastic debris.

## CIRCUIT DIAGRAM AND DESCRIPTION

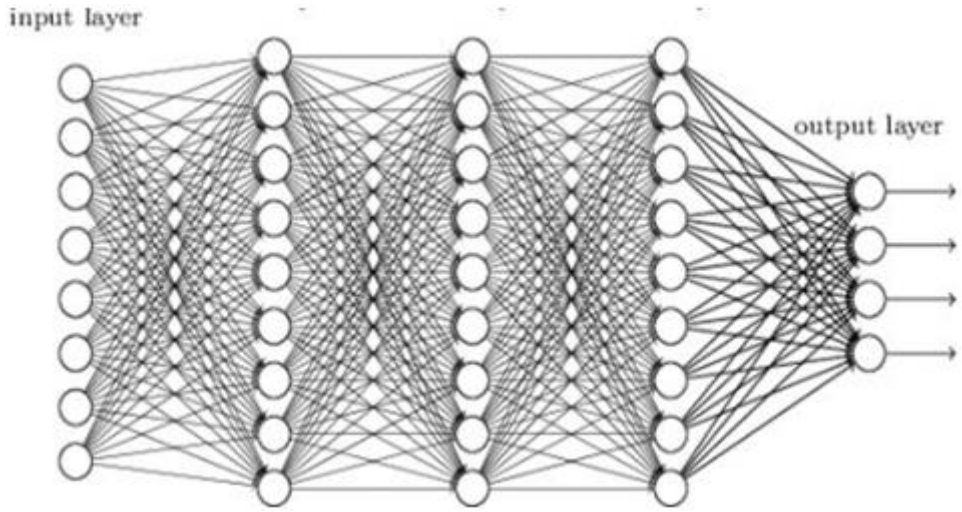



The solar panel, 1N 587 diode, 12 V battery, IC 7805 voltage regulator, Nano controller device, Driver board L293, relay, 30 rpm gear motors, and LCD display are the main components of the circuit diagram. The power from the solar panel is stored in a 12V battery, and the 12V supply is then connected to an IC 7805 voltage regulator, which converts 12v to 5v. The Nano controller receives a 5v power supply. 30 rpm gear motors are linked to the OUT1, OUT2, OUT3, and OUT4 PINS on the l293 driver board. EN1 and EN2 pins are wired to a 5v supply. The IN1, IN2, IN3, and IN4 pins are connected to the digital pins of the Nano controller. The

GND pin is connected to the ground. The VSS pin is linked to the 12v power supply. The relay is attached to a controller pin to activate the gear motor for pick and place. An LCD display with eight pin connectors VDD is linked to 5V. VSS is linked to the negative supply. Data pins are linked to controller pins D2, D3, D4, D5, D6, D7.

## DEEP NEURAL NETWORK ALGORITHM

The neural network must constantly learn in order to tackle tasks more competently or to apply other ways to offer a better outcome. When fresh information enters the system, it learns how to react to a new circumstance. When the problems you solve get more difficult, your learning becomes more in-depth. Deep neural networks are a sort of machine learning in which the system employs several layers of nodes to extract high-level functions from input data. It entails converting facts into a more creative and abstract component. To better appreciate the outcome of deep learning, consider the image of a typical guy. Despite the fact that you have never seen this photo or his face or body before, you will always distinguish it as a human and distinguish it from other things This is an illustration of how a deep neural network operates. To guarantee that the item is accurately recognised, creative and analytical components of information are examined and organised. Because these components are not directly introduced into the system, the ML system must alter and derive them.




DNN algorithm

## IV. CONCLUSION AND FUTURE SCOPE

In this project, waste is collected by the robot using a rotating mechanism, and the waste is then stored in a bin to achieve automatic waste treatment control. To reduce human effort, the system may move across the surface and gather waste autonomously. The cleaner moved efficiently during the heavier rains, which had a higher volume of rushing water with rubbish and a higher velocity

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Are Fingerprint Patterns Inherited Through Genetics?

**Dr. Gopala Krishnan[1], Kavya.R[2], Shilpa.B[2]**

[1]Assistant Professor, Department of Biotechnology, Vivekanandha College of Arts and Sciences for Women, Tiruchengode, Tamil Nadu, India

[2]Students, Department of B.Sc Biotechnology, Vivekanandha College of Arts and Sciences for Women, Tiruchengode, Tamil Nadu, India

## ABSTRACT

Fingerprints are an interesting feature of human biology that have been used for a number of practical purposes like individual identification. Have you ever looked at two different people and thought they looked so similar that they must be sisters/brothers/cousins? What about a mother and her daughter? We have often tell that two people are related because they appear to have several similar physical traits. This is because offspring receive half of their DNA blueprints, from each parent. What about fingerprints; are they an inherited trait? Fingerprints, impression are made by the papillary ridges on the edges of the fingers and thumbs. DNA can be obtained from every single fingerprint. However, there are several problems linked to a fingerprint samples as DNA source.

## I. INTRODUCTION

The basic fingerprint patterns are inherited through genetics. During 10th week of pregnancy - 24 of gestation (when a fetus is developing inside of its mother's womb, also called in utero), ridges form on the epidermis, which is the external layer of skin, on the fingertips of the foetus. The outline that these ridges make is known as a fingerprint. Fingerprints are constant and they don't change through out their lifetime, so an individual will have the same fingerprint from infant to old age. The fingerprint pattern changes size, but not shape, as the person grows. (To get a better idea of how that works, you can make fingerprint impressions of the whole family and you can see the differences.) Since each person has different and unique fingerprints that do not change over life time, they can be used for identification of an individual person. For example, the cops use fingerprints to check whether a particular individual has been at a crime scene or not. Although the exact number, shape, and spacing of the ridges changes from individual to individual, fingerprints can be differentiated into three general categories based on their pattern type: loop, arch, and whorl, as shown in Figure 1, below. Since the DNA that a person inherits from their parents determines many characteristics and traits, such as wheather someone is right or left handed or which colour their eyes are, all biological sibilings inherit a mixture of their parents' DNA possess similar traits.

## II. MATERIALS AND EQUIPMENTS

- Paper or towel
- Dettol solution mixed with 50 percentage of wate
- Ink pad
- Double sided cellotape
- Scissors
- Ethanol solution
- Sibling pairs (at least 5)
- Unrelated pairs of people (at least 5)
- Optional: Magnifying glass
- Lab notebook

## III. EXPERIMENT PROCEDURE

- To start this project, practice taking consistent and clear fingerprints. First try the procedure on yourself, then ask a colleague or family member to let you learn by using his or her fingerprints.
- Use ethanol solution to clean the person's left thumb finger.
- Thoroughly dry the finger with a paper towel.
- Press and slide each side of the the left thumb fingertip one time over the ink pad. To make an ink pad variation, place the person left thumb finger on the ink pad several times until an area of about 3 by 3 centimeters (cm) is completely blue, as shown in Figure 2 (the paper on the left).
- Then roll the finger on the double sided cellotape to make a clear fingerprint impression.
- Use another towelette to clean the person's blue ink finger.
- Cut off the piece of doublesided cellotape containing the fingerprint and stick it onto a piece of white paper, as shown in Figure 2.
- Practice the procedure until the fingerprints come out clear each time.
- When your prints start to fade, rub your thumb a couple of times over your ink pad and try again.

FIGURE:1

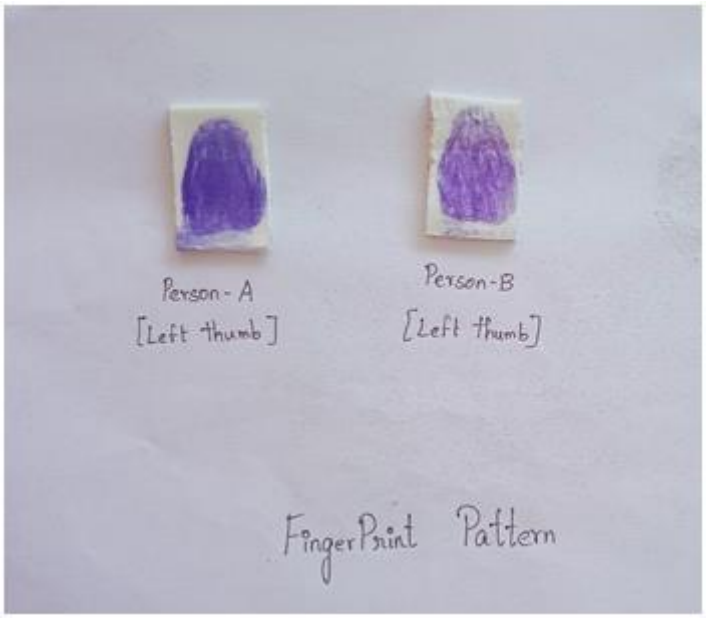
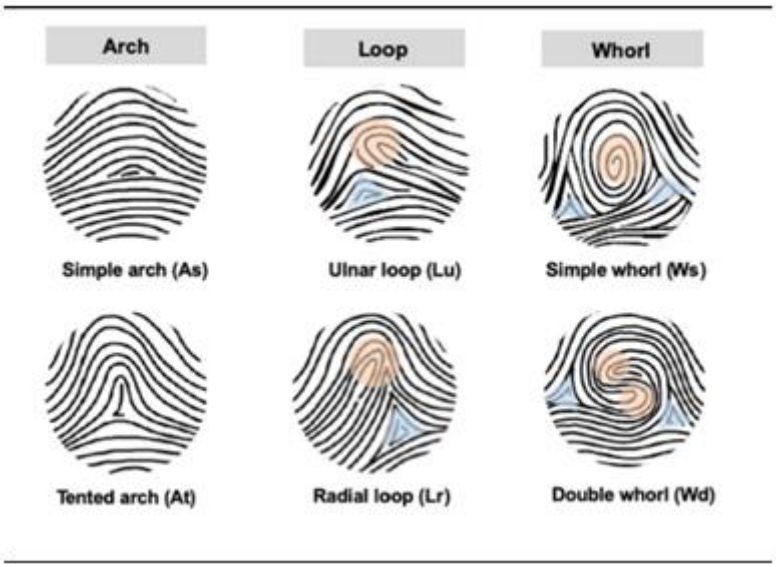



FIGURE:2

Figure 2: To create a fingerprint, apply pressure and slide each side of the person's fingertip over the pad once, then roll the fingertip onto the sticky side of the tape and stick the tape to a piece of white sheet.

- Obtain the fingerprints of pairs of siblings and of pairs of unrelated people. Make sure they sign a constant form before you take the fingerprint.
- Use the cleaning and printing system you developed in step 1 to take one fingerprint of each person's right thumb finger.
- Label each fingerprint with a unique code, which will tell you which pair the fingerprint belongs to or whether if the finger print is sibling pair or an unrelated pair. An example of an suitable code would be to assign each pair a number and each individual a letter. Siblings would be labelled as subjects A and B, while unrelated individuals would be labelled as subjects 1 and 2. Thus, fingerprints from a sibling pair might carry the codes $A and $B while fingerprints from a unrelated pair might be labelled #1 and #2.
- Collect fingerprints from at least 5 sibling pairs and 5 unrelated pairs.. As an example, you could pair sibling $A with sibling $B since these individuals are not related to each other.
- For example, the cops use fingerprints to determine whether a particular individual has been at a crime scene. Although the exact number, shape, and spacing of the ridges changes from person to person, fingerprints can be sorted into three general categories based on their pattern type: arch, whorl and loop.
- Look at drawings or pictures given below of the three basic fingerprint pattern type : arch /whorl/loop. **1**.In a arch pattern the ridges enter from one side,make a small rise in the center and exit generally on the opposite side. **2**.In a whorl pattern the ridges are usually circular. **3**.In a loop pattern the ridges enter from either side,curve up and then exit usually from the same side they entered.

❖ Examine each fingerprint , You can use a magnifying glass if you have one. In your lab notebook, make a data table like Table 1, generating a separate row for each person, and fill it out.




| Related Pairs (unique ID) | Fingerprint Category (arch / whorl / loop) | Related Category match in percentage% ($A & $B) |
|---|---|---|
| $A | Simple arch | ~ 75% |
| $B | Tented arch | ~ 75% |

| Unrelated Pairs (unique ID) | Fingerprint Category (arch / whorl / loop) | Related Category match in percentage% (#1 & #2) |
|---|---|---|
| #1 | arch | ~25% |
| #2 | loop | ~30% |

RELATED PAIRS OF FRINGERPRINTS:

| NAME | FAMILY | AGE | PLACE |
|---|---|---|---|
| RAMESH | FATHER | 45 | HOSUR |
| NAGAMMA | MOTHER | 41 | HOSUR |

| | | | |
|---|---|---|---|
| DHANUSH | BROTHER | 18 | HOSUR |
| KAVYA | SISTER | 20 | HOSUR |
| AISHU | SISTER | 22 | BENGALUR |

**UNRELATED PAIRS OF FINGERPRINTS**:

| NAME | AGE | PLACE |
|---|---|---|
| SHILPA | 20 | HOSUR |
| RACHANA | 23 | DHARMAPURI |
| SARASWATI | 42 | BENGALUR |
| HARIPRASADH | 16 | HOSUR |
| RAVI | 35 | HOSUR |

## IV. OBSERVATION

There is an inheritance component to fingerprint patterns but the genetics of how they are inherited are complicated .(Multiple genes are involved) Fingerprints are also affected by a persons environment wild developing in the womb. Because of this, you may have seen some examples of fingerprint patterns likely being inherited(such as a son and /or daughter having the same pattern type as their father).But this may not have always been the case for the ones you know to be closely related. To see more clearly how fingerprint patterns are inherited you would need to use a much larger sample size, such as described in the first “extra” step. Because each person’s fingerprints are exclusive, and not even identical twins -who share the same DNA, have identical fingerprints, this also shows that fingerprints are not completely guarded by genetics.

## V. CONCLUSION

After performing the experiment it was concluded that fingerprint patterns are genetically inherited. Two different families were tested, which included parent and offspring. Once the data was collected, it was concluded that fingerprint patterns are inherited due to the fact that every fingerprint of either parent is compatiable to the offspring. Unrelated persons from different families have various types of fingerprints which are unique from each other.

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Fourth National Conference on Emerging Trends and Challenges in Biomedical Engineering
In Association with International Journal of Scientific Research in Science and Technology
Volume 9 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

# Design And Construction of Defected Products Separation Conveyor Belts for Industrial Automation

**J. Mohankumar[1], Bharath.M[2], Sathyaprakash. S[3], Gaudam. R[4], Srinivasan. S[5]**

[2,3,4,] Student, Department of Electrical and Electronics Engineering., Adhiyamaan College of Engineering, Hosur, India

[1]Assistant professor, Department of Electrical and Electronics Engineering., Adhiyamaan College of Engineering, India

## ABSTRACT

The automated product separation machine employing conveyor belt is a very sophisticated procedure that is required by the manufacturing sector in various industries. The system must meet industrial requirements. This is an application for industrial automation. It depicts a standard conveyor belt concept, but with some intelligence. It is also known as an intelligent conveyor belt since it can distinguish between normal and defective items. Seasonal fruits, such as mango, are collected in bunches from gardens or farms. The mangoes in each batch are not evenly developed. As a result, classifying mangoes into separate categories is required. In this research, we are developing a model for recognising high-quality vs low-quality fruits. . For our convenience, we have broken our model into two pieces. The hardware model includes a conveyor system, a motor driver circuit, a dc motor coupled to the motor driver circuit, a digital camera, a microcontroller, and an external power source. The system's hardware configuration is employed for fruit sorting, so that good and poor fruits are automatically gathered on each side of the conveyor. The video signal acquired by the camera installed on top of the conveyer belt transporting mangoes is used in the software model. Extracted picture frames from the video signal were rectified and processed to extract several attributes that were shown to be more useful for decay level prediction. For the real-time simulation, we utilised the OpenCV The mango is detected using a camera, and the fruits are classified using the support vector machine technique. A neural network is used to detect the quality of fruit. The neural network is used to build the training and testing model. The signal is transmitted to the hardware for separation after detecting the quality of the fruit. Library.

## I. INTRODUCTION

Nowadays, illnesses commonly wreak havoc on fruit yield increase. A key issue that arises in a field is the decay product. Most fruits are afflicted by illnesses caused by bacteria and viruses. Fruits play an important function as a food in our daily lives. It gives essential nutrients for our health and bodily upkeep. Those who consume more fruits as part of a healthy diet are less likely to develop certain chronic illnesses. However, not all fruits are treated similarly, and it is concerning that not everyone is well-versed in all fruits. We can create an

autonomous fruit feeder using the Support Vector Machine Algorithm and a Neural Network Each fruit has its own recognition system and information dataset. Sorting is critical in every business, including manufacturing, to increase the efficiency of industrial operations. The primary function of this position is to sort the company's merchandise. A sorting machine is a more practical and cost-effective way of product separation. Because the design is basic and versatile, merely a conveyor belt may be utilised for product separation. A conveyor belt is made up of two or more pulleys that are connected by a continuous loop of material that rotates over them. The belt and product on the belt are moved forward by one or both of the pulleys. Belt conveyors are classified into two types based on their application handling, such as those used to move boxes within a plant, and bulk material handling, such as those used to carry industrial materials. This method is used to determine the quality and deterioration of fruits. Computer vision and image processing techniques have been more valuable in the fruit sector, particularly for quality detection applications..

## II. LITERATURE SURVEY

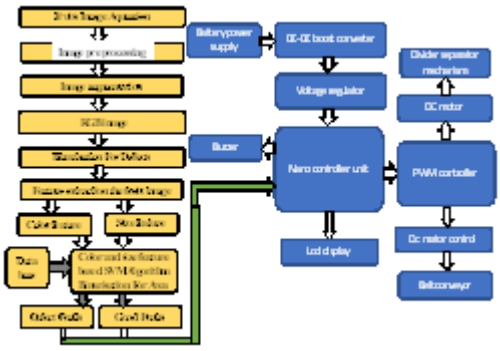
[1] H. Patel, R. Prajapati and M. Patel Detection of Quality in Orange Fruit Image using SVM Classifier,Detecting orange quality for which they have used apparatus for size, color and texture estimationThey essentially employed two classifiers for categorising the item based on feature and ANN for any chance of high degree of nonlinearity. There work suggested that SVM classification result changes when training/testing ratio changes [2] Nandhini. P, Dr. J. Jaya, Image Segmentation for fruit Quality Evaluation Using Computer Vision System Computer vision and support vector machine (SVM) for classification purpose. The work was carried out in various stages. Firstly, they resized the image to 256*256 resolution then they created feature space by extracting the color, texture, and shape features. [3] Ahmed Roukhe, Bouzid Abdenabi, and Noureddine El Barbri "Using a photo sensor system to sort dates fruit bunches based on age," journal of theoretical and applied information technology Abdellahhalimi, Ahmed Roukhe, Bouzid Abdenabi, and Noureddine el Barbri is about employing camera sensing to sort fruit based on maturity. This project proposes a computer vision-based method for automatically determining the maturity of date fruits. This approach was constructed and evaluated on a sample of photos of dates fruit at various stages of maturity. It identifies between good or mature and yellow or green date fruits using a machine vision technology. Fruit segmentation is carried out using the HSV colour space. The second review of literature[4] P. Sudhakara Rao and S. Renganathan New Approaches for Size Determination of Apple Fruits for Automatic Sorting and Grading. P. Sudhakara Rao and S. Renganathan is working on novel ways for determining the size of apple fruits using image processing in Matlab. This article demonstrates many ways for determining the size of different apple groups and sorting them using a threshold, such as the circle method, parabola method, ellipse method, and coefficient of variation approach.Also it explained percentage accuracies of different methods. [5]. C. S. Nandi, B. Tudu and C. Koley machine vision based techniques for Automatic mango fruit sorting and grading based maturity level and size C. S. Nandi et al [6] J. V. Frances, J. Calpe, E. Soria, M. Martinez, A. Rosado, A. J. Serrano, J. Calleja, M. Diaz, Application of ARMA modeling to the improvement of weight estimations in fruit sorting and grading machinery, IEEE 2020, pp 3666-3669 J. V. Frances, J. Calpe, E. Soria, M. Martinez, Rosado, A.J. Serrano, J.

Calleja, M. Diaz presented in their paper a procedure to improve the performance, whether increasing speed or accuracy, of the load-cell-based weighting subsystem in a fruit sorting and grading machine to achieve excellent accuracy.

## III. PROPOSED SYSTEM

In our proposed system the detection process of fruits and also checked the quality of fruits using computer vision technique. The hardware arrangement of the system is used for separate the fruit such that good or bad collected automatically on either side of the conveyor.The input source of our device is 12V connected to the controller circuit to motor controller unit. The output from motor controller unit is given to the dc motor to start the conveyor system. The Nano controller is connected to the motor controller unit and PC or laptop.The support vector machine algorithm (SVM) based processing is preferred to detect the particular region that is only the part which is infected. After the completion of the processing part of the input, particular characteristics were extracted .the database consists of data related to fruit conditions to be affected. The fruit details and the identification of decay fruit from the feature extraction are stored in the database. The entire database is viewed and compared with the captured image. The camera captures the real time images of the fruit. This image acts as an input of our system. The input image is then converted into normalized image pixel. The normalized image is then converted into gray scale image by using OpenCV library. This system is very useful for fruit industry, especially in quality detection. It reduces the manual work for separate the product.

## IV. BLOCK DIAGRAM DESCRIPTION




The suggested defective product separation utilising conveyor belts is depicted in the above block diagram. The above block represents the software block for fruit detection, as well as checking the quality of the fruit using the SVM algorithm. The camera may be used to capture photographs of fruits, and the image quality is improved during the image pre-processing stage. The segmentation procedure will begin when the input picture has been preprocessed. Images can be segregated during the segmentation process. The RGB image may then be transformed to a greyscale image. The fruit image may be used in the feature extraction method to extract the image's size and shape attributes. Images of both good and bad fruit may be taught and saved. The SVM algorithm will then compare databases based on feature classification to identify good and defective fruit. The

input source of our device in the hardware is 12V, which is connected to the controller circuit to the motor controller unit. To start the conveyor system, the output from the motor controller unit is sent into the dc motor. Based on computer vision, the conveyor belt will determine if the fruits are excellent or defective. The Nano controller is linked to the motor controller unit as well as the PC or laptop.

## V. CIRCUIT DIAGRAM AND DESCRIPTION

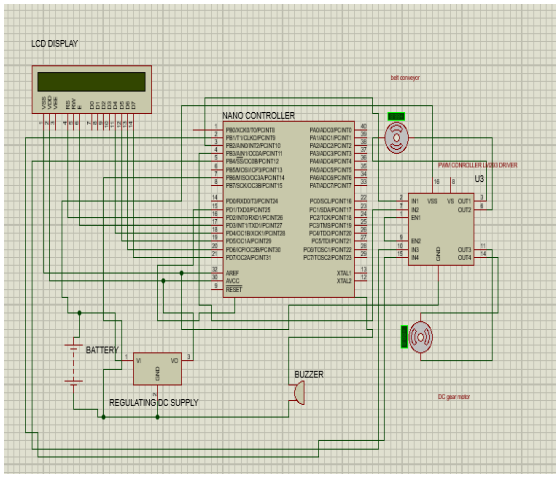
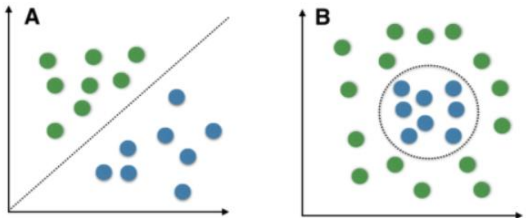



Fig 2.CIRCUIT DIAGRAM

The above circuit consist the core components of The battery power source is linked to a regulating DC supply that regulates voltage from 12V to 5V, then 5V. The power supplied to the Nano microcontroller LCD display is linked to the Nano controller digital pins d2, d3, d4, d5, d6, and d7. The VSS pin is linked to ground. The VDD pin is linked to a 5v power supply. Dc The motor is linked to the L293 driver board's output pins. The EN1,EN2 pins are linked to a 5v power source. The IN1,IN2 instruction pins are linked to the digital pins of the Nano controller. The conveyor belt is linked to the driver board's output pins. The IN1,IN2,IN3,IN4 pins are linked to the controller's digital pins. The EN1,EN2 pins are linked to a 5v power source. The buzzer has two pins. The positive pin is linked to the controller's digital pin. The ground pin is linked to the negative pin.

## VI. SVM ALGORITHM




To apply SVM to multi-class situations, we can develop a binary classifier for each data class.
To do multi-class classification on a class of fruits, for example, we may develop a binary classifier for each fruit. For example, there will be a binary classifier to determine if something is a mango or not. The SVM output is determined by the classifier with the greatest score.

SVM for Complex(Non Linearly Separable) Data SVM performs very well on linearly separable data without any adjustments. Linearly separable data is any data that can be shown in a graph and classified using a straight line.

VI. CONCLUSION AND FUTURE SCOPE

It has been demonstrated that machine vision is a viable replacement to unreliable manual fruit sorting. The framework is portable and lightweight. The algorithm works properly and can be adjusted at any moment based on changing illumination conditions from place to place and time to time. The microcontroller utilised is cheap but effective, and it is simple to reprogram on an embedded platform to adjust control settings. This system enables reliable product passage and separation of all types of products using an error-free image processing technique.

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4th National Conference on
Emerging Trends and
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( 24th and 25th May 2022 )

Organised by
Department of Biomedical Engineering,
Adhiyamaan College of Engineering,
Dr. M. G. R.Nagar, Hosur, Tamil Nadu, India
In Association with

Biomedical Engineering Society of India (BMESI)

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