3rd National Conference on Enhancement in Biomedical Engineering and Healthcare
Organised by Department of Biomedical Engineering,
Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India

Implementing an Emerging Technologies Based E-Saline Bottle Monitoring and Control System

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ABSTRACT

Modern health care organization requires manual caretakers and their heavy duties become a social problem in the modern world which is an extremely time-consuming job. We are proposing a device wherein remote drip infusion monitoring and control framework has been produced for medical clinics. The device contains various Infusion checking gadgets, control framework, and a focal screen. The infusion monitoring device using an load cell which can detect or sense the drip infusion rate (drops per minute), remaining time, an empty infusion solution bag at particular critical set level and also show remaining infusion capacity displayed on central monitor and this information will be sent wirelessly to the crucial or central monitor located at the nurse's control room and also from central monitor. Here automatic controlling of reverse flow blood. Continues monitoring patient present in bed or absent, if they not present. The essential monitor receives the data from numerous infusion checking or administering devices and then displays. The projected system eradicates continuous on vision/sight monitoring of the patient by nurses.

Keywords :- Power supply, LCD, Load Cell, Relay, Microcontroller, Motion sensor, Buzzer, HX711, Wi-Fi device.

I. INTRODUCTION

The current patient monitor schemes in hospitals permit continuous monitoring of patient vital signs, which need the sensors to be hardwired to neighbouring, bedside monitors or Personal Computers, and essentially restrain the patient to his hospital bed. Even after linking these systems to a specific patient, a paramedical associate need to endlessly monitor and note down all the vital parameters of a certain patient by keeping track of all of his/her records manually. Adopting such a method is error prone and may lead to disaster in the case of a human error. In the current planned system the patient health is continuously checked by the Mobile multi patient monitoring scheme and the attained data is transferred to a centralized controller. The patient monitor scheme that consumes very low power and is very small in size. These are specifically planned for low power consumption.

II. BLOCK DIAGRAM

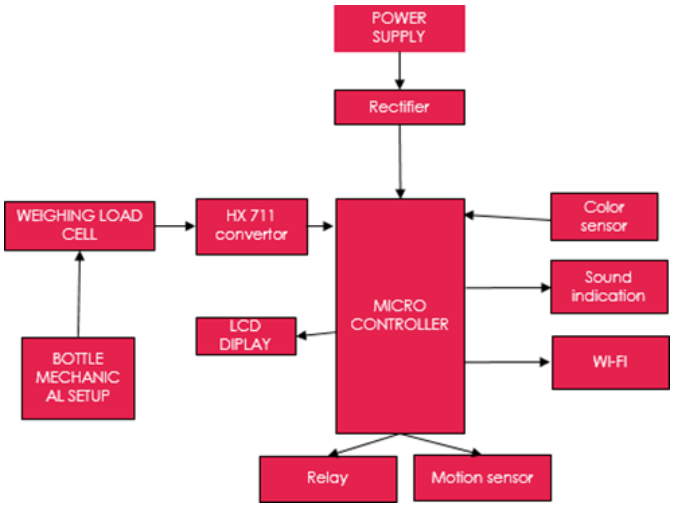


Fig.1 Block Diagram

In our project we are proposing a new system of Infusion pump which will indicate the glucose level, back flow of blood, and the patient present or absent in bed which will be displayed in LCD and control system.

The system consist 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 voltage, then riddling to a DC level, and finally, regulating to obtain a preferred fixed DC voltage.

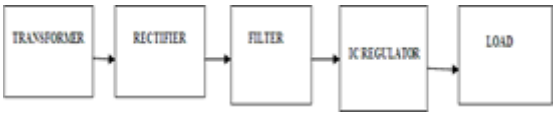


Fig 2. Block Diagram of Power Supply

The series of 78 regulators deliver fixed positive regulated voltages ranges from 5 to 24 volts. Similarly, the series of 79 regulators deliver fixed undesirable regulated voltages ranges from 5 to 24 volts.

- For IC's, Micro Controller, LCD - 5 volts
- For alarm circuit, op-amp, relay circuits -12 volts

The mechanical setup uses bottle and stand which connects to the load cell. The load cell which act as a force transducer is used to measure the weight of the saline bottle and load cell is connected to the HX711 which converts Analog data to digital data. That data is transferred to the PIC Microcontroller. PIC microcontrollers that can be programmed to carry out a massive range of tasks. The data from HX711 are transferred to the LCD display through PIC microcontroller. It displays the low level glucose rate and proper level glucose rate.

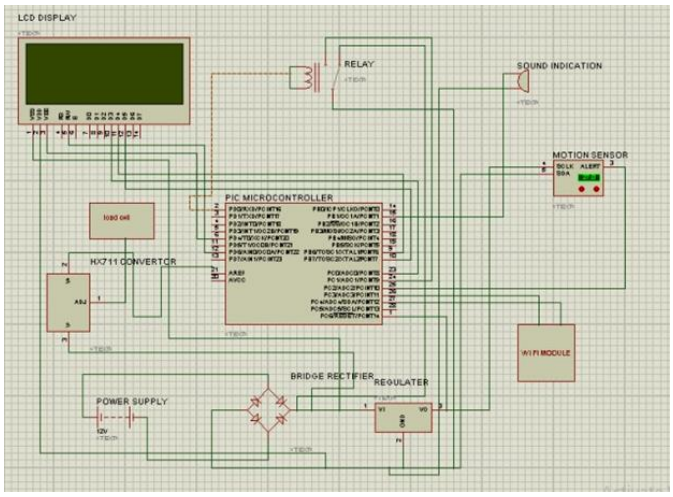
The Relay unit is used to controls (close and open) circuits electromechanically which controls the motion sensor and IR sensor. The Motion sensor checks either the patient is present or absent in bed. Socially the motion sensor alerts whenever there is change in patient position or when the child is missing.

Fig 3 Single point load cells

The Relay unit is also connected with the IR sensor which sense the blood back flow in the tube. It connects with a buzzer that alerts whether blood is reverse to the saline bottle.

All those data's are transferred to the PIC microcontroller which connect with Wi-Fi module that transfers all the data's to the control system or central monitoring system. The transferred data's are viewed in the specific website page.

III. CIRCUIT DIAGRAM



IV. RESULTS

The load cell is designed to give the analog output to the HX711 then analog output is converted into digital output that is displayed in LCD. The LCD shows the command indications that is Low level glucose, Proper level glucose. The LCD is also displays the patient is present or absent in bed and blood back flow.

Fig 5. Patient absent Indication

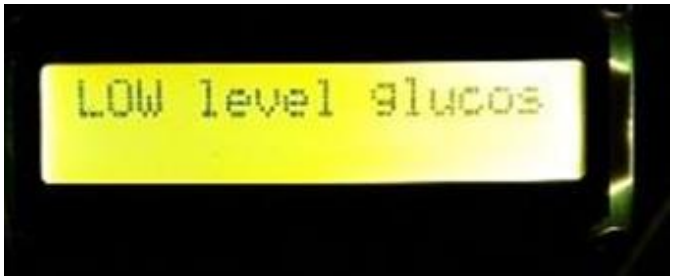


Fig 6. Low Level Glucose Indication

Fig 7. Blood Backflow Indication

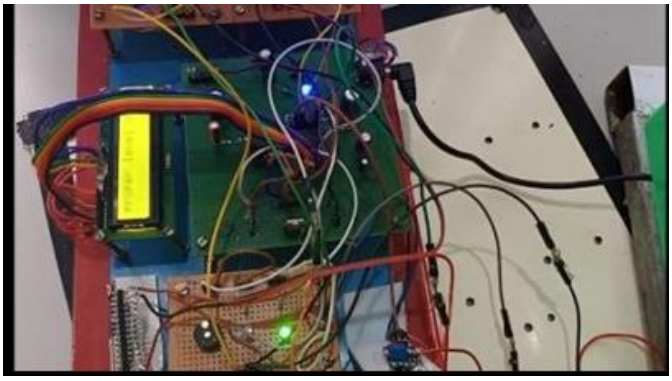


Fig 8. Proposed System

The Wi-Fi module is transfer the data to the connected device and it shows a threshold value and graphical representation of threshold levels and timings.

V. CONCLUSION

This project describes the system in which the saline flow rate is automatically monitored using microcontroller. The results in the form of saline drop rate, number of drops coming from saline bottle, saline solution given to the patient and remaining time to empty the saline bottle with the help of serial port test software are wirelessly send to nurse's or doctor's computer and displayed. This system is cost effective, reliable, and useful for nurses. It can be re-claimed the next time with a different saline bottle. The rural hospitals make use of this system efficiently. It is mostly advantageous during night as there is no necessity for nurses toward go to patient's bed each time to check the level of saline in the bottle.

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Cite this article as :

V. P. Krishnammal, K. Kalaiselvan, W. Joshua, V. Dharneshwaran, "Implementing an Emerging Technologies Based E-Saline Bottle Monitoring and Control System", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 5 Issue 5, pp. 109-112, March-April 2020. Journal URL : http://ijsrst.com/EBHBM010