



Smart Incubator System for Baby Growth Monitoring

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ABSTRACT

Significant progress in development of neonatal incubators are providing various advancement for baby monitoring. Babies in the gestation period of 32 to 37 weeks result in death due to lacking of essential care. However, the proposed device permits the early detection and consequent changes occurring in the neonates. Analysis of growth during the treatment period, detection of microbes in the incubator, humidity, temperature is done and measured parameters are stored in cloud. Immediate outputs are displayed in the LCD display itself. The proposed system assures the privacy of data.

Keywords : Microbial Detection, Growth Changes, Neonatal Monitoring, Cloud Storage, Data Privacy

I. INTRODUCTION

Incubator is an apparatus used for monitoring and maintaining environmental conditions needed for a newborn baby who is unable to adapt the new environment immediately after delivery from the mother's womb. Normally incubators measure the weight, temperature and pressure levels present in the device. Normally, newborns are more prone to "Airborne Diseases" such as influenza, pertussis etc. The proposed smart incubator differs from the existing system by inclusion of micro dust sensor which detects and gives indications in case of dust particles entering the system and prevent the microorganisms to be transferred to babies. And using IoT data can be viewed and analysis can be made easily.

The proposed smart incubator we use sensors and the collected data will be stored in the online using cloud

storage. The data obtained can be viewed using mobile phones and computers from places where we are and the actions can be taken. In case of any problem with medical data and short circuit, and the alarm signals will be given to the cloud connected devices and mobile phones from the sensor.

II. LITERATURE SURVEY

[1] Vetches Eng., Unnati Pensacon and Chan 'Start up incubators and the role of social capital', 2005. The medical data can be viewed from mobile phones and computer systems from the place where they are and they can take actions. The design is based on Wi-Fi and infrared technologies that measure the essential parameters that must be controlled for pre mature babies. Variation occurred in this result immediately given alert message to given alert to the relevant hospital management and also the patient home.

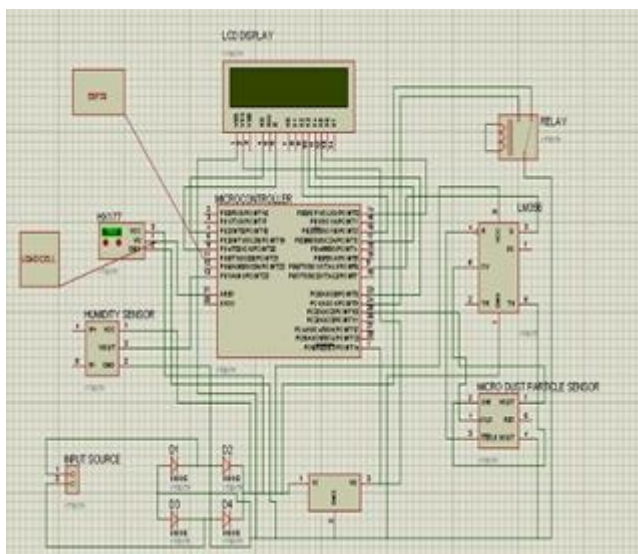
[2]Jignesh “Smart incubators Application using Arduino Controller”,2009. An incubator is an apparatus used to monitor and maintain environmental conditions suitable for a newborn baby. It is used in preterm births or for some ill babies. The baby’s health conditions are maintained properly. The incubator monitors oxygen supplementation and pressure levels. It also monitors temperature, radiation pulse activity and air humidity, gas around the environment.

[3]Dr.T.S.UdhayaSuriya “An Adaptive generalized predictive control for temperature and humidity inside an incubator”,2015.

This smart incubator has developed an Adaptive decoupling strategy for controlling temperature and humidity inside a neonate incubator by using Adaptive noise cancellation technique. Several decoupling methods have been demonstrated but the RLS algorithm is more general and practical approach. It is capable of giving satisfactory performance than other systems by exploiting active humidification.

III. METHODS AND MATERIAL

CIRCUIT DIAGRAM

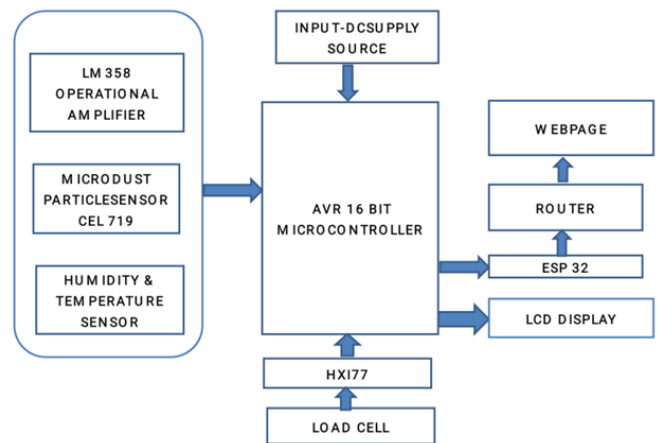


SOFTWARE USED

For storing and analyzing of data, the software in our system are as follows

- A.AVR STUDIO
 - a. AVR studio
 - b. Cloud computing

A. BLOCKDIAGRAM



B. BLOCK DIAGRAM DESCRIPTION

The block diagram for our proposed system is Shown in the fig-3.1. The proposed smart incubator uses the 16-bit microcontroller for processing the data. LM 358 is programmed to give two outputs from the device. DHT 11 sensor measure the incubator temperature and humidity. HX177 measure the baby weight and converts it into electrical signal. CEL 712 detects the microorganisms inside the device and gives indications using the buzzer circuit. The data is stored in cloud account of a user and data is sent to the signed user, when the AVR microcontroller is connected to the Wi-Fi network. The values can be checked for every second. It will give accurate values and that will be synced for every second. The data stored can be used as reference in future.

AVR Studio is a specially designed software for AVR microcontroller. It was developed Atmel studios. It is

embedded c program used for software applications. It is used for writing and debugging in integrated computers.

B. CLOUD COMPUTING

By means of using cloud storage we can store data in large numbers over online. Cloud computing allows us to analyse the previous and present medical data. By using this we are able to find out whether the baby have gained weight by using incubator. It allows doctors and nurses to get the medical data from the connected devices. Immediate alarms will also be given to the users by means of cloud and mobile phones in case of emergencies.

IV. RESULTS

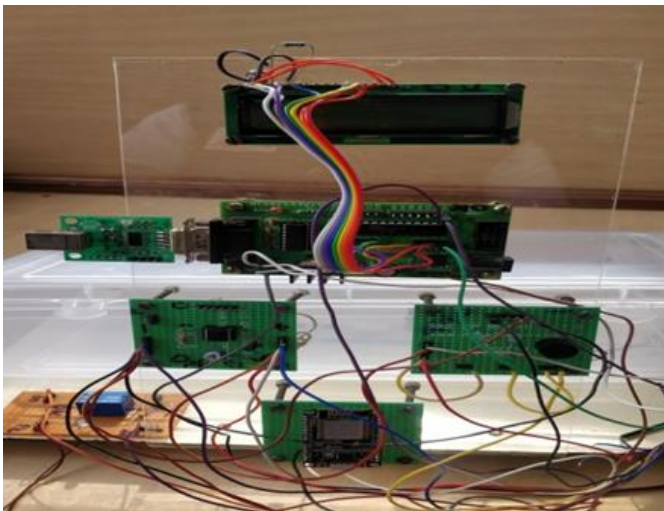


Fig Smart Incubator

In this project, by, using the CEL719,HX177,DHT11 we can detect the micro dust, weight ,humidity and temperature that can be stored in webpage using ESP32(Wi-Fi module)in order to make reference for future use.

V. CONCLUSION

In hospitals after detecting the microbes from the device we can apply UV rays to destroy the pathogens. Immediate and accurate values are obtained. It also provides great secrecy of medical data. Proposed smart incubator will have a huge impact in medical society and allows to maintain the babies in proper conditions under the supervisions of doctors and nurses.

Arduino

VI. REFERENCES

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