IoT BASED INFANT INCUBATOR MONITORING SYSTEM

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ABSTRACT

The incubator is an apparatus that provides a closed and managed environment for the sustenance of premature babies. Deaths and injuries to neonates in incubators have been linked to thermostat failure that caused incubator overheating and infant hyperthermia. This system monitors parameters such as pulse rate of the baby, temperature, humidity and also detects gases like Ammonia (NH_3), Sulphur (S), Benzene (C_6H_6), CO_2, and other harmful gases like smoke and if any variations happen in the parameters (pulse, temperature, humidity and gaseous), the data will be automatically sent to the doctor and family members using IoT technology.

Keywords: IoT, Incubator, Arduino, Sensors.

INTRODUCTION

According to recent study, two in ten babies were born prematurely or with low birth weight and faces complications. This can be prevented by using infant incubator for these pre-term babies. Infant lies on a bed in the infant incubator, which is closed by a clear plastic cap. Incubators have hand- access ports with doors that permit the infant to be handled while limiting the introduction of cool room air. An Infant incubator is a device used to monitor and maintain sustainable environmental condition for a newborn baby. Mostly incubator is used in preterm birth cases or for some ill full-term babies, so the baby's health conditions are maintained properly. It also monitors temperature, humidity and also detects harmful gases like Ammonia (NH_3), Sulphur (S), Benzene (C_6H_6), CO_2, and other harmful gases like smoke. In incubator we use sensors and data transfer devices to store and transfer the data using IoT technology. The data of the infant can be monitored using cell phones and computer devices from any place and can take action regarding the data. If there is any problem with the medical data the sensors send the message to the doctors and family members using IoT technology.

Fig.1 Infant Incubator

LITERATURE RIVEW

WervyanShalannanda;IrmaZakia; FahmiFahmi,ErwinSutanto- Implementation of the Hardware Module of IoT- Based Infant IncubatorMonitoring System. IoT-based incubator replaced Arduino Uno Rev3 and ESP8266 communication module Implementation of IoT-based incubator replaced Arduino Uno Rev3 and ESP8266 communication module with an Arduino Uno+WiFi. The measurement results show that the average error of pulse rate was less than one per cent, while the SpO2 is slightly above three per cent is shown in this paper.

P.BhuvaneswariRajnishMahaseth - A Wearable Infant Healthcare Monitoring and Alerting System Using IoT. To monitor continuously and notify the life-threatening situations of an infant to the corresponding authorities.It was developed to rescue the sudden ambiguous death which is technically termed as sudden infant death syndrome (SIDS). It performs the real time monitoring of the baby activities as well as analyzes the basic health parameters using wearable wireless sensor devices.

EXISTING METHOD

Many incubator structures contain temperature and other on-screen parameters, which are focused on the incubator system. In the maternity ward, doctors or nurses should monitor the health status of the children once every hour or so. The presence of a doctor or nurse is always required and they need to constantly monitor the health status of the baby in the incubator. This may not always be accurate in care, sometimes due to human negligence a possible death. In the current incubator systems data collected sensors cannot transmit to remote locations and the incubator device cannot transfer data from remote locations.

PROPOSED METHOD

In this proposed system we are using Heartbeat sensor for detecting pulse rate, DHT11 sensor for room temperature and humidity. If the temperature in the room is above it will automatically come down. MQ135 Sensor for detecting any harmful gases in the room. The values will be uploaded to cloud server and will be displayed on LCD. If any emergency happens message alert will be sent to parents and to hospital personsand those absurd

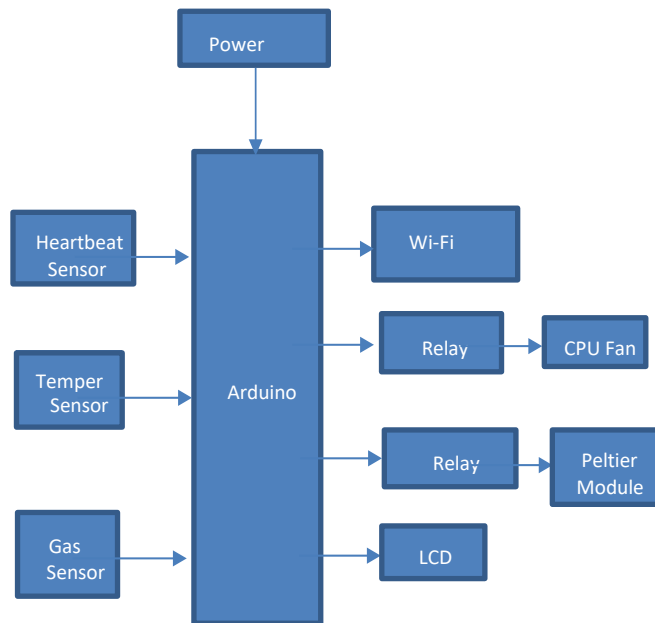values will be uploaded in ubidots server after sending alert messages via email.

Fig.2 Block diagram of proposed infant incubator
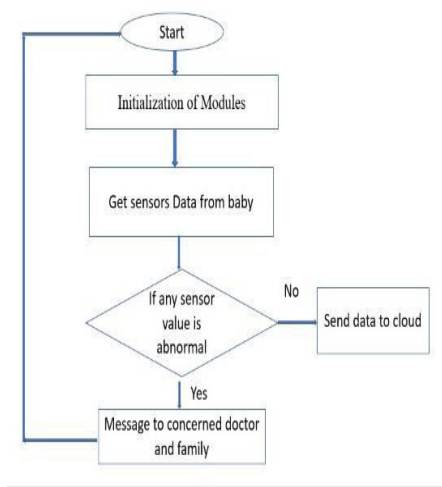
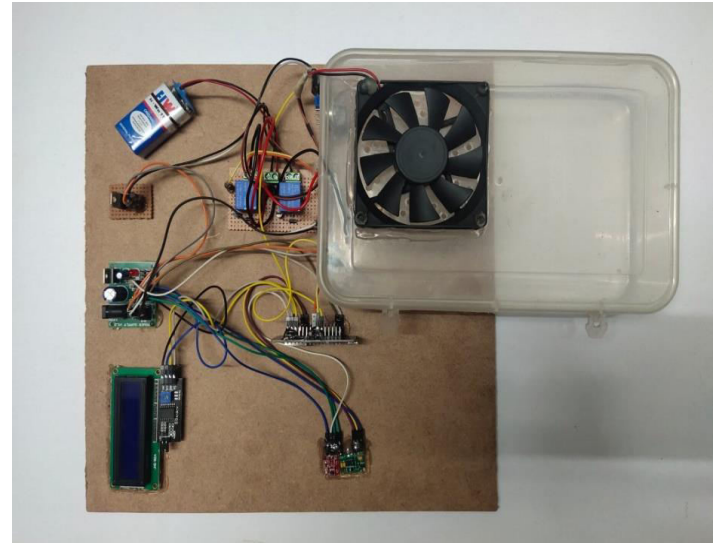## METHODS OR TECHNIQUES USED

Fig.3 Flowchart

RESULT

Fig.4 Hardware Implementation

Fig 4 shows the hardware implementation of infant incubator.In the hardware implementation of infant incubator all sensors are connected with Arduino. Heart beat sensor module operates from 3.3 to 5V DC Voltage. VCC requires voltage range of 3.0 – 5.5V.Imax (Maximum Current Draw) should be less than 4mA.Wavelength of LED Output is 565nmn and wavelength of Sensor Input is 525nm.The working principle behind heart beat sensor is Photoplethysmography (PPG). The photosensor measures the intensity of light as it is directly proportional to rate of change in volumes is the signal output which is Connected to analog input of an Arduino.
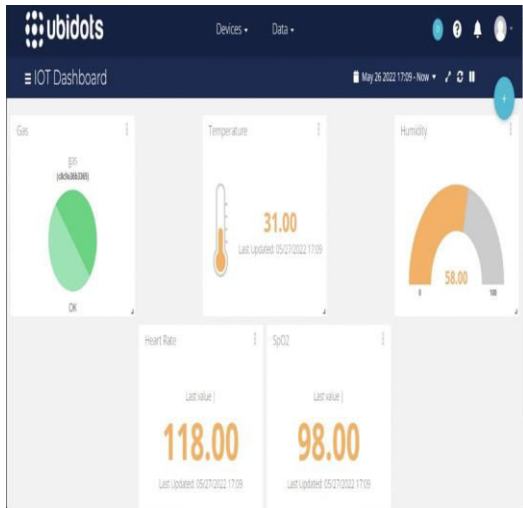
Fig.5 Dashboard with no Gas Detection

Fig.6 Dashboard with Gas Detection

Fig 5 shows the values of baby as these values will be uploaded on ubidotsserver after getting every alert message and if any abnormal things happen to the infant alert messages will be sent to mobile phone via email as shown in Fig 6.
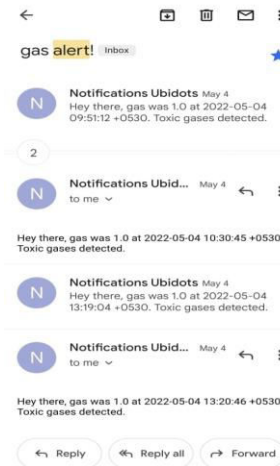

Fig.7 Alert Messages

CONCLUSION

Thus, IoT helps in sensing various objects, remote controlling of those objects and creates an ease in directly integrating the physical world into computer-based systems. So, in upcoming days this system has a great future and it will be a great impact on medical field and the newborn infants will be saved from critical cases as their health conditions of those infants will be under control of concerned doctor and family.

FUTURE SCOPE

The project has a vast scope in future. The project can be used in rural areas as this incubator is easily affordable.

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