

Infant Monitoring System Using IoT

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Abstract— As the world advances the parents are busy building their and with their responsibilities monitoring the infants who need enormous care and attention has been hectic due to their busy schedule. To ease the task of monitoring the infants the infant monitoring system has been proposed. This system aims in integrating the surrounding environment of the infant with the parents' mobile via GSM module i.e. sensors accumulate the real time data from the environment. If there is any activity like urination or increase in temperature or baby waking up, an alert call and the SMS is forwarded to the registered parents mobile. In order to give a soothing effect to the infant until the parents arrive the SD module and the speaker is connected to play the lullaby. This infant monitoring system can also be implemented where the parents are not available to continuously monitor the infant, or it can be used in the maternity hospital or the baby care centres to assist the staff responsible to supervise the infant.

Keywords— Infant monitoring, integrating, GSM, alert call, message, SD module, lullaby.

I. INTRODUCTION

During earlier days usually mothers were not stepping out to work and sufficient time to supervise and look after their infants there was no need of extra intervention to guard the infants. In a progressing country like India, both the parents have their own responsibilities in building a secured future for themselves and they strive hard in order to give a quality lifestyle for their children. During these times it is hard to monitor the infants 24/7 and hiring someone to monitor the infant is not a better option due to cost factor. In order to reduce burden on parents the infant monitoring system was introduced. This device is an application of IoT which aims in connecting things like sensors and actuators to the internet. Data is generated by the sensors, embedded devices in the physical layer. Later on, it is communicated through the network. This research paper aims on developing an infant monitoring system where the alert call and message is forwarded to the registered parents mobile via GSM module once the

stimulus is noticed. The system contains sound sensor, by which an alert is dispatched to the parents if the infant is crying, moisture sensor which notifies if the child urinates and the temperature sensor by which the temperature of the infant is monitored. If the baby is crying for a long time to give a soothing effect until the parent arrives, the SD module and the speaker are used to play the lullabies, the SD module reads the file from the SD card present, and the same is played from the speaker connected. The methodology is also cost effective which may cost around 2000-2500 which is more effective than hiring a staff to monitor the infant.

II. COMPONENTS

The brief explanation of the components is as follows.

A. Arduino

Is a microcontroller board which controls the sensors and actuators according to the change in inputs, the input change is sensed from sensors which are connected to input port. Arduino has variants like Arduino UNO, Arduino NANO, Arduino Micro etc [6].

B. Sound Sensor

Is the type of sensor which is used to detect the sound travelling by the air. It is used to detect the intensity of the sound travelling [7].

C. Temperature Sensor

Is used to measure the temperature in the environment and converts it to an electrical signal which is further read by the microcontroller [8].

D. Moisture Sensor

Is used to measure the humidity present in the surrounding

E. SD Module

The module is used to read and write data from or to the SD card with the help of microcontroller [9].

F. GSM Module

Global System for Mobile Communication is a module that provides a wireless data link to a network [10]. GSM module has numerous varieties such as

SIM800C GSM GPRS Quad-band module

SIM800C GSM Module

SIM808 Module

SIM808 GSM/GPRS Modem

III. LITERATURE SURVEY

In current market there is numerous Health Monitoring Systems such as to monitor BP, Blood Sugar etc. These systems are of great use in order to monitor various health parameters in adults, but when it comes to monitoring infants that's a different scenario. Monitoring infants is far more different from monitoring adults. The infants need an extra care and observation.

In this section we give a brief overview of such baby monitoring systems proposed by different authors.

In Paper [1] the author has designed a system using temperature, pulse rate, moisture, and sensors. The system also contains GSM module by which an alert message is delivered to the parents mobile. A 16x2 LCD display is incorporated which displays the readings of the various sensors.

In Paper [2] the author has proposed a system which is implemented with the aid of camera along with sound, temperature, and moisture sensor. A motor is also attached to swing the cradle and the swing can be controlled by parents via message. The connection between the parents and the cradle is established through GSM module. In addition to these parents can activate and deactivate the baby toys via message

In Paper [3] author presents the architecture of the system using web service technology. The system contains a login module which handles user registration and login information. The system has two modules, cry classification and device control. The cry classifier classifies the cry of a baby using, Artificial Intelligence & Machine Learning algorithms. Based on this the suitable sensors attached to the cradle are activated and the intended functions are performed. According to the emotions of a baby the systems in the cradle are triggered.

In Paper [4] the author has implemented the system with raspberry pi microcontroller. The system also incorporated L298N motor driver and camera to sing the cradle and to monitor the baby movements respectively. In addition, the system also contains temperature, humidity and sound sensors to monitor the baby. The system is simple and performs all the basic functions of monitoring the baby.

In Paper [5] the author suggests a simple smart cradle system which consists of PIR sensor to monitor the movements of a baby. The system also incorporates the motor in addition to sound temperature and humidity sensors and the system also has a feature of sending an alert message to the parents. When sound is detected, the SMS is sent and accordingly the cradle starts to swing with the help of motor.

IV. THE PROPOSED SYSTEM

1. Turn ON the system
2. Monitor the surrounding environment of the infant
If (sound sensor==1)
{
Send an alert call and SMS
Delay (3000)
Start playing the soft music
}
Elseif (temperature sensor==1)
{
Send an alert call and SMS
}
Elseif (moisture sensor==1)
{
Send an alert call and SMS
}

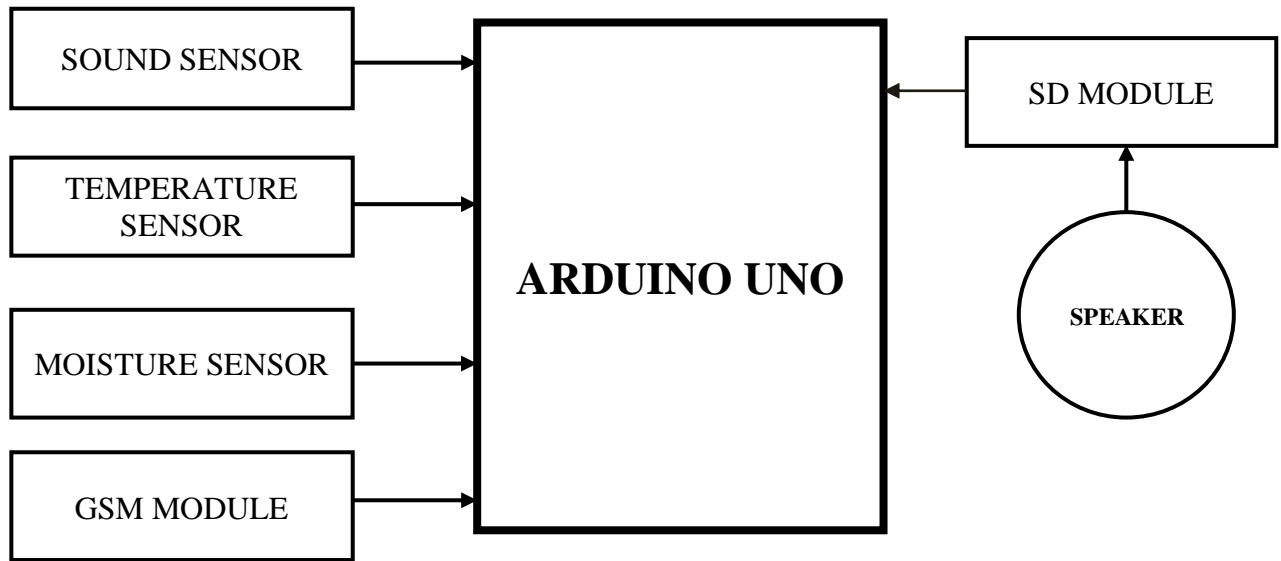


Figure 1Component design

V. RESULT AND DISCUSSION

The system is based on arduino in which any one of the saved values differs, it alerts the parents. Whenever the sound sensor is triggered not only an alert call and SMS will be sent to the parents through the GSM module but also a soft music is played to soothe the baby for the time being with the use of the SD which is an added feature of our proposed system. The sensors connected to the arduino uno will record the external environment of the baby continuously.

At present, females have started working in industrialized sectors which in turn affects the child care in the families. Since nowadays managing the cost of living has become difficult, females started working which has affected their children's care. Therefore, this system helps to reduce the burden on the mother.

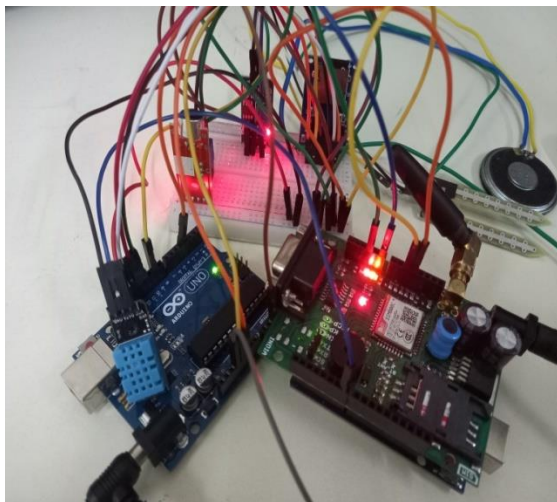


Figure 2 Component setup

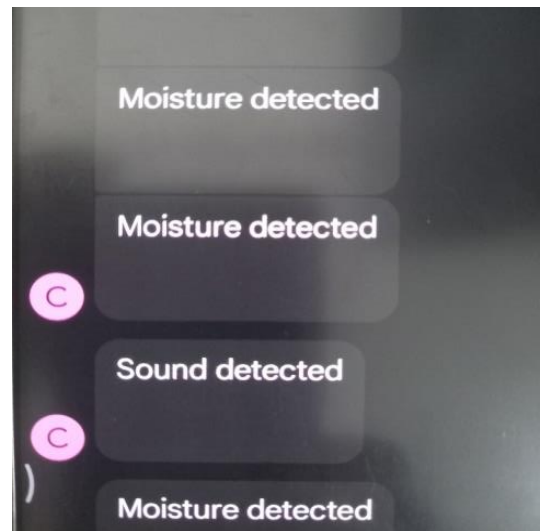


Figure 3 Result

VI. FUTURE SCOPE

The future scope of the smart cradle system using a GSM module is promising, with several potential advancements in technology and features including Artificial Intelligence integration, integration with other smart devices, Cloud-based monitoring, incorporate advanced sensors to monitor the baby's vital signs and oxygen levels providing more comprehensive monitoring and control system.

CONCLUSION

In this paper, a software architecture for a smart baby cradle IoT based system was proposed. In conclusion, the infant monitoring system using IoT and GSM technology can be a great solution for parents who are unable to continuously monitor their infants due to their busy schedules. With the use of various sensors such as sound, temperature and moisture sensors, the system can detect any changes in the infant's environment and send alert calls and messages to the registered parent's mobile. Moreover, the use of an SD module and speaker to play lullabies can provide a soothing effect to the infant until the parent arrives. This system is cost-effective and can be used not only by parents but also in maternity hospitals and baby care centres. The use of Arduino microcontroller and various modules such as GSM, SD, and sensors make the system efficient and reliable. Overall, the infant monitoring system can greatly reduce the burden on parents and provide a safe and secure environment for their infants.

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