

Baby Monitoring and Health Prediction System using IoT

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Abstract: The current number of working parents has greatly increased. Subsequently, baby care has become a daily challenge to several families. However, the foyeys cannot continuously monitor their babies' conditions either in normal or abnormal situations. Therefore, the Internet of Things-based Baby Monitoring System (IoT-BBMS) is proposed as an efficient and low-cost IoT-based system for monitoring in real time. The proposed new algorithm is our system that plays a key role in providing better baby care while parents are away and this reduce the strain of working parents. Within the designed system, it is exploited to collect the knowledge read by the sensors and uploaded via Wi-Fi to thingspeak server. The sensors plays a really important role by providing the values which are collected from the sick new born baby and are stored for future use. The system exploits sensors to monitor at baby's vital parameters, like ambient temperature, moisture, and crying.

Keywords: IoT, Sensor.

1. Introduction

An estimated 130 million babies are born annually globally, and about four million of them die within the hospital period. 1/4 of the world neonatal deaths occur in India. Effective and accelerated reduction in death rate also needs back-up support of state-of-the-art Sick Newborn Care Units (SNCUs) in hospitals with an outsized number of deliveries. This also results, within the type of number of lives saved and also the estimated reduction in death rate for the full district, even with a limited number of beds and staff, were so encouraging that this model was put to scale by the regime in several other districts. The SNCU facilities provided controlled environment, normal temperature, individual warming and shut monitoring devices, intravenous fluid and medications by infusion pump, central oxygen, oxygen generators, bedside procedures. It, however, didn't include mechanical ventilation and specialized neonatal surgery. One important constraint of because it's now known, was the severe shortage of nursing staff.

2. Literature survey

[1] IoT is getting upgraded day by day simultaneously its security is additionally upgraded. For sensing purpose they are using Waterproof Ultrasonic Obstacle Sensor which are placed within the straightforward locket that's given or worn to the

baby so as that locket will give alert to the caretaker or parents through the mobile and for battery backup we are using electrical device through which the energy will get stored within the care taker's shoes and this energy are obsessive about the steps covered by the care taker. First, the signals curve is partly divided and maximum and minima values in each segment are collected. The frequently recorded maximum and minimum values are removed and every one fake peak are merged within the case of ensuring true or false peaks remained.

[2] Child safety and tracking is additionally a big concern because the more number of crimes on children are reported nowadays. With this motivation, a wise IoT device for child safety and tracking is developed to assist the foyeys to locate and monitor their children. The system is developed using one board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the kid during emergency. The parameters like touch, temperature & heartbeat of the kid are used for parametric analysis and results are plotted for the identical. The above system ensures the protection and tracking of kids using different modules.

3. Existing system

The diagram of the proposed child guard is shown in Figure 1. The LinkIt ONE board is an open source platform. It consists of inbuilt Wi-Fi, GSM. The link it one board is analogous to the Arduino board and it's termed as all-in-one prototyping board for wearable's and IoT devices. The board consists of ARM7 EJ-S and also the clock speed is 260MHz. A SIM and SD card slots are provided on the board itself. Different components like Temperature, Touch sensor, heartbeat sensor, GSM. The touch sensor has three main components on the circuit card. The other component is comparator, when the signal falls under a selected value it will switch the output. The GSM/GPRS block is activated with a SIM card on the board. GSM standard used here is GSM900. GSM network consists of mobile station, Base station subsystem network and operation subsystem. The Link it ONE board consists of micro SD/SIM combo. The device

sends the monitored parameters data like Temperature, touch and vital sign to cloud. When there are any abnormalities in temperature or touch or vital sign readings, a SMS is distributed to the parent/caretaker portable immediately. (Figure 1)

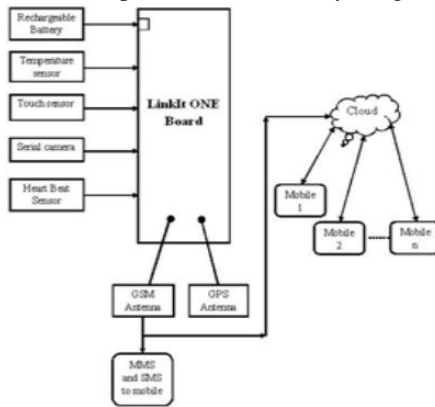


Fig. 1. Architecture block diagram

4. Proposed system

The proposed system consists of sensors which are used to monitor the changes that happen within the sick new born baby. The detailed explanation is given via flow chart (Figure 2) and are as follows:

1) Temperature Sensor

The DHT11 temperature and humidity sensor is fixed to the cradle in order that if there's any changes within the surrounding it records the value. If the sensor is fixed in baby's hand, then it will check whether the baby is affected with fever or not. The values are stored in cloud and may be employed in the long run. The threshold value of temperature sensor is 28 to 32.

2) Pulse sensor

The pulse sensor is employed to watch the heart beat rate of the person. This sensor works on a principle of modulation by blood flow through finger at each pulse. This LED must be super bright in order that the sunshine must be ready to pass under the finger and will be detected at the detector side. The heart beat sensor is employed to calculate the heartbeat of the baby. The values which are obtained from the sensors are stored in cloud and are viewed for further reference. The threshold value of pulse sensor is 60 to 90.

3) Barometric sensor

It is also called as S0P2 sensor. The barometric sensors are used to detect the atmospheric and humidity around the baby. The sensor is employed to detect the oxygen and atmospheric round the baby. If there's any increase or decrease within the gas pressure the values are stored within the cloud and provides message to folks. The threshold value of barometric sensor is 400 to 800.

4) Sound sensor

The sound sensor is one type of module used to notice the sound of the baby. The sound sensor mainly has true or false values. If the sensor detects sound, then the value is 1. If not, then the value is 0. Through this we can find the baby is sleeping or awake. The threshold value of sound sensor is either 0 or 1.

5) GSM

GSM is a combination of TDMA (Time Division Multiple Access), FDMA (Frequency Division Multiple Access) and Frequency hopping. The abnormal values are which are collected from sensors are sent to the parents via message. In this project whenever there is any change in baby's condition, the message will automatically be send to the parents and guardian.

6) Wi-Fi

The ESP8266 WiFi module is used. The ESP8266 is a WiFi and is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. The health status of the baby will automatically get uploaded in the things speak cloud storage so that the baby's data can be seen anywhere from the world and all the data is accessible and used by the parents and doctors during checkup.

The monitoring system is used to monitor babies when their parents are away or when left under a care taker. The sensors which are connected to the Arduino gets the value from the sensors and are stored in the cloud for further use and are used to send messages to parents and guardians via android application (Figure 2).

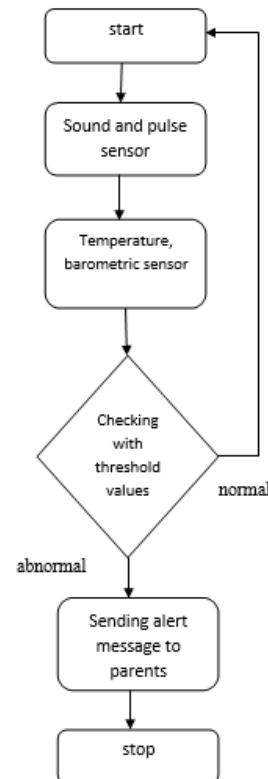


Fig. 2. Flowchart

5. Experimental result

The experiment is mainly used for sick new born baby. This project monitors the vital parameters which are obtained from the sensors and the message are sent to the parents and guardians if there are any changes in the threshold values.

6. Conclusion

The implementation of IoT devices ensures the complete solution for baby safety problems. The idea is to implement an automatic system for baby monitoring to remove the anxiety of the parents. The project proposes IoT devices for child safety and monitoring helps the guardian/parents to monitor the baby. If any abnormal values are read by the sensors, then an SMS message is sent to the guardian/parents mobile phone.

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