iBABY CLOUD: SHAPING THE FUTURE OF PREGNANT WOMEN USING IOT

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ABSTRACT -- *Promoting healthy pregnancy and safe childbirth is a goal of all Indian health care systems. Despite significant improvements in recent decades, mothers and their babies are still at risk during the prenatal period, which covers pregnancy, delivery, and the postpartum. Babies born too early are more likely to die than those born at term. To improve prenatal health, we need the right tools to assess problems and their causes. We also need to monitor the health condition of the pregnant woman frequently. We have proposed the system using IOT which is based on maternal health care solution that promises to effectively monitor the health of the pregnant women in rural India. This system allows sensing various attributes like the temperature, heart rate and the blood pressure of the mother frequently. The readings of the attributes are stored in a cloud. In case of any abnormal conditions there is a message which is sent to the hospital, doctor in charge and the guardian of the patient. We have also used Diffie Hellman Key Exchange algorithm to secure transmission of data.*

Keywords-- *Temperature sensor, Blood Pressure sensor, Heart rate sensor, Internet of Things, Arduino UNO R3*

I.   INTRODUCTION

Kevin Ashton first found the Radio-frequency Identification (RFID) prior the evolution of Internet of Things. This Internet of Things became popular in 1999. One such thing where IoT is efficiently used is the health care domain. In the health care there is high mortality rate of fetus especially in India. Even in today's scenario due to work pressure and eating of unhealthy and junk food causes obesity. The stress which mainly affects the pregnant ladies may lead to any kind of abnormalities. Hence the work mainly takes care of the pregnant women in the rural areas to help and reduce maternal mortality. The device used in the hospitals are non-portable, sophisticated and expensive. The aim of the proposed work is to develop a compact device for the rural pregnant women in order to access the vital signs such as temperature, heart rate and the blood pressure of the mother. Medical care of pregnant women involves a lot of attention, proper and timely diagnosis, medication patients should undergo and of course all this costs a lot of money. People in rural areas rarely do proper check-ups during pregnancy. The system which has been proposed tries to give quality and timely medical care with less expenses. Even during any outbreak of a pandemic where you are not able to go out this is very useful during these times.

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II.   LITERATURE REVIEW

Shiny Amala S and Mythili S[1] proposed a hardware setup for pregnant woman. In this the data from four sensors that is temperature sensor, Heart rate sensor, Blood pressure sensor and accelerometer sensor are used. The measured parameters of the sensor are sent though IoT to a mobile application. It is like doing regular checkups.

V.Santhi, K.Ramya, APJ.Tarana and G.Vinitha [2] In this paper a device to monitor the health of pregnant ladies is done using CC3200, where the parameters are sent to doctor through IoT so that there is no miscarriage of the infant and the mother. In case of emergency an alert is sent.

Kavitha Sooda, Archana Naik, Sammer Desai, Shivam Dubey and M Bhargavi. [3] The experimentation done in this paper is using sensor the data is collected in the arduino. The collected data is sent to a cloud and IoT platform to analyse and then send notifications.

Selvaraj Shanthi In this paper near field communication device is used to access the vital signs like weight, temperature, heart rate are checked within a particular limit the data is sent. This kiosk contains all the sensors which are necessary but is too large which can be handled by the doctors or specialists.

III.   EXISTING SYSTEM

In the existing strategy, the ultrasound scan is being done to check the condition of the pregnant women in person. The other one which has been done is there are four sensor which are connected to the arduino. These sensors collect the data and send the data to a IoT based health care monitoring system known as Thingspeak which is a cloud and IoT platform. These data can be seen directly in the mobile application. The hardware used is heart rate sensor, temperature sensor, blood pressure sensor, accelerometer sensor and the arduino board. The advantage of the existing is that it collects the data and displays the reading. The main disadvantage is the collected data can only be seen. There is no any kind of alert given when there is any abnormal condition detected in the body of the pregnant woman which may lead to higher mortality rate. It is also not more efficient as Bluetooth can only transfer data within a short range. The ultrasound scan can affect the child. There is no any security measures taken to protect the data.
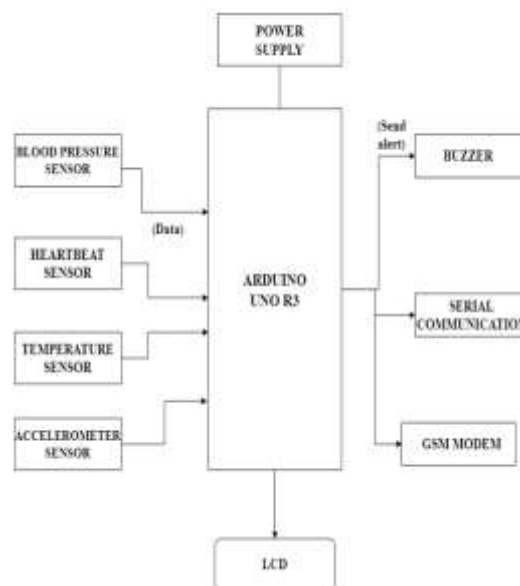

Fig: Block diagram of wearable device

IV.   PROPOSED SYSTEM

Timely health check up is more necessary so that miscarriage dose not happen. To ensure all this we have proposed a system using IoT. The system consists of sensors embedded to the arduino which gives timely alert in case of abnormalities using IoT platform.

V.   IMPLEMENTATION

This system is implemented in two modules:

i.   IoT

ii.   Web Application

i.   *IOT*

Internet of Things is connecting things together for a purpose to be done. Similarly in this project we have connected various sensors together to the Arduino UNO R3.

The sensors used are Heart rate sensor, Blood Pressure sensor, Temperature sensor and Accelerometer sensor. The values which are read is displayed on the LCD and the data is sent to Web Application using serial communication.

The GSM Modem is given to send message to the guardian and the gynaecologist if there are any abnormal conditions found in the measured parameters to take necessary actions.

There is also a buzzer that gives alert in case of abnormalities.

ii.   *WEB APPLICATION*

This web application is developed for the ease of doctors and patients. This web application consists of three modules.

a)   Admin

b)   Doctor

c)   Patient

d)   Guardian

e)   Forecasting

f)   Notification

Admin

The admin is the hospital receptionist who in take the patient. The patient details are taken and a new login is given to the patient. The admin also allocates the patient to a particular doctor.

Doctor

In this module the list of patients are displayed when clicked on a particular patient the details of the patient will appear. The doctor can prescribe any medications if necessary through the web application. To view the measured parameters of the patient the doctor needs to enter a key which will be sent to their respective email given during the registration. Here the Diffie Hellman Key Exchange is used to keep the details of the secure.

Patient

In the patient module the prescription of the doctor is viewed and also to view the data that is being read also uses diffie hellman key exchange.

Guardian

The details of guardian can be entered. The guardian and patient can login and view the data. If any abnormal condition is occur and the notification will be sent to the guardian.

Forecasting

The patient's data can be predicted and medicines can be prescribed by the doctor.

Notification

The notification can be sent to the doctor, and guardian or patient
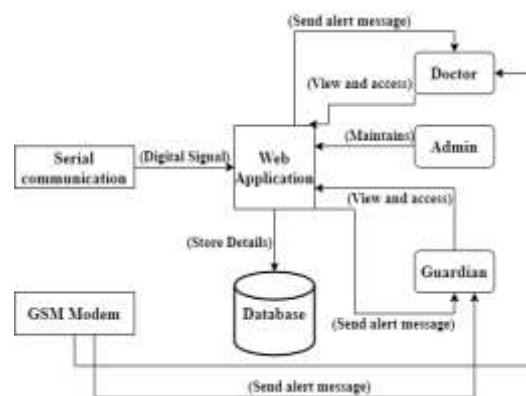

Fig: Architecture of work flow

VI.   FUTURE SCOPE

In future work, we can involve more sensors that measure a variety of other health parameters of pregnant women. We can also extend the framework to implement various security algorithms to provide more security and privacy.

VII.   CONCLUSION

Due to carelessness there is high mortality rate in many countries. Therefore, in this paper we have built a system to reduce some of the common problems faced by the pregnant women. This system is built in a compact way where it can be wearable. We have used some sensors like the Temperature sensor, Heart rate and blood pressure sensor to frequently monitor all these parameters. The readings are taken and stored in a database so that the gynecologist can view it any time in case of any abnormal conditions. When some abnormal conditions are detected a message is sent to the gynecologist and the guardian of the patient so that necessary actions would be taken. Therefore this system helps to reduce the mother and fetus mortality rate.

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