IOT Based Wearable Health Monitoring System for Pregnant Ladies Using CC3200

V.Santhi[1],K.Ramya[2],APJ.Tarana[3],G.Vinitha [4]
Department of Electrical and Electronics Engineering
Knowledge Institute of Technology
Salem,Tamilnadu
ramyaeee64@gmail.com,vinithaeee96@gmail.com

Abstract—The world mortality rate has decreased but many women are still dying every day from pregnancy complications. Various technic resources are being used in an integrated manner in order to minimize even more the death of both mothers and babies. Pregnant women from rural areas can't do their regular checkups at the early stage of pregnancy. But routine checkup can avoid birth of physically challenged infant in this system. Some vital parameters of pregnant women like pressure, temperature, heartbeat rate are monitored and measured. This project provides a wearable device which will continuously monitor the vital parameters to be monitored for a patient and do data logging continuously. If any critical situation arises for a patient, this unit rise an alarm and communicates to the web app using WIFI which is in-built in CC3200.It will collect and transfer the information to the doctor at the earliest because of IoT and the product is compact and wearable.Also in this proposed system IoT has been implemented and its related technology plays a dynamic rolein pregnant women. IoT ensures the effective and efficient care of pregnant women in any environment .The usage of these advanced technologies in pregnant women care environment, absolutely eradicates the pregnancy complications and harmful incidents.

Keyword—*Blood Pressure, Heart Beat, Temperature Sensor, IOT,CC3200*

I. INTRODUCTION

According to present scenario, people prefer to consume junk foods due to work pressure which is unhealthy and it leads to obesity.Due to technological development and environmental factors people suffer because of stress which will mainly affect the pregnant ladies.Hence it is our duty to resolve the health issue of pregnant women. This paper presents a healthcare solution that combines web app and CC3200 techniques in a wireless sensor network to monitor the health condition of patient and provide a wide range of effective, comprehensive, and convenient healthcare services. The specialist staying at a distance can monitor the pregnant ladieshealth condition so that he can save the life of the patient and also the infant.IOT technology is used so that we can monitor the patient condition easily from anywhere. measures the health parameters dynamically and is connected to cloud using IOT, according to the concept of CC3200. This paper presents a working model which incorporates sensors to measure all these parameters like body temperature,pressure and pulse rate which is transferred to the microcontroller CC3200, so that the patient condition can be analyzed by doctors in any part of the hospital wherever they live.When patient reaches abnormal

condition, an alarm will be passed to both the doctor and to the relation of the patient.

II. SYSTEM COMPONENTS

A. Hardware Components

This section discusses the basic theory of components used for this work.

- Microcontroller – CC3200
- Heart Beat sensor
- Temperature sensor
- Pressure Sensor
- Rs232 - MAX232
- WIFI in-built in CC3200
- Power supply circuit

B. Software Used

- Embedded C

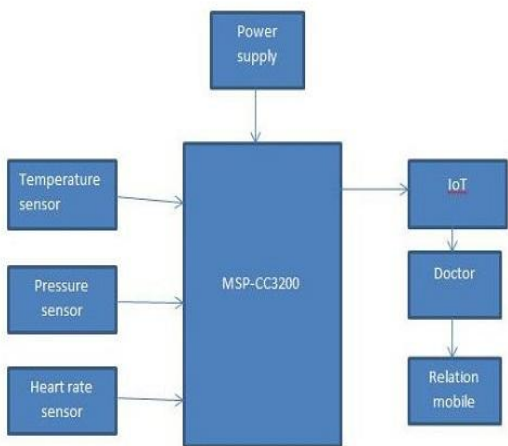## III. System Design and Implementation

Fig.1. *Block diagram of Wearable Health Monitoring System for Pregnant Ladies*

The real time implementation and design procedure of the system is discussed in this section. In the schematic block diagram, the working principle of IoT based wearable health monitoring system using CC3200 is explained. Block consists of temperature sensor, pulse sensor, pressure sensor and CC3200. The sensing part will sense the temperature, pulse rate and pressure of the pregnant women and it sends analog signal to the microcontroller CC3200. The controller consists of in-built ADC and wifi module. Hence the analog input signal is converted into digital signal which is then transferred to cloud. In transmitting part, the information is send to the pc of doctor via an IP address. If the values are abnormal i.e., varying over a small range than the preset value, this information will be received by the doctor along with an alarm sound. Hence the doctor will send back prescription to the patient's IP address.If the values exceed than a critical range then the doctor will call the ambulance and this information will be send to the relative of the patient along with an alarm.

IV. Features of CC3200

- 32-bit ARM Cortex-M4 architecture optimized for small-footprint embedded applications.
- 80-MHz operation
- Fast interrupt handling
- Low-power consumption with multiple sleep modes.
- 3-stage pipeline Harvard architecture
- Thumb-2 mixed 16-/32-bit instruction set delivers the high performance.
- 32-bit ARM core in a compact memory size usually associated with 8 and 16-bit devices.
- 16-bit SIMD vector processing unit.
- Deterministic, high-performance interrupt handling for time-critical applications.

Fig.2. MSP─CC3200(In build wifi board)

V.EASE OF USE

A.Temperature Sensor

It measures hotness and coolness of an object.Its working base is voltage which is read across the diode.When voltage increases temperature also rises.It records voltage drop between voltage base and emitter.The amplification of difference in voltage will generate analog signal that is proportional to temperature.

B. Pressure Sensor

It is also known as pressure transducer.It converts pressure into an analog electrical signal such as voltage or current output which can be measured easily.The force applied will deflect the diaphragm inside the transducer which is measured and converted into electrical output.It can be monitored by programmable controllers,microcontrollers and computer.Mostly transducers are deigned to produce linear output.

C. Pulse Sensor

Taking your pulse is simple as holding a finger to your neck or wrist and timing the beats with your watch.But if you want to record the data or use it to trigger events, you need to turn mechanical pulsing signal into electrical signal.This sensor fits over fingertip and uses the amount of infrared light reflected by blood circulation.

VI. LITERATURE SURVEY

A. Smart Health Monitoring System Using GSM Technology for Pregnant Lady

This paper is developed for continuously monitoring the health condition of pregnant ladies. Due to lack of hospital facilities in villages and no proper checkups of pregnant ladies in many areas will affect the pregnant women and her child. Which will also increases the risk of pregnancy and death of both women and child or any one. Constant health monitoring of pregnant women with proper supervision will reduces the risk of pregnancy and costly hospitalization. In addition to that the death rate of pregnant women can be reduced. The health monitoring device recommends that it will continuously monitor the body temperature and heart rate of patient. If there is any variation in normal value, the information about her health condition is passed to the patient's personal doctor form her mobile. This device also helps to hear the instructions and prescription which is given by the doctor. In this proposed system IoT(internet of things) also implemented which will helps the patient to get advices from doctor from any place at any time. The main objective of this paper is to avoid the complications in pregnancy and destructive occasions.

B. Health Monitoring System for Pregnant Women

Now a day's technology plays the vital role in health monitoring system.It is sensory device for various medical parameters.In rural areas, People are not really worried about their health because of

absence of hospitals in the adjacent areas and also they need to travel extended space even for lesser wound and routine checkups. At the initial period of pregnancy they don't do their regular checkups because of the predictable scans which can avoid birth of handicapped kids and other problems in fetal body. For example, pregnant women must be accomplishing Ultra rigorous scans minimum two times during pregnancy stage to familiar with fetal growth. This project describes, important parameters of pregnant women like temperature, pulse rate and kicking of child are restrained and the information is stored in memory card. By using the mobile application the information about pregnant women can be retrieved which will compare the previous and present report to form the graph. This comparison chart will be displayed in the mobile.

C. Prediction Based Health Monitoring in Pregnant Women

Gestation or pregnancy a stage where women undergo several physiological changes, sometimes inducing complications turning severe and initiating instances leading to death of both mother and fetus. Pregnant women must thus be protected from complications arising during gestation period. Several classification algorithms are successfully implemented in several fields. Decision Tree Classification Method is one efficient method best suitable for medical diagnosis. A popular algorithm C4.5 Decision Tree classification algorithm is appropriate for classifying the pregnancy data. The algorithm constructs a learning model from the training data and later risks in pregnancy are predicted for unseen pregnancy data. The main aim of this paper is to optimize performance of C4.5

classification algorithm by applying on standardized and appropriate format of data. The paper highlights the effective performance achieved by C4.5 classifier in accurately predicting risk levels during pregnancy from the collected, standardized and transformed data efficiently.

VII. APPLICATIONS

- Hospitals
- Remote heart rate monitoring applications
- Local monitoring applications

VIII. ADVANTAGES

- Ease of operation
- Low maintenance cost
- Fit and forget system
- No wastage of time
- Durability
- Wearable device
- Compact in size

IX. Conclusion

Currently available system is not compact and wearable.Hence it occupies more space and measurement capacity is not that good.But the system we proposed will collect and transfer the information to the doctor at the earliest because of IoT and the product is compact and wearable.So, it is easy for the doctor to analyze the health condition of patient continuously. Since we use IoT, it is easy to retrieve the previous record which is used for analyzing during complications. CC3200 of TI Company is used for complete process which is cost efficient, the results are accurate and precise. It helps pregnant ladies to avoid miscarriage and the doctors are able to suggest healthy diet to the women from their place itself through IoT.

References

1. Media Aminian and Hamid Reza Naji "A Hospital Healthcare Monitoring System Using Wireless Sensor Networks,", Department of Computer,Science and Research branch, Islamic Azad University, Kerman, Iran and College of Electrical and Computer Engineering, Kerman Graduate University of Technology, Iran, vol 4, 2013.

2. Tia Gao, Dan Greenspan, Matt Welsh, Radford R. Juang, and Alex Alm, "Real Time Patient Monitoring System Using Lab view", *International Journal of Scientific & Engineering Research*, April-2012.

3. Sherin Sebastian, Neethu Rachel Jacob, "Remote Patient Monitoring System Using Android

Technology", IJDPS, September 2012. PremaSundaram, *InternationalJournal of Computer Science and Mobile Computing* Vol.2 Issue. 5, May- 2013, pg. 191-201 ©2013, IJCSMC All

Rights Reserved 201.

4. Darwish A, Hassanien AE (2012) Wearable and Implantable Wireless Sensor Network Solutions for Healthcare Monitoring. Sensors 12: 12375-12376.