Smart Health Monitoring System for Pregnant Ladies

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Abstract -Health monitoring system plays a vital role in hospitals for the rapid decision making and treatment through the high-speed medical data transfer to the physicians. Sendingthe medical data to physicians over mobile for consulting and remote medical examinations. In this way, the patient's dynamic signs like heart rate, blood pressure, temperature, heart rate of fetus are captured. These values are transferred to database, to upload on the thinkspeak server. Data from thinks peak server can be monitored from any corner of the world.
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***Key Words*:**blood pressure, heart rate.

1.INTRODUCTION

People in rural areas are not really concerned about their health, because of unavailability of hospitals in the nearby areas and they need to travel long distances even for routine check-ups. Pregnant women from rural areas are not aware about their regular check-ups at the early stages of pregnancy. Routine check-ups can avoid birth of children with physical and mental disabilities. Also helps in reducing foetal mortality rate to a very large extent.Stillbirth prevention requires high quality healthcare and early detection [1]. Continuous monitoring of foetal heartbeat can be one of the ways to reduce pregnancy complications and even stillbirths. A doppler ultrasound transducer is found to be one of the possible devices that can be adopted for long-term monitoring of the foetal heartbeat at home. In wearable health monitoring system for pregnant ladies, some vital parameters of pregnant women, like temperature, heart rate ofmother and of foetus, blood pressure and kicking can be measured.

2. WORKDONE

2.1. **Literature survey**

Anandhi Ramachandran.et.al.[2]havedescribed wearable sensors monitoring of high-risk pregnancies.Pregnancy complications increase the risk of maternal and infant death such as miscarriage, stillbirth, and preterm birth. Women going through high-risk pregnancies may require complex care involving lifestyle modifications, pharmacological and technical support and even hospitalization. They proposed theoretical and conceptual framework in which they showed the use of wearable sensors in remote monitoring of high-risk pregnancies. Thus, the integrated system enables healthcare worker to do continuous monitoring of vital parameters of pregnant women through wearable sensors. This will improve timely communication between relevant stakeholders and help in reducing maternal mortality occurring due to lack of timely help.

Jennifer Runkle.et.al.[3] have proposed Use of wearable sensors for monitoring the health of pregnant women. Descriptive findings from the perspective of patients and providers. In proposed survey they work on wearable sensors, smart textiles, and other mobile health innovations, presenting exciting new opportunities to enhance the diagnosis, clinical monitoring, and management of pregnancy health outside of traditional care settings. Pregnancy is a stage of life that involves rapid physiologic and behavioral changes and some high-risk women may benefit from more vigilant outpatient monitoring. In the areas of women health, smart technology has already been used to motivate countless, to improve patient compliance in chronic disease care including diabetes, heart diseases, breast cancers, and osteoporosis and to support mental health.

Gayathri S. et.al.[4] have developed Pregnant Women health Care Monitoring System Based on IOT pregnant women who stays in home during post operational days. Checking is done either via overseer/ medical caretaker. They worked on this problem and proposed framework which can check the health from time to time. They used heart rate sensor, temperature sensor, MEMS sensor, Wi-Fi module and Arduino to gather the data on cloud storage.

Shruthi.T.et.al.[5] have proposed Fetal Health Monitoring System. It uses sensors to measure the necessary human target parameters like heartrate, body temperature, Respiration, SPO2(stamina). ECG which is transferred to the Personal Computer via embedded microcontroller pic16f877a, then this data is transferred to the specialist at distant hospital for consultation.

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2.3. Block diagram

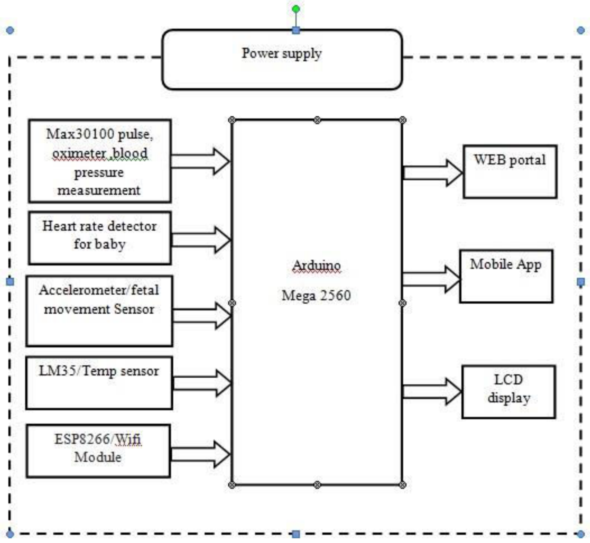

Fig.1 block diagram.

Heart rate detector

Heart rate sensor / pulse sensor (SEN-11574) clips onto a fingertip or earlobe.

Oximeter

Pulse oximetry is a non-invasive method for monitoring a person's oxygen saturation (SO2). Though its reading of SpO2 (peripheral oxygen saturation) is not always identical to the more accurate reading of SaO2 (arterial oxygen saturation) from arterial blood gas analysis, the two are correlated well enough. This is safe, convenient, non-invasive, inexpensive pulse oximetry method which is valuable for measuring oxygen saturation in clinical use.

A blood-oxygen monitor displays the percentage of blood that is loaded with oxygen. More specifically, it measures what percentage of hemoglobin (the protein in blood that carries oxygen) is loaded. Acceptable normal ranges for patients without pulmonary pathology are from 95 to 99 percent. For a patient breathing room air at or near sea level, an estimate of arterial pO2 can be made from the blood-oxygen monitor "saturation of peripheral oxygen" (SpO2) reading.

The sensor used for oximeter is MAX30100 which gives the approximate amount of oxygen in blood. Pulse oximetry operates on the red and IR light absorption characteristics of oxygenated and deoxygenated hemoglobin. Blood oxygen concentration can be calculated from the ratio between the absorption of red light and IR light by the hemoglobin. Heart rate is detected by the change of blood volume throughout the finger which is quantified by the amount of light that passes through the finger.

The MAX30100 is an I2C device which requires the Wire library to interface with the Arduino. Physically, the MAX30100 (in this case, the breakout board) is connected to the Arduino through special pins that are able to read data from the SCL and SDA lines, which are A4 and A5. The SCL and SDL lines provide the data signal and the clock signal. The ground and VIN lines are connected to the GND and 5V lines respectively.

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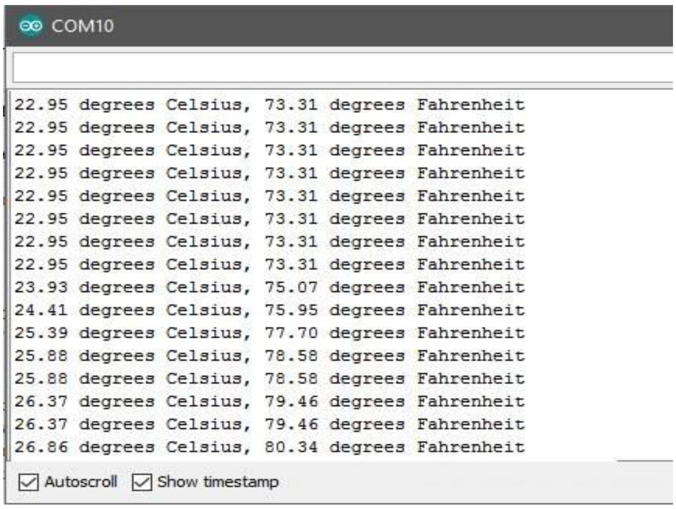
Temperature control (thermoregulation) is part of a homeostatic mechanism that keeps the organism at optimum operating temperature, as the temperature affects the rate of chemical reactions. The range for normal human body temperatures, taken orally is 36.8±0.5 °C (98.2±0.9 °F). This means that any oral temperature between 36.3 and 37.3 °C (97.3 and 99.1 °F) is likely to be normal.

Reported values vary depending on how it is measured: oral (under the tongue): 36.8±0.4 °C (98.2±0.72 °F), internal (rectal, vaginal): 37.0 °C (98.6 °F). A rectal or vaginal measurement taken directly inside the body cavity is slightly higher than oral measurement and oral measurement is somewhat higher than skin measurement. Other places, such as under the armor in theear produces different temperature values. While some people think of these averages as representing normal or ideal measurements, a wide range of temperatures has been found in healthy people. The scale factor is .01V/

3. RESULTS AND DISCUSSION



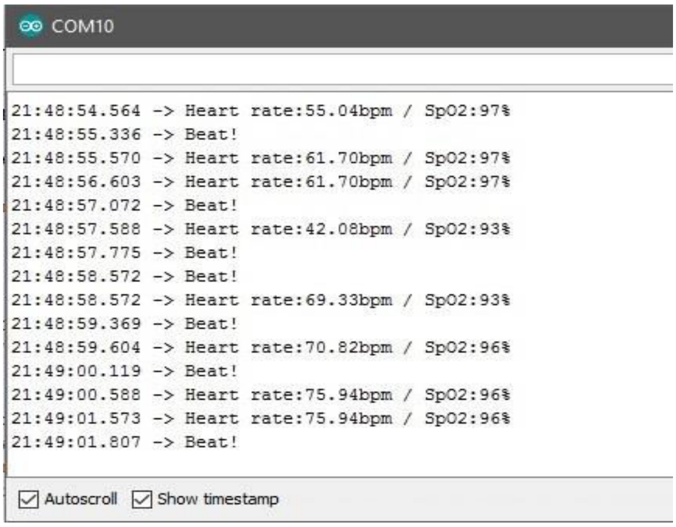


Fig.330100 results.

4. CONCLUSIONS

This system will be used for health monitoring in which we have used heart rate sensor, oximetry sensor, blood pressure sensor, temperature sensor and for connectivity to the internet we have used ESP8266 module. The ESP module continuously tries to establish a connection over internet. Once connection is established, the data from heart rate sensor, blood pressure sensor and temperature sensor are processed by Arduino board and then the data is uploaded on thinks peak server. The data from thinks peak server can be monitored by suggested physician.

5. REFERENCES

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