WEARABLE HEALTHCARE DEVICE FOR PREGNANT WOMEN

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Abstract - Human resource is the backbone of developing and under developed nations. In developing nations like India, rural areas are more when compared to the cities. People in rural areas are not really concerned about their health, because of unavailability of hospitals in the nearby areas and also they need to travel long distance even for small injuries and routine checkups. Pregnant women from rural areas don't do their regular checkups at the early stage of pregnancy. The mobile application can access this information and can check for emergency condition.. The project aim is to design a connected wearable healthcare device to monitor pregnant women health status continuously and provide timely alert as they go about their everyday lives. The device has sensors built into it to provide vital health data of the mother in the later stages of pregnancy. While detecting an abnormal event the device issues alert to the family members and doctors by communicating with a custom smartphone app over internet and can also send e-mail to them. An emergency button helps the mother to call for help.The device monitors the mother's physical activity, sleeps quality, heart activity and infrared body temperature helping the doctor to analyze the condition. Heart rate is measured by an optical heart rate sensor circuitry. Respiration rate sensor enables to measure the breathing rate by detecting changes in temperature when the patient breathes in and out. A 3-axis MEMS accelerometer sensor helps to know the daily body activity of the monitored women.

Key Words- Vital parameters- physical activity, sleeps quality, heart activity, body temperature.

1. Introduction:

In this paper smartphone app allows the user to monitor and control the device from a remote place. The smartphone GUI is created using Blynk app that is readily available for download for both Android and iOS. Blynk is a smartphone app that allows the developer to create a custom UI according to the application requirements. It leverages the resources of a smartphone and provides a set of widgets that helps to create the custom user interface. There are many cloud platforms available. In our case, we are going to use Blynk cloud server and

Blynk smartphone app for its ease of use and simplicity. The connection to the internet is based on Wi-Fi. The project hardware has to be registered with the Blynk server. An authentication token is issued by the server while creating the project. This token will be used as a unique identifier that allows connecting the hardware to the smartphone app. The cloud is capable of managing all forms of communication, between device to device, device to server and server to web application over internet. The Blynk server will be running a custom protocol for this communication and the Blynk library provided handles that.

2. Literature Survey:

Here is a brief description of how the system functions.[1] Overall, our system has hardware and a software part. The hardware part comprises of electronic gadgets that are attached to the body of the pregnant woman. The function of the gadgets is to perform ultrasound scan and also to measure the heart rate, temperature, pressure and ECG. Each patient is provided a unique memory card where their details are stored. Readings from the gadgets are also stored into this memory card. We need the service of an experienced health care worker to monitor all these activities. The software part comprises of two applications: an android mobile application and a windows desktop application. With the help of Arduino Bluetooth shield, values from the gadgets are sent to the mobile application via Bluetooth.

In this, an Optimistic Medium Access Control (OMAC) has been proposed and evaluate to transmit the packet when the leg is at the most forward position [2]. OMAC uses the accelerometer measurements to predict the leg movement of the users. It assumes that the walking paces and strides are similar and a predetermined accelerometer threshold is applied to detect the best transmission period. However, different users may exhibit different walking patterns that can affect the accelerometer reading. The OMAC was not able to accurate predict the forward leg position when the user is walking in uneven and dynamic stride or running. The distance and relative antenna orientation between the BSN transmitter and receiver changes for different activities. This affects the accelerometer reading used by OMAC to predict the forward leg position.

Hypertensive disorders are the most common problems during pregnancy. They cause about 10% of maternal deaths [3]. 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. Mobile devices with Internet access have a great potential to expand actions of health professionals. These devices facilitate care with people that are living in remote areas, assisting in patient monitoring. Information exchange anywhere and anytime between experts and patients could be an important way to improve the pregnancy monitoring. This paper presents a mobile monitoring solution using body sensors to identify worsens in the health status of pregnant women suffering hypertensive disorders. This mobile application uses Naïve Bayes classifier to better identify hypertension severity helping experts in decision making process. Results show that the proposed mobile system is promising for monitoring blood pressure disorders in pregnancy.

With an increasingly mobile society and the worldwide deployment of mobile and wireless networks, the wireless infrastructure can support many current and emerging healthcare applications.[4] This could fulfill the vision of "A Pervasive Health System

Integrating Patient Monitoring" or healthcare to anyone, anytime, and anywhere by removing location, time and other restraints while increasing both the coverage and the quality. The pervasive healthcare applications include pervasive health monitoring, intelligent emergency management system, pervasive healthcare data access, and ubiquitous mobile telemedicine. The design and development of a pervasive health system enabling self-management of chronic patients during their everyday activities. The proposed system integrates patient health monitoring, status logging for capturing various problems or symptoms met, and social sharing of the recorded information within the patient's community, aiming to facilitate disease management.

In the last decade the healthcare monitoring systems have drawn considerable attentions of the researchers.[5] The prime goal was to develop a reliable patient monitoring system so that the healthcare professionals can monitor their patients, who are either hospitalized or executing their normal daily life activities. In this work we present a mobile device based wireless healthcare monitoring system that can provide real time online information about physiological conditions of a patient. Our proposed system is designed to measure and monitor important physiological data of a patient in order to accurately describe the status of her/his health and fitness. In addition the proposed system is able to send alarming message about the patient's critical health data by text messages or by email reports. By using the information contained in the text or e-mail message the healthcare professional can provide necessary medical advising. The system mainly consists of sensors, the data acquisition unit, microcontroller , and software (i.e., LabVIEW). The patient's temperature, heart beat rate, muscles, blood pressure, blood glucose level, and ECG data are monitored, displayed, and stored by our system.

3. Existing System:

In the existing system they have used GSM and sends all the information about pregnant women to doctors. It monitored only the heartbeat rate and blood pressure in the exiting system.The system is capable to identifying if they suffers with another hypertension disorder. An algorithm to predict all kinds of abnormal condition is not possible. Still, taking these parameters into account, an algorithm is implemented to notify critical condition. Initially, the health care worker can attach the electronic gadgets to the body of the pregnant woman. The mobile application is designed in such a way that, it searches for the Bluetooth shield from which all the data are read into the application via Bluetooth. Out of the measured parameters, temperature, pressure and heart rate are passed on to the mobile application. OP number of the patient uniquely identifies each patient according to the hospital records. OP number, age and month of the pregnant woman is fed into the application. The algorithm notifies the critical condition and thus prompts for sending an SMS with all the patient details like OP number and readings to the concerned doctor for immediate action to be taken. The drawbacks in this paper are the health status can be sent to only nearby Bluetooth devices.

4. Proposed System

In proposed system Respiration sensor, mems sensor are been used .It sends the information not only to doctors but also to family members. Internet of Things is a concept in which devices used daily by people are equipped with sensors capable by capturing aspects of

real world as temperature, humidity, presence, etc and send data to a repository to receive this information and use them smartly. Enables the pregnancy condition to be monitored without having to see the doctor thus avoiding the frequent hospital visits and travel related to that. Provides safety by connecting her with other family members all the time. Helps physicians to detect symptoms that may lead to complications in pregnancy earlier. Using non-invasive sensors avoid the potential harm to tissue posed by ultrasonic devices and are perfectly safe for both the mother and baby during continuous monitoring. Using Wi-Fi allows the data to be stored on a secure cloud-based database accessible only by authenticated doctors and faIts light weight, mobility and continuous monitoring benefit the doctors by avoiding the bulky machines needed which are heavy and connected to the wall power. Helps to predict about events of pregnancy ,like preterm labour, like preeclampsia and more to be able to intervene in the right time.

5. Conclusion

Enables the pregnancy condition to be monitored without having to see the doctor thus avoiding the frequent hospital visits and travel related to that. Provides safety by connecting her with other family members all the time. Helps physicians to detect symptoms that may lead to complications in pregnancy earlier. Helps to predict about events of pregnancy, like preterm labour, like preeclampsia and more to be able to intervene in the right time. Its light weight, mobility and continuous monitoring benefit the doctors by avoiding the bulky machines needed which are heavy and connected to the wall power. Using Wi-Fi allows the data to be stored on a secure cloud-based database accessible only by authenticated doctors and family members.

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