Health Monitoring System for Pregnant Women

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Abstract

Human resources 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. Routine checkups can avoid birth of handicapped children and also helps in reducing fetal mortality rate to a very large extent. in this system, , some vital parameters of pregnant women, like temperature, heartbeat rate and kicking are measured and are stored in a memory card. the mobile application can access this information. This system compares previous report and the present report and gives to the user in the form of graph.

Index: *Arduino kit, Bluetooth, sensors.*

I. INTRODUCTION

It is the responsibility of a nation to provide food, education and medical care to its citizens. Fulfilling this can promise effective efforts by human resource for the nation's development. Efforts should start right from providing timely and quality health assistance to pregnant ladies which will lead to the birth of healthy children. Here comes the need of technology which helps to take care of them. People in rural areas are not aware of proper medications and technological advancements toalleviate complications during pregnancy period. For instance, pregnant women should perform Ultra sound scans at least 2 times during pregnancy period to know more about fetal growth. Moreover, proper and timely checkups can ensure safe delivery. Women in rural areas lack knowledge about importance of proper medication. Medical Expenses are also unaffordable to them. Therefore in this system, some vital parameters like heartbeat, temperature and Kicking is measured. Sensors are attached in this system thus it helps to take reading and display on your mobile.

II. LITERATURE SURVEY

A. *Health Monitoring Laboratories by Interfacing Physiological Sensors to Mobile Android Devices:* SuhasRanganath-Mahesh.K,

Thispaper describes, Android Java-DSP (AJDSP) as a mobile application that interfaces with sensors and enables simulation. This also helped in visualization of signal processing. In this system firstly there is creation of interface between both external sensors and on-board device sensors for monitoring the physiological parameter of human being. This paper also explored the trend of mobile sensing and adapted it towards improving digital signal processing (DSP), by building interfaces to medical sensor and external sensors. In this paper there is use of SHIMMER. It is a small wireless low-power sensor International Journal of Advance Foundation and Research in Computer platform that can record and transmit physiological (Health related like ECG) and kinematic data in real-time. The drawback of this system is that it only monitors the patient which is admitted in the hospital. In this low power sensor are used.

B. *Smart Elderly Home Monitoring System with an Android Phone:* Kenny T.H. Chieng Dr. Lee JerVui, Chuah Yea-Dat el al

This paper considers or takes into account certain facts, which are heart attack and stroke as they are the major cause of hospitalization of the elder people. There is more chances of survival if the older people gets the treatment within an hour. it had also been developed. An android smart phone with accelerometer is used to detect a fall of the carrier, and this android device is known as healthcare device. The android phone is then connected to the monitoring system by using the TCP/IP protocol through Wi-Fi. Because of this system, elderly and chronically ill patients can stay independently in their own home and secure in the knowledge that they are being monitored. The drawback of this system is that it only considers elder people as there is more chances of sudden (emergency situation) outbreak in them like heart attack and stroke.

C. *Design and Implementation of Wearable ECG System:* ByungkookJeon, Jundong Lee, JaehongChoielal,

This system describes the design and implementation part of wearable ECG with the smart phone for the real time monitoring of health. In this system smart shirt are developed with ECG sensors and

can be worn by any type of patient for monitoring his or her health in real time and get required treatment or prescription. These systems are mainly developed considering elder people in mind as they live alone in their homes. Therefore this system basically monitors the elderly people for self diagnosis purpose. The result of this system was the system could monitor and diagnose patients' heart conditions in real time, when they wear a sports-shirt with a ECG sensor in it. In addition to this, the system also provides graphical information with history management tools and an automatic emergency call system to the patient to get the required treatment in time. The drawback of the system is that it only concentrates on elder people and it includes shirt (ECG sensor) for wearing which cost a lot.

D. Remote patient Monitoring System:

YeduManmadhanAn and V.R.M.J. JayashreeSherin Sebastian, Neethu Rachel Jacob

This paper provides the image based system which acquires the ECG signal via digital camera; this information is performed on the tool like MATLAB and data sending through the internet network and stored in database. Then the original image is then availed to the doctor via Android mobiles. The purpose of this system is the vital signs and parameters from the ICU monitoring system and makes this data to be available to the doctor who may not be in the hospital and in the country. In case of any abnormality, the doctor is alerted by sending a notification from C2DM server to his mobile. The drawback of this paper is that, due to the slow internet connection the data will not be send to the doctor which is located remotely. The image is captured through the camera, which must be HD which cost a lot.

E. Hospital Health Care Monitoring System using Wireless Sensors Network:

Naji HR Aminian M. Ael al, International Journal of Advance Foundation and Research in Computer.

In this paper there is continuous observation of the patient's physiological parameters such as blood pressure of patient as well as heart rate. This system is mainly useful for pregnant women to measure the various parameters like blood pressure, heart beat and fatal movement to control the health issue. This system has to monitoring more than one patient at a time and easily able to sense the blood pressure (BP) and heart rate of the patients. In this system, there is a sensor node attached to body of patient to measure signals from the wireless sensors and sends these signal to the database. This system can detect the abnormal conditions of the patient, raise an alarm to the patient and sends a SMS/Email to the doctor for treatment. The main advantage of this system is to increase the freedom for enhancing patient's quality of life. The demerit of this system is that in this the patients need to get admitted in the hospital for continuous monitoring of the patient physiological parameters. This WSN gets complicated if number of patient is admitted in the hospital beyond the specified limit.

F. Wireless Health and the Smart Phone Conundrum:

HydukeNoshadiMajidSarrafzadeh William Kaiser Jonathan Woodbridge, AniNahapetian.

This paper tells us that, they implemented wireless healthcare by sensor communication, data processing, data visualization etc on different mobile platforms. There is central controller for wireless health application. They developed libraries for particular mobile devices to implement the health care on different platforms. CDMA and UTMS have more network then Bluetooth and Wi-Fi, and all this cellular connectivity is supported by mobile platforms. They started by, assessing the best smart phone platform for the health care, next they determine the runtime environment to the smart phone platform and finally they developed the wireless health application for that particular platform. They provide different and better debugging environment for different platforms. The drawback of this paper is that they do not represent the complete wireless heath software library

G. Android ECG Application Development:

BehutiyeWoubshet,

The paper describes the design and implementation part of ECG application. The main purpose or objective of this paper was to use the power of android platform and produce a prototype model of ECG application. It performs its works with VS100, Bluetooth ECG monitoringdevice. This paper also describes the architecture, development environment and tools that are used in android mobile application development. The tools used in development process or phase are Eclipse, Android SDK, ADT plugging for Eclipse. This device monitors Heart Rate via Bluetooth communication. The result of this paper was communicating with vital sense device via Bluetooth communication. The demerit of this system is that it monitors only ECG and not other parameters like temperature.

H. Mobile Health Care System Using NFC Technology:

A Devendran, Dr T Bhubaneswar, Arun Kumar Krishnan.This paper tells us that the patient monitors his or her health which may be physical or mental, through the mobile devices and gives extra information like location of user and provide the security and reliability. New technology is used for this

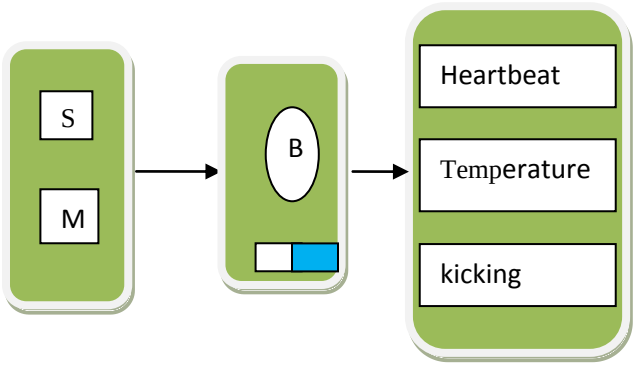
purpose. To maintain the security they use a wireless Technology called as NFC (Near Field Communication Technology for the Future) which interacts with the electromagnetic radio fields. NFC technology is used to access the patient information, and this information is stored in hospital EMR Database. Doctor refers to the data instead of going via the paper. When the patient gets discharge all the details will be transferred to the NFC tag from EMR The drawback of this paper is that, this system mainly emphasis on the database security rather than providing service like nearest hospital list and alert to the family members. International Journal of Advance Foundation and Research in Computer

I. Mobile Phone Sensors in Health Applications:

EvgenyStankevich, ILYA Paramonov, Ivan Timofeev el al,[9] This papers tells us that mobile health uses embedded sensors and their applications 1. Microphone Sensors-Use to access patients feels i.e. my tonic syndrome 2. Camera Sensors-Provides information about images and videos. 3. Acidometer Sensors-Purpose of this system is to track the person's physical activity. The purpose of this paper is use applications of embedded to mobile phone sensors. The drawback of this system are that various sensors are used which cost a lot.

III. ARCHITECTURE

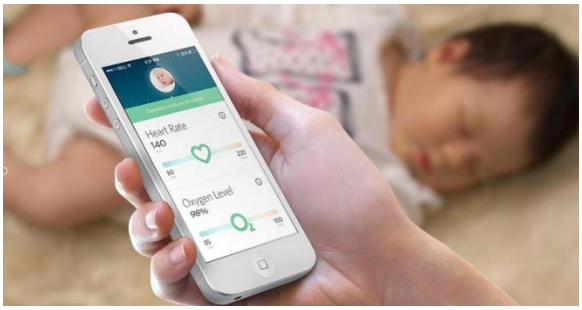
Women in rural areas lack knowledge about importance of proper medication. Medical Expenses are also unaffordable to them. Therefore in this system, some vital parameters like heartbeat, temperature and Kicking is measured.



Alert mechanisms are highlights of our system. It helps to get details about health condition of pregnant women in rural areas thus providing portable mobile health care system that helps in proper diagnosis at early stages of pregnancy thereby it helps in reducing fetal and maternity mortality rate.

A. Heartbeat

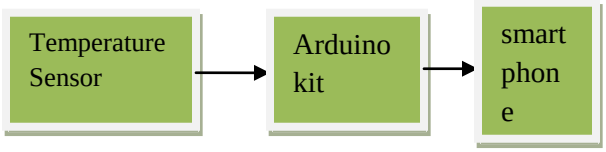
The Fetal heart rate is measured using heartbeat sensor. The signals from the electrodes are using an instrumentation amplifier and then filtered to the required band of frequency. The output signal is given as input to the Arduinoitsexceeds a particular threshold. Pulse rate sensor is used for maternal pulse rate measurement. This is also given as input to the Arduino.



B. Temperature Measurement

The temperature sensor LM35 is used in this system.LM35 series temperatureSensors belong to precision integrated-circuit temperature sensors. The output of the sensor is linearly proportional to theCelsius (Centigrade) temperature.Temperature sensor is used for temperature measurement of the mother and sends it to Arduino is a microcontroller which will take these signals as inputs and is programmed using Arduino software to get the desired output.16 by 4 LCD displays the output values of these blocks which are given from Arduino.A piezoelectric buzzer gets input from the Arduino and it alarms every time any value

Fig.1. Block Diagram of Temperature Measurement.



The analog output from temperature sensor is connected to ADC input of friendly ARM kit. There are ten ADC Channels in this development kit used for various purposes like touch screen and so. This systemwe are using Channel 0 of the ADC in 12-bit mode to measure temperature as shown in block diagram Fig.1. The working of ADC in ARM processor goes on the following sequence. The mode selection to select 10bit/12bit conversion. The channel selection input given to select desired channel, here it is channel 0. Followi0ng channel selection analog MUX connects the selectedchannel conversion unit.Then the start conversion (SOC) is given to ADC.After receiving the end of conversion (EOC) from ADC, the digital output data is readout from the ADC.All the above said

operations are in I2C protocol. To make user-friendly flexible development, the Friendly ARM kit gives a function “Hardware controller readadc( ) “Which takes care of all the actives of ADC pertaining to reading a digital data of given analog input channel and returns value of the analog input. The value returned by the function is a raw digital data of the analog input signal. This value most be normalized.

C. Kicking

When the baby's first movements, called "quickening," between weeks 16 and 25 of your pregnancy.During pregnancy, some women start to feel movements as early as 13 weeks. You're more likely to feel baby move when you're in a quiet position, either sitting or lying down.Pregnant women describe their baby's movements as butterflies, nervous or a tumbling motion. At first, it may be hard to tell whether your baby has moved. Second- and third-time moms are more adept at distinguishing those first baby movements from gas, hunger pangs, and other internal motions. Babies tend to move more at certain times of the day as they alternate between alertness and sleep. They are usually most active between 9 p.m. and 1 a.m. as trying to get to sleep. This surge in activity is due to changing blood sugar levels. Babies also can respond to sounds or touch, and may even kick your partner in the back if you snuggle too close in bed.

IV. CONCLUSION

In mobile Application, some vital parameters for pregnant women like temperature, heart beat ratesensor are detected through haptic vibration for kicking counter, and also provides notifications to patients, in the android application.Our system tries to provide quality and timely health assistance for pregnant women.

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