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AN IOT HEART BEAT TRACKING SYSTEM

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Abstract— The purpose is to track the heartbeat of a specific patient and monitor it precisely to provide the emergency message when there is a variation in the specific level of heartbeat. Life is beautiful. Many people lose their life due to heart attack. This is because of their food, age, less physical activity and many other factors. Today, the main cause of death in the world is heart attack. Heart attack is not easy to notice and indications of heart attack differ from male to female. To overcome and benefit the society from heart diseases and attack, heart beat tracking system is developed which helps to reduce the death rate and early detection of heart attack.

Keywords:
Electrocardiogram, Microcontroller, Internet Of Things

I. INTRODUCTION

These days we have an increased number of heart diseases including increased risk of heart attacks. Below proposed system utilizes sensors that allows to detect heart rate of a person using heartbeat sensor even if the person is at home. The sensor is then transmitting to a microcontroller that allows checking heart rate readings and send them over the internet. The user may set the threshold of heart beat boundaries. After setting these boundaries, the system starts tracking and as soon as patient heart beat goes above or beyond the certain boundaries, the system sends an aware to the controller which then sends this over the internet and alerts the doctors as well as concerned person of the patient. Also, the system alerts for lower heartbeats. Whenever the user logs on for monitoring, the system also displays the live heart rate of the patient. Thus, concerned ones may monitor heart rate as well get an attentive message of heart attack and the location of patient immediately from anywhere and the person can be saved on time. Mobile phones are one of the most useful and common devices available with each and every individual in this world. The recent mobile phones have enough available memory, energy, and processing power. So these advantages of mobile phone technology can be utilized to overcome the constraints of wireless sensor network technology for transmission, processing, and buffering of the sensed data. This work proposes a wireless sensor network design for real-time monitoring and detection cardiovascular disease. This system incorporates wireless sensor network technology with other wireless technologies such as cellular network, wireless LAN, and broadband network, for efficient and fast delivery of health alerts. This proposed system consists of a wearable wireless sensor system, control system, heterogeneous wireless network system, two phase real-time data analysis and visualization system, and the warning system. All these together will provide the Electrocardiogram (ECG) signal analysis of a cardiac patient, remote monitoring, delivery of warning to a doctor, relative, and the hospital, and an extended service of transferring the ECG signals and previous records of the patient to his doctor in a remote location. This system can be used for providing enhanced healthcare services to the rural areas of the developing countries that are facing shortage of efficient specialized doctors. Thus the cardiovascular disease causing the death of patient can be reduced immensely by the implementation of this proposed system, in both rural and urban areas.

II. PROBLEM STATEMENT

A.EXISTING SYSTEM

The existing system defines home-based mobile cardiac monitoring resolution, which includes a design of an combined ECG beat detector, supported by the Personal Health Information management System (PHIMS) and Facilitated Accurate Referral Management System (FARMS) through wireless network.

During a resting ECG the body must be relaxed (at rest), as the neighboring muscles and nerves also produce electrical tension. The electrodes are attached to predetermined locations on the body, located on the chest, arms and legs, which are connected to the ECG machine via a cable. The electrodes can detect electrical tension of less than a millivolt, which is then transcribed onto graph paper to produce an ECG.

WHAM shows enough feasibility and has advantages as a wearable ambulatory monitoring device, the hardware is miniaturized to integrate on a small region, it will reduce the complexity of wired connection. This system is developed to monitor the ECG of the patient if the patient is not mobile. Whereas the proposed system is capable to continuously monitor patients in all states such as mobile or immobile.

B. PROPOSED SYSTEM

The proposed system is capable to be used for continuous monitoring of the patients at different environments such as home, hospital, work place and the rest. It consists of lead chest electrodes, blood pressure sensors, respiratory sensors, interfacing and signal processing circuit, and the transmitter. Electrical signals initiated from the heart are captured by the lead chest electrodes, amplified and filtered using the interfacing and signal processing circuit. The sensor system is used to continuously sense the ECG of a patient. The ECG signals are transmitted to the mobile phone using Bluetooth technology. The blood pressure and respiratory sensors will also be incorporated with the system. The data from these sensors will be monitored when an ECG variation is noted. Correlation between a disposable electrode, a controller and personal gateway data will be used to produce an alarm and a emergency message will be sent to ***Nurse practitioner*** and the ***Doctor.***

III. LITERATURE SURVEY

In today's generation there is many number of heart attack happening so There is a need of excellence healthcare from distant positions. Scientific developments in the field of medical and communication can help in reducing the cost of healthcare. In this paper a real-time heart disease tracking system is produced. In this paper Internet Of Things is becoming a main stage for many services & requests, also using raspberry pi microcontroller act as a controller here. **[1]** Heartrate can be seen by the guardian without visiting patient so this will play a very important role when patient and doctor are in different locations

A technique and tackle for monitoring heart rate of the heart using a wearable structure is de-signed and performed in this paper. A heart rate obtains from heart beat signals and supplies the data to a catalogue and after a time this method can govern an idle heart rate of the monitoring body **[2].** This idle heart rate is linked with the stored data and can determine the normal and abnormal heart rate variability

Wireless sensor networks (WSNs) are growing into a widespread technology due to the improvement of low-power and low-cost wireless technology's architecture supports diversified network topologies like star, mesh and hybrid star-mesh network. In this work, a heart rate monitoring system is designed with using Bluetooth based WSN. Pulse-Oximeter(SPO2) data, which is received from the patients, forwarded wirelessly through Arduino to the personal computer (PC) using HC-05 Bluetooth module also processed on PC**.[3**] Graphical User Interface (GUI) is designed using with MATLAB program to use this design without programming knowledge which also enable to observe the measurements of the pulse of the heart rate, simultaneously.

Many countries are facing burdens on their health care systems due to ageing populations. A promising strategy to address the problem is to allow selected people to remain in their homes and be monitored using recent advances in wearable devices, saving in-hospital resources. With respect to heart monitoring, wearable devices to date have principally used optical techniques by shining light through the skin **[4**]. However, these techniques are severely hampered by motion artifacts and are limited to heart rate detection. Further, these optical devices consume a large amount of power to receive a sufficient signal, resulting in the need for frequent battery recharging. To address these shortcomings, we present a new wrist ECG wearable that is like the clinical approach for heart monitoring.

IV. ARCHITECTURE

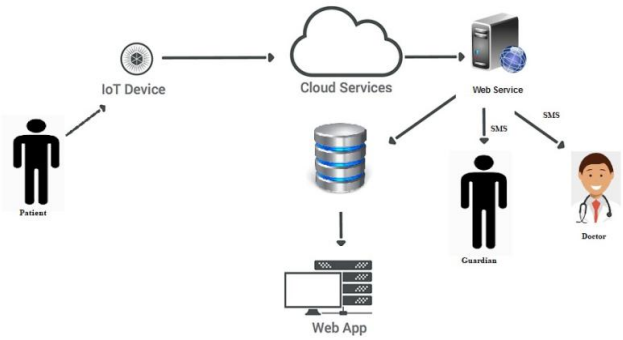

Fig 1 Architecture of heart beat monitoring system.

The architecture of this project consists of a Internet OF Things (IoT) based hardware device to read the heartbeat rate from the patient body and then data is captured from the IoT device. web services is used to send and store the data into the database located in the cloud so that the real time data can be available for doctors and other associated with the patient with real time data, when there is a variation in the heartbeat, the

web services invokes the SMS module to send message to the doctor and the patient guardian and share the current location of the patient.

V. METHODOLOGY

Fig 2: Arduino Microcontroller

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (*shields*) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

Fig 3: Sen-11574

Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heartrate data into their projects. The sensor clips onto a fingertip or earlobe and plugs right into Arduino with some jumper cables. It also includes an open-source monitoring app that graphs your pulse in real time.

Fig 4: SIM800L

The SIM800L module supports quad-band GSM/GPRS network, available for GPRS and SMS message data remote transmission. The SIM800L communicates with microcontroller via UART port, supports command including 3GPP TS 27.007, 27.005 and SIMCOM enhanced AT Commands. It also has built-in level translation, so it can work with microcontroller of higher voltage than 2.8V default. Besides, the board also supports A-GPS technique which is called mobile positioning and gets position by mobile network. This feature make it can also be a tracker modiot

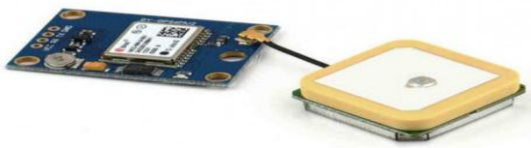

Fig 5: Ublox Neo-6M GPS Module

The NEO-6 module series is a family of stand-alone GPS receivers featuring the high performance ublox 6 positioning engine. These flexible and cost-effective receivers offer numerous connectivity options in a miniature
16 x 12.2 x 2.4 mm package. Their compact architecture and power and memory options make NEO-6 modules
ideal for battery operated mobile devices with very strict cost and space constraints.

VI. RESULTS AND SCREENSHOTS

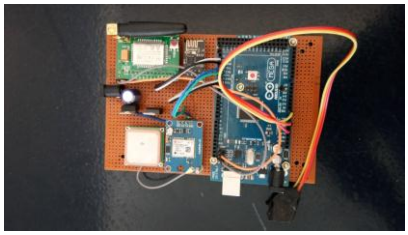

Fig 6 : An IoT heart beat Monitoring System

The above figure 6 is the working model that includes all the hardware components required for the project

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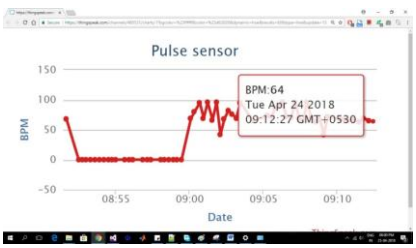

Fig 7: Data display in form of graph

The figure fig 7 indicates the heart beat data of the

patient, time interval in which the data is recorded.

VIII. CONCLUSION

The system is implemented successfully and in most of the cases the system behaves efficiently. Heart Rate Monitoring (HRM) system is a simple solution for real time heart rate status monitoring and abnormality alerting. The system can be used to determine and monitor the idle heart rate for each and every person which creates an emerging awareness in a secure way.
The system deals with the numeric data which is found from the experiment that helps to detect the patient's health condition as well as heart rate. It will co-relate the sensor data with the real patient's data which will help to compare the real scenario. In future some other features can be added to develop the system and make it easy to user. through smart application. This system can be incorporated with cloud computing and enriched the prototype system. This noble system can be used for disabled or patient to aware about their present situation.

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