Smart Health Using Andriod Application

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Abstract: -- **This project is an attempt to develop an IOT implementation for the health monitoring of the patients at home as well as in hospitals. The remote access of the data from the wearable sensors is more important, as it would help the doctors to take decisions at work. The patients at Hospitals and Home those who are treated by the hospital doctors would have to update their data by coming to the hospitals. In order to avoid the movement of the patients, this project takes up the idea of updating the patient monitored data on the firebase which is received on Android application. The firebase would update the monitored data on the Database and the doctor would be able to see the data as the Bio-medical signal on the Application. To intimate the doctor the data which is received by Raspberry pi is sent to the application through the firebase to the doctor's mobile During an Emergency time. If the doctor is offline, then after few seconds automatically the phone call is made to doctor, but even if phone call step fails, again within a few seconds, Immediately the Alert message is triggered to other doctors. The application in health care to monitor the patient health status, internet of things makes medical equipment's more efficient by allowing real time monitoring of patient health. The internet of things in the medical field brings out the solutions for effective patient monitoring at reduced cost and also reduces the tradeoff between patient outcome and disease management. In this paper discuss, monitoring patient's blood pressure and heartbeat using the raspberry pi.**

Keywords— IOT, raspberry pi, Sensors, Patients, health care.

I.   INTRODUCTION

The objective of this project is to monitor and improve the quality of care of people in remote location and to provide continuous information about the patient for making better healthcare decisions in critical situation and to reduce the regular checkups of the aged patients. Internet of Things (IoT), gather and share information directly from patients to doctor more accurately. As the technology for collecting, analyzing and transmitting data in the IoT continues to mature, with the help of sensors. Connected healthcare environment promotes the quick flow of information and enables easy access to diseases such as hypertension, diabetics and cardiac diseases which needs continuous monitoring. The ability of the devices to gather data on their own removes the limitations of human intervention and it reveals the data-automatically and send it to the doctor whenever they needed. The automation reduces the risk of error. This type of solution employs sensors to collect comprehensive physiological information and uses the cloud to analyze and store the information and then send the analyzed data wirelessly to authenticated person for further analysis and review. It replaces the process of having a health professional come by at regular intervals to check the patient's vital signs, instead providing a continuous automated flow of information. In this way, it simultaneously improves the quality of care through constant attention and lowers the cost of care. These solutions can be used to securely capture patient health data from a variety of sensors, analyze the data and then share it through wireless network, for medical professionals who can give appropriate health recommendations for the patients.

II.RELATED WORKS

There are many other related projects like sending alert via mail, SMS, Etc. and accessing the data through the web and android application is also exist.

III.SYSTEM ARCHITECTURE

3.1 Existing System
Current scenario says sending SMS to the authorized person while an emergency time .Numerical readings do not leads to realistic view of health condition of a patient. If the authenticated person not able to see the SMS or in case of any signal drop it leads to emergency.

3.2 Proposed system Configuration

Graphical view of data received by the Android application. If the person couldn't able to get the patient data, then immediate call will be made to consulted doctor. If signal is lost, group message will be sent to all the doctors.

3.3 Heart Rate Sensor

Heart rate is a very vital health parameter that us directly related to the soundness of the human cardiovascular system. This project describes a technique of measuring the heart rate through a fingertip using a Raspberry pi board. While the heart is beating, it is actually pumping blood throughout the body, and that makes the blood volume inside the finger artery to change too. This fluctuation of blood can be detected through an optical sensing mechanism placed around the fingertip. The signal can be amplified further for the Raspberry pi Board to count the rate of fluctuation, which is actually the heart rate.

3.4. Blood Pressure Sensor

A blood pressure device used to measure force of the blood in the veins and arteries. Atrest, the force of blood flow is constant and, in healthy individuals, ranges between 110/70 and 120/80. The larger number is the systolic number--the force of blood as the heart contracts.

The lower number is the diastolic number. If the force of the blood is more than 120/80 the condition is abnormal, this may indicate hypertension. A blood pressure device is specially calibrated to register the force of the blood and help medical personnel determine the patient's health condition status.

Figure:1 Monitoring BP rate

3.4. Blood Pressure Sensor

The Raspberry Pi 3 Model B is the third generation Raspberry Pi. Raspberry PI is a credit card sized single board
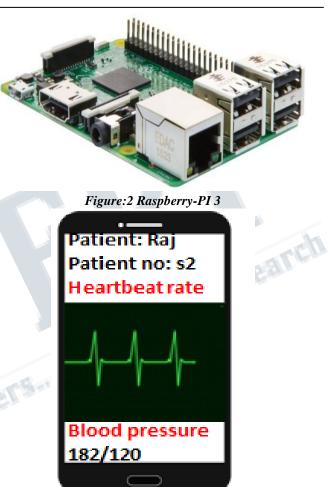

Figure:2 Raspberry-PI 3

Figure:3 Application View

computer. Compared to the Raspberry Pi 2 it has: A 1.2GHz 64-bit quad-core ARMv8 CPU. 802.11n Wireless LAN, it is 10 xs faster than the first generation Raspberry Pi. Additionally it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs. It can be operating on Raspbian, Ubuntu and Fedora operating systems. Broadcom BCM2387 chipset processor is present for efficient process and graphics 1.2GHz Quad-Core ARM Cortex-A53, for wireless connection 802.11 b/g/n Wireless LAN is used and Bluetooth 4.1 (Bluetooth Classic and LE). There are 40 pins used for interfacing the hardware's such as sensors, LED ...etc. Raspberry PI consist of 1 GB RAM (Random Access Memory) and Micro SD extendable up to 32 GB. When we enable the raspberry PI it is booting from SD card where the files are stored.10/100 Ethernet cable is used for fast internet service and Bluetooth 4.0 is used and for video output there is port

HDMI, composite RCA.

3.6 WIRELESS NETWORKING

The data transmission components of the system is Responsible for conveying records of the patient from the patient's house (or any remote location) to the Doctors mobile ideally in real-time. Raspberry pi collects the sensor data and analyze it and sent to Firebase, which is created to send the details about the patient condition to doctor. FIREBASE is a mobile and web application development platform. Firebase is used for analytics; cloud messaging, Real-time Database, storage, notifications etc. Firebase provides a real time database and backend as a service. The service provides application developers an API that allows application data to be synchronized across clients and stored on firebase cloud. From firebase data are sent to android application.

IV WORKING PRINCIPLE

Initially the Raspberry Pi connects to the internet through Wi-Fi. When the connection is established it will start reading the parameters of sensors like p1, p2, p3 etc. (No of Patients).This project is an attempt to develop an IOT implementation for the health monitoring of the patients at home as well as in hospitals. The remote accesses of the data from the wearable sensors (s1, s2, s3, etc.) are temporarily given to the multiple patients (p1, p2, p3.etc). In order to avoid the movement or strain for the patients, this project takes up the idea of updating the patient monitored data on the firebase and the data can be received as Bio-medical signal to our Android Application while in emergency case, the application acts as a single point user interface for the doctors. Raspberry pi Bio-medical signals (signals sent when the device is at dynamic conditions) are sent to the web-server, web-server intern to Android Application, which is enabled for doctors to look after patients during Emergency case. If the doctor is offline, then after few seconds automatically the phone call is made in substitute of Application by using Twillo. But even if phone call step fails, again within a few seconds, Immediately the Alert message is triggered to Every other doctors in the same institute (provided each doctor should install the App), So that the patient can get treatment as fast as possible. While in installation process of Application, doctor's identity should be given clearly because the identity of authorized doctors of the Particular institute is predefined in database in order make the database secured.

If the identity entered is found wrong or if data entered doesn't match with database, then the installation of Application will be discarded. The heart rate and the blood pressure sensors are utilized in this project to get the Patients Health details which is up to date through the external ADC used as an input to raspberry Pi and updated on the firebase for accessing through the Application during an Emergency.

V. MARKET POTENTIAL AND ADVANTAGES

MARKET SIZE:
Around 122 hospitals are there in Karnataka. Heart disease is still the leading cause of death in India, killing 1.7 million Indians in 2016, according to the 2016 Global Burden of disease report released on September 15, 2017.

MARKET GROWTH:
In the modern era, global economy is very much dependent on the advanced technology, where considerable emphasis is placed on the contribution made by human resources, or you can say the human capital, to economic growth Patients are increasing day by day, we can implement our idea for the welfare and safety for the patients.

MARKET PROFITABILITY:
This product is completely a new concept since the idea of this project is independent. This project is designed in order to help the patients at home as well as in hospitals. This help them to live their life .This product is designed with an aim of social impact to help patients. There is no existing system which contains the similar features of our product. Where doctor can independently respond the android application and electronic device around them using their heart beat rate.

NOVEL:
This idea can be more useful for doctor to get immediate information during critical condition. Mainly it is implemented to take care of multiple patients' health at every moment in hospitals, especially in government hospitals and applicable for home environment. Heart beat and blood pressure readings are sent to the doctor's mobile during emergency and the doctor can be able to look into the application for the bio medical signal (ECG wave) of heart beat rate. Getting heart beat readings as bio medical signal (heart beat wave) and blood pressure reading in android application from the raspberry PI through the firebase.
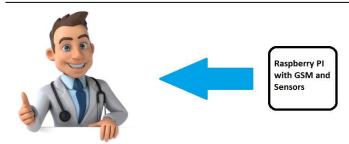
Figure:4 Receiving Alternative data

CUSTOMER TYPE

It can be used in Hospitals for patient's health.

VI. FUTURE ENHANCEMENT

Additional sensors can be added for various diseases. Live streaming can be done for the better understanding of patient health and the web application can be developed for accessing the data's.

VII. CONCLUSION

Raspberry-pi Improve the flexibility and scalability of healthcare applications, in addition, an Android mobile healthcare application can be deployed on mobile devices. We can also conclude that with the evolution of network integration and the continuous monitoring of biomedical signals gives the doctor to take decision at the correct time.

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