International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 08 | Aug 2020 www.irjet.net p-ISSN: 2395-0072

ANDROID APPLICATION ON E-HEALTHCARE

Amrutha Sindhu H B[1], Vaishnavi M[1], Priyanka M[1], Samayama P J[1], Sudeep J[2]

[1] *UG Student, Dept. of Information Science and Engineering, NIE Institute of Technology, Mysuru, Karnataka, India.*
[2] *Assistant Professor, Dept. of Information Science and Engineering, NIE Institute of Technology, Mysuru, Karnataka, India.*

Abstract - *Our E-healthcare project initiates a vision to deliver better health outcomes in terms of access, quality, and affordability for bedridden patients. We developed an android application on E- Healthcare which aims at monitoring health of remote elderly person using IoT devices which monitors blood pressure, heart rate and body temperature of the patient. Through intelligent devices, vital data can be sent to a medical center/customer, and if anything goes beyond normality, the system can generate an alarm and also send a notification about the health condition to the concerned people who are either the doctor or caretaker or the family member of the patient. A certain threshold is set for the vitals and notification can be sent. This project presents in progress e-health architecture using IoT for data acquisition, fog for data pre-processing and short-term storage, and cloud for data processing, analyze and long-term storage. This helps to observe the patient's health condition continuously. It plays a very important role in bridging the gap between the Doctors and patients.*

Key Words: **e-Health app, IoT module, Raspberry Pi, Android studio, SQLyog**.

1. INTRODUCTION

Healthcare costs in many countries are increasing at an unsustainable rate. Factors accounting for the increased healthcare spending include chronic diseases, waste, and inefficiencies such as over-treatment, and redundant, inappropriate, or unnecessary tests and procedures. One possible way to address the challenges facing the healthcare industry is by caring for patients in their environments such as their residences. Many patient categories such as those with chronic disease who need only therapeutic supervision, elderly patients, and patients with heart defects which are congenital do not need to use a hospital bed, as they can be cared for at their homes.
The system should be able to facilitate patient's mobility, and at the same time improve their safety and increase their autonomy. This project addresses this challenge by augmenting existing healthcare systems with inexpensive but flexible and scalable pervasive technologies that enable long-term remote patient health status monitoring.

2. EXISTING SYSTEM

The existing health care systems are manual and hence time consuming. The sensors being used are compact. For measuring the heartbeat a digital heartbeat monitor is required. The system is not portable. Complex system and difficult to operate.

Existing system lacks flexibility and scalability.

There is not instant health monitoring.

The healthcare industry is taking care of the patients from their environments such as their residences.

The healthcare professionals cannot accurately, reliably and securely monitor the health status of their patients without physically visiting them at their residences. The existing system is not able to facilitate patient mobility.

3. PROPOSED SYSTEM

We proposed system has the following features:

- Remote patient health monitoring using IoT.
- Monitors blood pressure, heart rate and body temperature.
- Sending notification of health condition of patient to concerned people.

3.1 Hardware design

3.1.1 Temperature sensor

The temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. We have used DC18B20 temperature sensor in this project.

Fig. 1. Temperature sensor

3.1.2 Blood pressure sensor

The Blood Pressure Sensor is a noninvasive sensor designed to measure human blood pressure. It measures systolic, diastolic and mean arterial pressure utilizing the oscillometric method. Pulse rate is also reported.

Fig. 2. BP sensor (pulse sensor included)

3.1.3 NodeMCU

NodeMCU is a very low-cost open source IoT platform. NodeMCU is an open source firmware for which open source prototyping board designs are available. It provides access to the GPIO (General Purpose Input/Output). The ESP8266 NodeMCU has total 17 GPIO pins broken out to the pin headers on both sides of the development board.

Fig. 3. NodeMCU ESP8266

3.1.4 Raspberry pi

Raspberry pi is a credit card sized single board computer, which can plug into a computer monitor or TV, and uses a standard keyboard and mouse. We use raspberry Pi 3 B+ as our fog device in this project.

Fig. 4. Raspberry pi B 3+

3.2 Advantages:

The delay that is caused by transferring data to the cloud and back to the application is reduced by utilization of fog architecture, thus reducing the response time.

Fog provides reduction in data while sending or transforming data. Reduced operation cost.

Reduces bandwidth requirement and also increases the efficiency of the network. Moving data to the best location for processing is resolved. The proposed application leverages the combined strong synergy of IoT and CC for efficient and high-quality remote patient health status monitoring. Our project makes the following contributions:

An energy-efficient, flexible,and scalable remote patient health status monitoring application. A health data classification mechanism which enables good patient care. The proposed system implements a patient monitoring system infrastructure which is based on integrated cloud computing and IoT technologies.

4. METHODOLOGY

System Architecture

The aim of this project is to develop an android E-healthcare application which reads input from wearable wrist band which monitors the vitals of the elderly bedridden patient and must send an emergency

notification to the concerned people if anything abnormal is detected. The most significant purpose of using IoT for the elderly is to monitor and manage health conditions. Although older adults suffer from many health conditions, chronic diseases are the ones that affect most of them. Since most of them prefer to stay at home when they're bedridden they can be monitored and the data can be shared with the caretakers and doctors to call for immediate medical help if necessary.

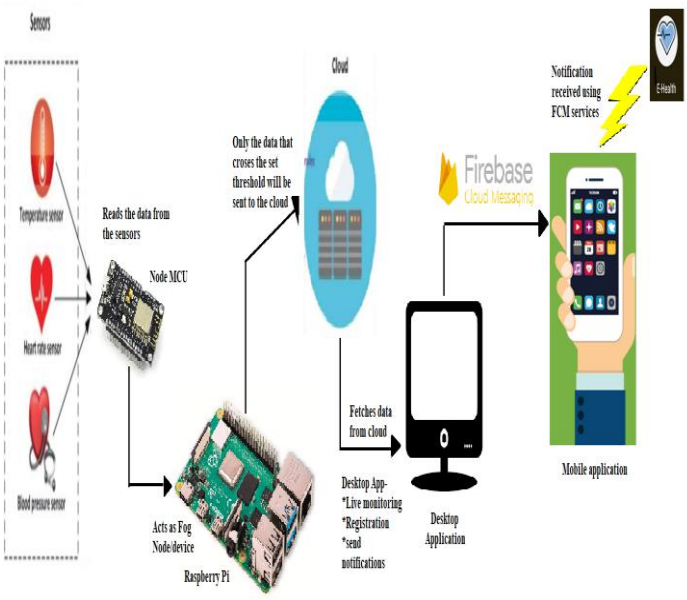

Fig. 5. Architecture of e-Healthcare

4.1 Working

We will deploy certain sensors in the wearable devices used by patients, which mainly measures the vital signs like blood pressure (BP), heart rate, temperature of the person. NodeMCU is the micro controller used to directly record all the information/data sent from the IoT devices(sensors).In turn, the microcontrollers send this data to fog devices(Raspberry pi),where the data can be pre-processed, which guarantees the rapid response of the system if any abnormality is identified. At the fog layer, the data that is collected from the sensors are classified initially. To do this data pre-processing, we have proposed a device with medium computational capacity which ensures that this layer does not become the bottleneck of the system. We choose to use a Raspberry Pi, due its capacity and accessible price. Our raspberry pi will communicate with the microcontroller by the MQTT (message queue telemetry transport) protocol. MQTT, is messaging protocol that allows multiple devices to talk to each other. MQTT is based around the idea that the devices publish or subscribe to topics. All the data that is collected will now be analysed to check if any of the vital signs cross the minimum threshold set by us. If any data goes beyond normalcy, it will now send the necessary data to the cloud. The cloud layer stores the data and analyses on a larger scale. We propose to use some public cloud, such as amazon (AWS), due to its ease management and high availability. According to the data processed in the cloud, the alert notifications will be sent to the doctors or the concerned people.

4.2 Design

The Android application is designed using java in android studio. The users have to register when they use it for the first time. An FCM (Firebase cloud messaging) token will be sent to the admin/desktop application handler. The user can log into the application and look into 2 services that are provided- 1) locate nearby pharmacy 2) locate nearby doctors. In case of emergencies. A notification will also be sent to the device and the location of the patient will also be accessible.

The desktop application is mainly handled by admin or a person from the hospital. The person handling this application has to register the patient details, caretaker/doctor/family members details and store it in the database for access. The live monitoring of patients can be done here. The services can be started and stopped as when necessary. The notifications will be sent through the desktop app based on the FCM token IDs stored for each device. A wrist band is created to read all the vitals of the patient. The proposed wrist band is shown in figure 6.

Fig. 6. Proposed wrist band

5. RESULTS AND DISCUSSIONS

The main purpose of this project is to create an android application which provides certain services. A wrist band is created to read all the vitals of the patient. The proposed wrist band is shown in figure 6. The notification that is sent to the caretaker is shown below in Figure 7. It will contain the patient's name, family member details, reason for the emergency and location.

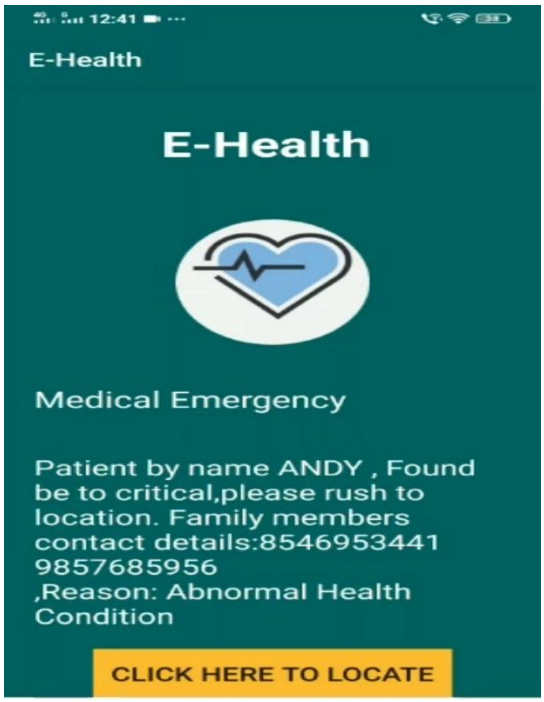

Fig.7 . Notifcation sent to the Android App

6. CONCLUSIONS

In our proposed system the current inaccuracy problem in reading the vitals of the patient in healthcare, has been eliminated. This will demonstrate live monitoring of the patients and sending alert notifications that will be sent to the doctors or the concerned people which may include the family members or the caretakers. Using fog device(Raspberry pi) increases the efficiency of the network, reduces the bandwidth requirements and moves data to the best location for processing. We have created a desktop application for the purpose of live monitoring and a mobile application which is very user friendly and also notifies the user with the appropriate message. The additional services of the application is also useful in emergency situations. This project is made with pre-planning and it provides flexibility in operation. This innovation has made it more desirable and economical. This project "ANDROID APPLICATION ON e-HEALTHCARE" is also designed with hope that it is very economical and helpful for bedridden patients who can be monitored live and also sends notifications if things go out of hand, thus saving their lives.

REFERENCES

[1] Rian Muhammad F1, Surya Michrandi N2 and Ratna Astuti N3(The 2nd International Conference on Data and Information Science) 2019 M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989"Health monitoring application using fuzzy logic based on android".

[2] Inkollu Gowri Ramya Sri*1, SravaniKonduru2 , Pravallika Madiraju3, Jetty Bindu Mahitha4, V. Koteswara Rao5- K. Elissa, "Title of paper if known," unpublished. "IOT Based Health Monitoring System".

[3] Maradugu Anil Kumar, Y.Ravi Sekhar,IEEE(ICIIECS)2015"Android Based Health Care Monitoring System".

[4] C. Kotronis, G. Minou, G. Dimitrakopoulos, M. Nikolaidou, D. Anagnostopoulos, A. Amira, F. Bensaali, H. Baali, and H. Djelouat, "Managing criticalities of e-health IoT systems".

[5] Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud(IEEE) 2015, "A Smart System Connecting e-Health Sensors and the Cloud".

[6] Websites - https://www.raspberrypi.org/ - For raspberry Pi set up and usage and https://ieeexplore.ieee.org/