



Surveil Band

Self-adaptive smart healthcare system using Data Mining & Block chaining

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Abstract: In India, doctor-patient population ratio is observed to be 1:1674. The shortage of health providers and infrastructure is most acute in rural areas. The doctor can't monitor every patient all the time. To tackle these problems we have proposed a system. The proposed system can monitor the health of patients using wearable devices and bio-sensors. The system consists of three major modules 1. Internet of Things (IoT), 2. Android Application 3. Block Chaining. The IoT module is basically used for intersecting and fetching the data that is being generated by wearable devices worn by patients like heartbeat, body temperature, blood pressure, Oxygen. The second module i.e. Android Application is to show the vital parameters (data collected by various sensors) to doctors as well as patients in the form of live graphs generated by application to analyze the patient's health if he is under observation. The third Block Chaining module is to train the data set and to classify newly generated data in the group as well. By connecting Different kinds of wireless networks, we have designed and implemented a system called Patient Health Monitoring System, Which provides communication between Doctors and Patients which will help Doctors to monitor Patients Continuously even if the Patient is not present in the hospital.

Index Terms - IOT, Arduino, Monitoring system, Raspberry Pi.

I. INTRODUCTION

A recent health monitoring system should provide better health services to people at any time anywhere in an affordable and patient friendly manner. Currently, the health monitoring system is going to change from a traditional approach to a modernized patient centered approach. In the traditional way the doctors play the major role. For necessary diagnosis and advising they need to visit the patients. There are two basic problems related to this approach. Firstly, the healthcare professionals must be at place of the patient all the time and second, the patient remains admitted in the hospital, wired to bedside biomedical instruments, for a long period of time. In order to solve these two problems the patient oriented approach has been received. In this theme, the patients are aware with knowledge and information to play a more active role in disease diagnosis, and prevention. The important element of this second approach is a reliable and readily available patient monitoring system (PMS). Health is one of the global challenges for humanity. According to the constitutions of the World Health Organization (WHO) the highest attainable standard of health is a fundamental right for an individual. Healthy persons can secure their lifetime income and hence an increase in gross domestic product and in tax revenues. The doctor can't monitor every patient all the time. To tackle these problems we have proposed a system. The proposed system can monitor the health of patients using wearable devices and bio sensors. The system consists of three major modules 1. Internet of Things (IoT), 2. Android Application 3. Block Chaining. The IoT module is basically used for intersecting and fetching the data that is being generated by wearable devices worn by patients like heartbeat, body temperature, blood pressure, Oxygen. The second module i.e. Android Application is to show the vital parameters (data collected by various sensors) to doctors as well as patients in form of live graphs generated by application to analyze the patient's health if he is under observation.

II. LITERATURE SURVEY

Paper(1) Survey On IOT & Arduino Based Patient Health Monitoring System

Author B. N. Karthik, L. Durga Parameswari, R. Harshini, A. Akshaya, B. N. Karthik proposes and investigates the problem of how health care services are an important part of our society, automating these services lessens the burden on humans and eases the measuring process. The transparency of this system helps patients to trust. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing procedures. Many further improvements can be made in our system to make it better and easily adaptable such as adding more advanced sensors. Because of wireless data transmission over the internet, health related data will be sent to the doctor's personal computer or on his mobile. So, I need to go to the hospital every time and sending a message to the doctor gets immediate remedy related to the health condition. The system can be extended by adding more features like location access, linking the ambulance services, leading doctor's list and their specialist, hospitals and their special facilities etc. Doctors can create awareness about diseases and their symptoms through the mobile application. From the evaluation and the result obtained from analysis the system is better for patients and the doctor to improve their patients' medical evaluation.

PAPER(2): Wireless Patient Health Monitoring System

In this paper author Manisha Shelar, Jaykaran Singh, Mukesh Tiwari presented by Normally it is difficult to keep track of abnormalities in heartbeat count for patients itself manually. The average heartbeat per minute for a 25-year old ranges between 140-170 beats per minute while for a 60-year old it is typically between 115-140 beats per minute and body temperature is 37 degree Celsius of 98.6 Fahrenheit. Patients are not well versed with manual treatment which doctors normally use for tracking the count of heartbeat. So there must be some device which would help patients to keep track of their health by themselves. There are various instruments available in the market to keep track of internal body changes. But there are many limitations regarding their maintenance due their heavy cost, size of instruments, and mobility of patients. We have analyzed the wireless patient health monitoring system of temperature and heartbeat of humans using ZigBee, GSM, and SMS. Any abnormalities in health conditions are informed via SMS to the indicated mobile number through GSM. The hardware is implemented and the output is studied. To overcome these limitations a device used to keep track of the heartbeat count of a patient should be easy to use, portable, light weighted, small size etc so that it gives freedom of mobility for patients.

PAPER(3) : An IOT Based Patient Monitoring System Using Raspberry Pi

In this paper, author R.Kumar, M.Pallikonda Rajasekaran The unpredictable growth of the "Internet of Things" is changing the world and the rapid drop in price for typical IoT components is allowing the public to innovate new designs and products at home. IoT can be used in monitoring patient's health, for making smart home and smart city. The unexpected occurrences in patient's are monitored using IoT. In this paper a specialized sensor is used to monitor a patient's heart rate, body temperature, body movement and breathing rate. One of the key learning platforms for IoT is the Raspberry Pi. The Raspberry Pi is a popular platform that offers a complete Linux server in a tiny platform for a very low cost. The Raspberry Pi also allows interfacing services and actuators through the general purpose I/O pins. The combination of Raspberry Pi and IoT becomes a new innovation technology in the healthcare system. Raspberry Pi acts as a small clinic after connecting these (Temperature, Respiration, Accelerometer, Heartbeat) sensors. Raspberry Pi works as a small clinic in many places.

PAPER(4): Body Sensor Network For Mobile Health Monitoring Diagnosis and Anticipating System

In this study author Johan Wannenburg, Reza Malekin in modern technology have allowed for the development of miniaturized wireless mobile health monitoring systems, capable of continuous monitoring while being power efficient. Through this advancement a transformation in health monitoring is taking place, whether it be for medical or non-medical purposes, wearable body sensors are growing in popularity. A need for the development of such devices definitely exists, since they will allow for the detection of abnormalities, unforeseen situations and even provide a prognosis all based on the monitoring of physiological parameters data from sensors and then it transfer wirelessly to IoT websites. Raspberry Pi board is connected to the internet, that board MAC address is registered to the internet. After that on the IoT website, add the MAC address of this board. Then the sensor's output is connected to the IoT website The overall results achieved are very closely related to what was required and expected from the design, this means that the final implementation of the system works as intended. The solution does not only focus on the specifications but also aspects to ensure that the design is practical and that the ultimate goal is to be able to deliver a working product.

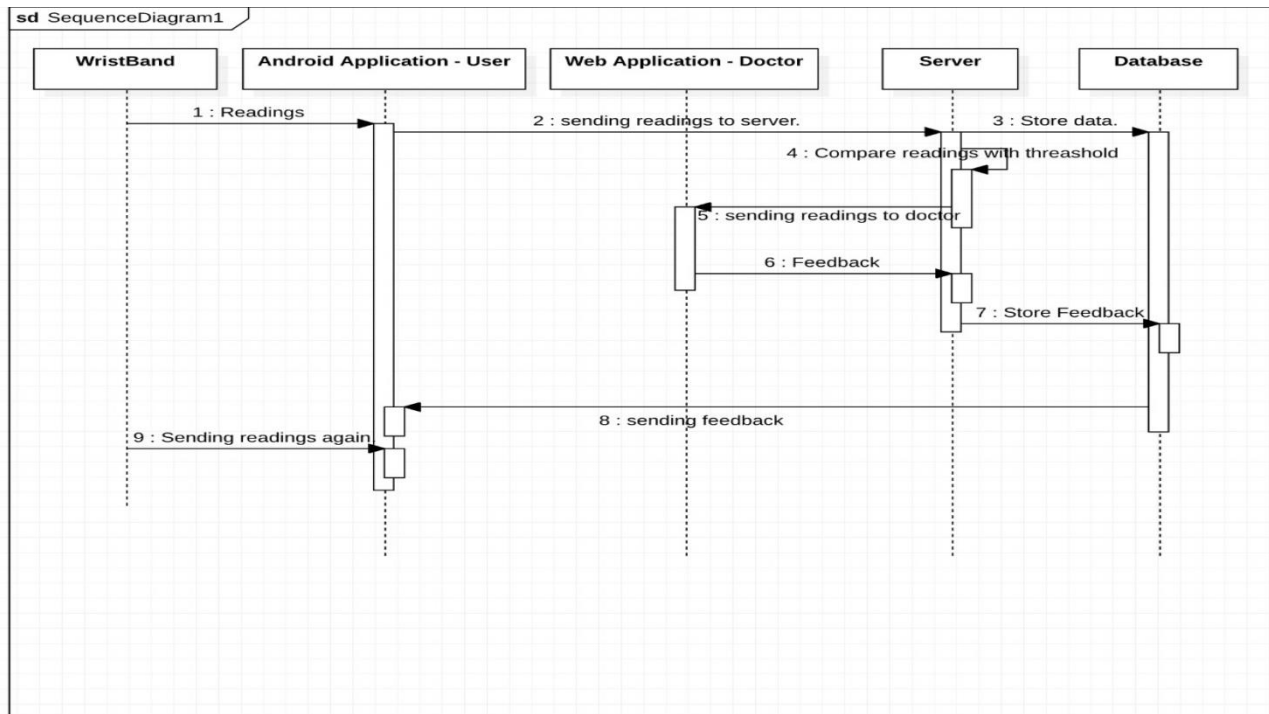
PAPER(5): Heartbeat And Temperature Monitoring System For Remote Using Arduino

Author Vikram Singh R. Parihar Akesh Y. Tonge Pooja D. Ganorkar In today's world, the maximum use of resource is always complemented. So, the use of wireless technology is enhanced to meet the need of remote control and monitoring. Remote patient monitoring (RPM) is a technology that helps us to monitor patient even when the patient is not in the clinic or hospital. It may increase access to health services and facilities while decreasing cost.

Remote Patient Monitoring saves time of both patient and doctor, hence increasing efficiency and reliability of health services. Heartbeat and body temperature are the major signs that are routinely measured by physicians after the arrival of a patient. Heart rate refers to how many times a heart contracts and relaxes in a unit of time (usually per minute). Heart rate varies for different age groups. For a human adult of age 18 or more years, a normal resting heart rate is around 72 beats per minute (bpm). The functioning of the heart can be called as efficient if it is having a lower heart rate when the patient is at rest. Babies have a much higher rate than adults around 120 bpm and older children have heart rate around 90 bpm. The heartbeat was measured with the help of photodiode and bright LED while the temperature was measured by using precision integrated temperature sensor LM35

III. WORKING STRUCTURE

Patient Health Monitoring System



Diagram(a) Sequence diagram

1. Overview of Patient Health Monitoring System:

The Patient Health Monitoring System includes two components: the Doctor's system and the Patient system. The Doctor's System runs on the smartphones those on the Doctor's Side and Patient System will run on Patient Side. The Doctor System will continuously Monitor Patients Health if the Patient is having any difficulty during his/her Medical conditions.

2. Network scenario

With the help Of Mobile Data or Wi-Fi Communication Data can be continuously transferred to the Doctor. Emergency Situations can be given by the Patient or with the help of the Sensors doctor can get to know that the Person facing any medical issues.

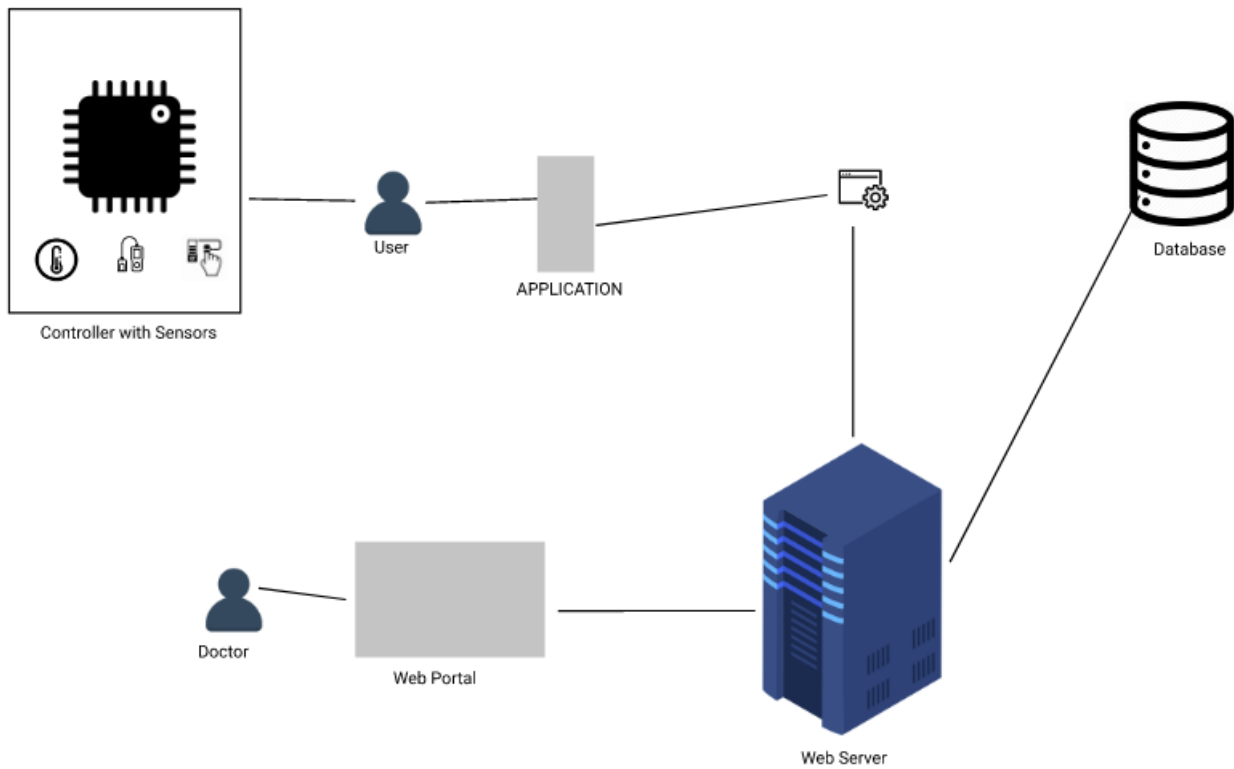
3. System Architecture of Patient Health Monitoring System Implementation

In this section we describe the detailed implementation which includes Patient Health Monitoring System interface and Patient Health Monitoring System application, where the network interface configuration and Security are implemented in JAVA, BLOCK-CHAINING and PYTHON(DJANGO) based on Windows, and the application is implemented in java based Android. The Architecture of Patient Health Monitoring System implementation is illustrated in figure.

4. Patient Health Monitoring System Application

The Patient Health Monitoring System applications are the Doctor system and Patient system together, implemented in java, Block Chaining and Data Mining on Android systems.

IV. BLOCK DIAGRAM



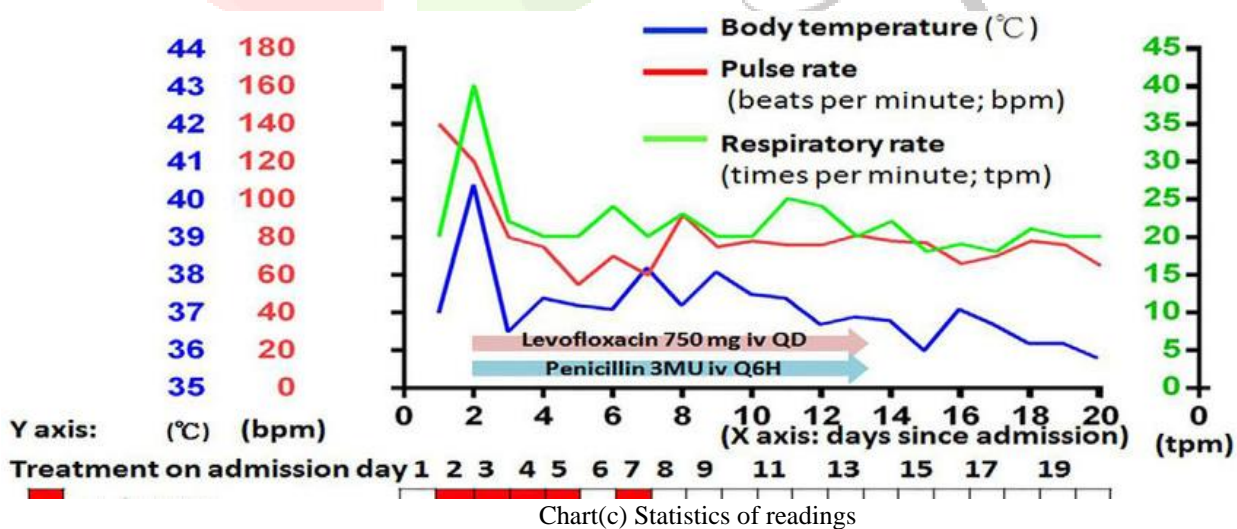
Diagram(b) Block Diagram

Block Diagram Description

As you can see in the diagram the system comprises two kinds of users , that are patient and doctor. The purpose of this system is to monitor the health of patients using different sensors like temperature, humidity, heart bit etc. which will provide the real time information to the respective doctors , which will be a stepping stone in the medical field. We're using wrist bands to monitor the patients , every patient is connected to the application using cloud storage.

V. RESULTS AND DISCUSSION

4.1 Results of Descriptive Statics of Study Variables



Chart(c) Statistics of readings

This system is tested on different test cases to meet all the necessary requirements. The system is functioning properly in both the modules . The surveil band module i.e. the Internet of things module is working appropriately by measuring the heart rate and temperature of the respective patient and the android application is working appropriately by showing all the real time parameters . The system portal is maintaining all the doctor and associated patient information in very easily accessible formation for the any unprecedented Information retrieval. Whenever any patient parameters reach the upper bound set by doctor or the maximum limit then the associated doctors get notified by the system

ESP8266/ESP32 Patient Health Monitoring



Diagram(d) Reading of patient

VI. CONCLUSION

The main aim of the project was to monitor the real time health parameters of the patients like heart bit rate, temperature , blood pressure etc. The real time data can be a milestone in medical field as the medications used can be altered or proper treatment can be begin before the situation turns worst. The mild symptoms of any worst case situation in any patients life can be identified way before the occurrence of life threatening situation using this kind of real time health parameter monitoring system.

The proposed surveil band system is a prototype system built using Arduino, sensors, web portal and mobile application. This system consists of two different modules namely surveil band and android application. The first module surveil band is an Internet Of Things module comprised of Arduino and sensors like heart bit and temperature . This module is fixated at patients wrist like a band hence it's called surveil band , it monitors the real time health parameters and continuously send the data to web portal. The second module of the system consists of web portal and android application. The real time data transferred from band is monitored at web portal for any kind of unsupervised readings. This module has the responsibility to alert the doctors if the associated patients real time data of health parameters has reached upper bound or any designated reading. This module will be helpful to monitor the patients who have even left the hospital premises.

The overall prototype is working upto the expectations. The surveil band prototype has successfully passed all the different test cases. The surveil band system monitors the real time health parameters and transmit the information without any delays to the associated doctors and alert whenever necessary. If further researched and thoroughly Implemented this system can be a big time life saver for many people.

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