

Modern Approach for Patient Health Monitoring System

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Abstract:

IOT devices are used in many fields which make the user's daily life more comfortable. These smart sensors devices are used to collect heartbeat which is used to assess the health condition of the patient. Communicating the accurate information to the doctor, making exact decision on the data collected and notifying the patient is the challenging task in the IOT. This paper will give you a comparative study on health detection and monitoring of the patient parameters.

Index Terms - IOT, PMS.

I. INTRODUCTION

Patient's health is one of the global challenges for humanity. According to the constitutions of World Health Organization (WHO) the highest attainable standard of health is a fundamental right for an individual. Healthy individuals secure patient's lifetime income which leads to increase in gross domestic product as well as they reduce pressure on the already overwhelmed hospitals, clinics, and medical professionals and reduce huge workload on the public safety networks, charities, and governmental (or non-governmental) organizations. To keep individuals healthy an effective and readily accessible modern healthcare system is a precipitation. A modernized healthcare system should provide better healthcare services to people at any time and from anywhere in an economic and patient friendly environment.

Currently, the healthcare system is undergoing a cultural shift from a traditional approach to a modernized patient centered approach. In the traditional approach the healthcare professionals play the main role. They need to visit the patients for necessary diagnosis and advising. There are two basic problems associated with in this approach. Firstly, the healthcare professionals should be on site of the patient continuously and secondly, the patient remains admitted in a hospital, wired to bedside biomedical instruments, for a long period of time, to solve these two problems the patient oriented approach has been conceived. In this approach the patients are equipped with information and knowledge to play a more active role in disease diagnosis, and prevention. The key element of this second approach is a reliable and readily available patient monitoring system (PMS)

The need for a real time recording and notification of vital signs of a patient is first priority for an effective PMS. By using the advantages of modern bio-instrumentation, computers, and telecommunication technologies, the PMS should receive, record, display, and transfer the physiological data from the patient body to a remote location at any time. For more efficient, timely, and emergency medical care the PMS must also be incorporated with an alarm system. In order to alert the patient and the health care service providers the PMS should not only monitor and study the critical patient's data but it should also send alerting messages in case the monitored data go outside their normal ranges. Hence, an active database system must be connected with the PMS. Most of the proposed PMSs are centralized in a sense that all patients' data are stored in a single server. By using necessary firmware and software the server can be connected to an open communication network by TCP/IP protocol. Hence a patient can be monitored from a remote location. Existing and widespread mobile phone networks can support in this regard. With the global market demand and use of the mobile phones the mobile healthcare system (mHealth) is a matured idea now. By using the mobile phone healthcare system can be made available for people, who are living in rural areas without much access to other types of communications. Even a simple mobile phone can become a powerful tool now. Text messages and phone calls can quickly deliver real-time and critical information of a patient to a rural location. Thus the patients, living in remote areas, can reduce unnecessary back-and-forth travel to the far located healthcare canters. However, mobile devices have become "smart" now to do more rather than simply transfer medical information and advice.

1.1. Objectives

- The major design objectives of this project are given below:
- To get the information about human health in real time by IoT device.
- Pre-processing of data acquisitioned about human (if necessary).
- To bring IoT-based healthcare monitoring systems, anywhere, anytime.

II. LITERATURE SURVEY

S. Siva [1] et al. has demonstrated to monitor patient's health condition by using the smart hospital system. The health condition of patient's can be monitored by using the spark kit. It collects information about the temperature and heartbeat rate of the patient and sends an alert notification if any of the obtained parameter crosses the predefined threshold value.

Sarfray Fayaz Khan [2] has demonstrated an effective patients healthcare monitoring system with the help of IoT and RFID tags. In this system, health condition of the patient is monitored by improving the power of IoT and using the combination of microcontroller and sensors. But, it does not contain preventive measures with respect to the patient health condition by controlling the appliances and providing the prescribed drugs to the patient which is included in our paper.

Boyi Xu et al. [3] discussed the challenge of gathering and storing the data in the IoT platform and also provide the ways to solve the problem. . Due to the gathering of various data and regular input of data it becomes more complicate to analyse and store the data sequentially in a proper manner. Hence this paper provides a way to do that.

Ananda Mohan Ghosh et al. [4] has proposed a health monitoring system for managing the hospital to allow family members and consultant doctors to remotely monitoring the patients' health condition through the internet with E-health sensor shield kit and Phi gets interface kit. But it does not send any notification such as email and SMS alert to the respective family members and doctors.

Freddy Jimenez et al. [5] have considered only on monitoring the patient's health condition and sending the necessary information and notification to doctors, family members. Moreover, it does not contain the appliance control, which is included in our project; it only focused on Monitoring and provides notification to the respective people on time.

Felipe Fernandez et al. [6] discussed the problem which we will be happening if we already go ahead to make an IoT based health care system. It also discussed about the flexibility of an IoT based systems, which is a must concern in the emergency of the healthcare.

P Kumar et al. [7] has demonstrated a patient monitoring healthcare system which is controlled by a raspberry pi such as the heartbeat rate, respiration level, and temperature and body movement of the patient is monitored and data is collected by using sensors and displayed it on the screen using the putty software. However, it does not provide the alarm notification for insisting the family members or doctors to give the prescribed drugs to the patient which is included in our proposed solution.

Danilo F. S. Santos et al. [8] tells about the use of connected Personal Health Devices (PHD) through which the correct data can be received from the sensors. This paper actually gives a standard architecture that actually helps in sharing the data between the systems like out of our mobile phones and cloud databases.

III. PROPOSED SYSTEM

3.1. Block Diagram

MODERN APPROACH FOR PATIENT HEALTH MONITORING SYSTEM

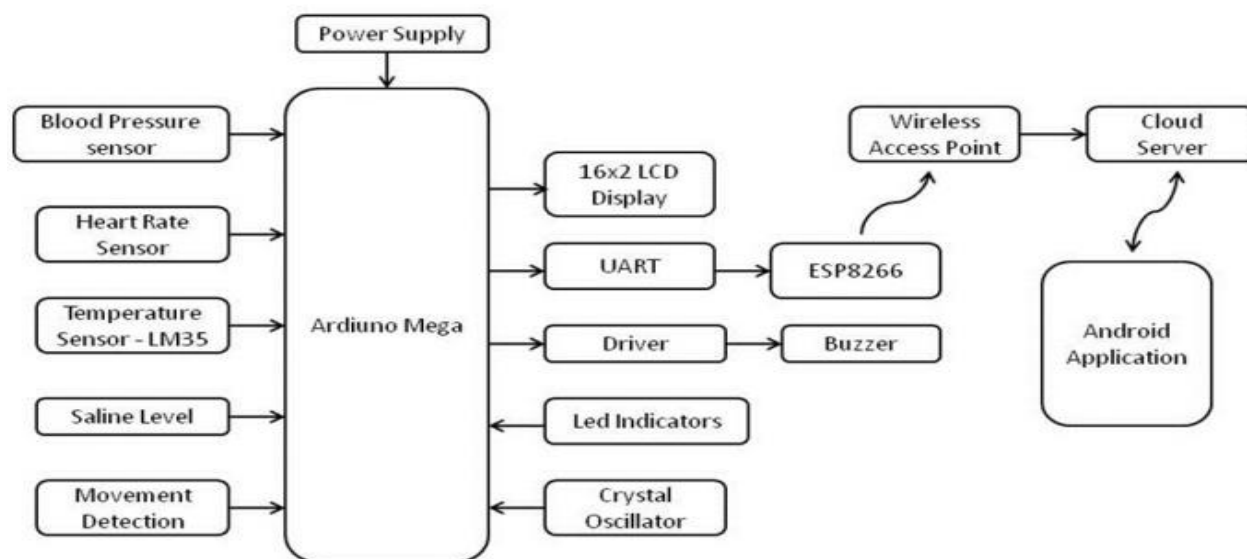


Fig. 1. System Architecture

The main idea of proposed system is to monitor the patient health remotely using the android phone and the IOT technology. The system is especially for monitoring the bed rest patients who can stay in their house. In this system, doctors and relatives of patients can monitor the patient remotely through Android application. It uses remote sensing to keep track of certain parameters like heartbeat, body temperature, patient movement, saline level and patient's blood pressure. All the sensors are wired over the body of the patient. Sensors will be connected to the Arduino mega controller and this controller is in turn interfaced to a LCD display for offline monitoring the sensors readings locally on LCD display. Also buzzer is connected to the controller for local alerting purpose in abnormal conditions. The sensors output values will be uploaded to a centralized cloud server using the MQTT protocol and IOT concept using the internet provided though the WIFI module ESP8266. A threshold value is assigned for each sensor and in case of any abnormal means, it warns immediately to the relatives or doctors through the notification on his mobile phone. For the security and safety issues, a role-based user authentication system is also available in the system to access the information.

Heart beat sensor is used for monitoring real time pulse rate of the patient body. Blood pressure sensor shows Systolic, Diastolic blood pressure of the patient. Body temperature of patient is measured accurately by using LM35 sensor. The accuracy level is +/-0.5c. IR sensor is used to detect the saline level when it is dropped to predefined threshold level. Accelerometer sensor

is used to detect the patients movements when he is in rest condition of it can be used to detect fall detection of patient in case of old age person.

IV. RESULT

Currently a nurse continuously stays near patients who can be replaced by this system. Our system monitors the parameter of patients like heartbeats, blood pressure, and temperature etc. accurately and gives properly information to the doctors with the help of this system. This system reduced the manpower required to continuously monitor the patients.

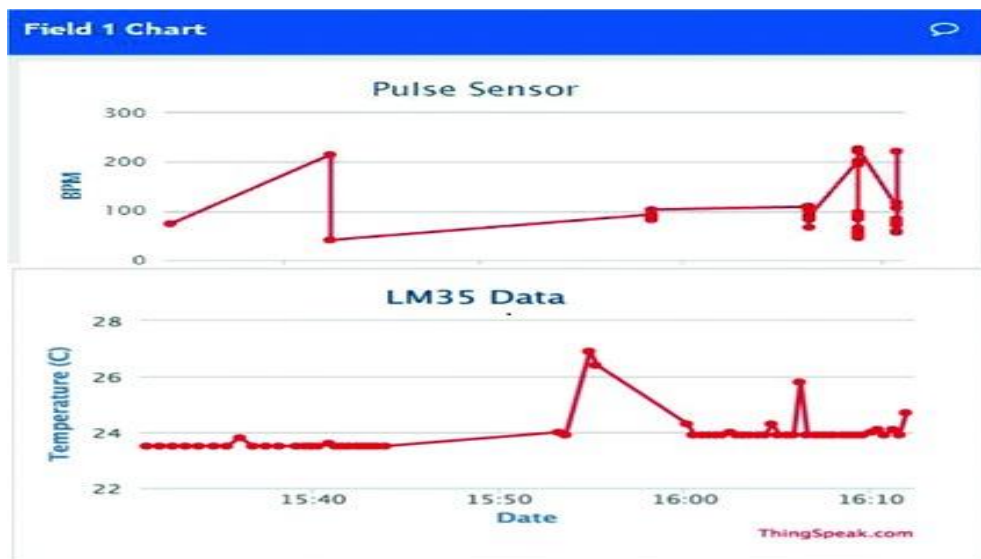


Fig 2: Chart of Heart beat and Temp Sensor

In this system we use Thingspeak tool as server to transfer the all sensor data to server then it's collects and send to web page. We have login this page give all parameters of patients information. Below figure shows the account in Thingspeak server which is used in this system to create web page and also show the parameters of patient's information.



Fig 3: User Profile



Fig 4: Patient Result

V. CONCLUSION

In this work a smartphone based health monitoring system has been presented. By using this system the healthcare professionals can monitor, analyse and advice their patient's any time. The physical parameter are stored and published online. Hence, the healthcare professional can monitor their patients from a distant location at any time. Our system is simple and just few wires connected to a small kit with a smartphone. The system is power efficient. Only the smartphone or the tablet needs to be working enough to do the test. It is easy to use, fast, accurate, efficient, and safe (without any danger of electric shocks). Overall as compared to other conventional medical equipment this system has the ability to save data for future reference. Finally, the reliability and validity of our system have been verified by field tests. The field tests show that our system can produce medical data that are similar to those produced by the current medical equipment.

VI. REFERENCES

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