A Study on Patient Health Monitoring Using Iot

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Abstract - IoT is Internet of Things. The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. These devices are used in various application fields to make our day to day life comfortable. These days frequent monitoring of health is very important for every individual in order to stay healthy. The various advances in Health monitoring using Iot, sensors, Arduino, Raspberry Pi etc are discussed in the paper.

Keywords - IoT, Sensors , Arduino, Raspberry pi.

I. INTRODUCTION
Healthcare is one of the most important concern for everyone whether they are young or old. As there is increase in the number of people with chronic diseases due to dietary habits, lack of exercise, smoking etc hence it is very important to regularly monitor health condition. Hospitals provide provision to monitor health of patients this can be more convenient if the patient can continuously monitor health at home. The survey of various approaches that are proposed to monitor patients health using IoT, Arduino Uno, Temperature sensors , Heart rate sensors , Blood pressure sensors , Raspberry pi are presented in the paper.

The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery. The general methodology followed is Parameters of temperature, heart rate, blood pressure are collected from IoT devices and evaluated. After evaluation the data is processed and passed to the website or application that is accessed by the patient to view the result. In case of emergency message is passed to the doctor.

II. LITERATURE REVIEW
In the paper IoT based patient health monitoring system using arduino uno by V Akhila et all The patient health monitoring system[PHMS] using IoT devices are used to collect the parameters that are required and the data obtained from IoT devices is evaluated. The precautionary measures to be practiced by the patient are also notified by the PHMS. In case of critical situation the system also suggests the patients with medical care and further steps to be followed. The PHMS is evaluated using the parameters and decision made on data obtained from source.

ESP8266 is used as it provides unsurpassed ability to embed wifi capabilities within systems and offers self contained wifi networking solution. Offload wifi networking function from other application processor or hosting the application can be done using ESP8266.Thinkspeak.com website is the IoT website where the data generated from arduino is presented with the use of wifi module. The system notifies the patient with precautionary measures to be practiced and further steps to be followed The system design is represented in the figure 1.

Fig.1 Iot Based Heath Monitoring System Using Arduino.
In the paper Patient Health Monitoring System using IoT by Prashant Patil et al., temperature, heart rate, blood pressure are frequently measured and sent to the server. There is a period of sending for e.g., 3 sec. Patient or the observer should learn specific threshold like 37°C is the normal body temperature but some people feel feverish. The threshold for patient is observed for long time. Doctors can view health status using android application. The system architecture consists of temperature sensors, ECG and heart beat is connected to Arduino board. WiFi connectivity is used to send values to web server through the microcontroller. Using smart phone doctor and patient can view values in android application. The system design is represented in figure 2.

In the paper Real Time Health Monitoring System Using Arduino Lab View With GSM Technology by Mohan Lal Sahu et al., heart rate and temperature are monitored and health condition are monitored in the hospital and analysed using LabView software. Lab View software is used to acquire process and transmit data. It also provides graphical platform to analyse.

The analysed data is sent to doctor and parents of patient using GSM and IoT technology. Alert message is also sent if something goes wrong. The methodology used consists of sensors temperature sensors (LM35) and pulse rate sensor. The data is graphically analysed using Lab View software. GSM and IoT technology are used for transmitting data. The system design is represented in figure 3.

In the paper Remote Heath Monitoring Using IoT by Mr. Prashob Bharathan et al., a health monitoring device is developed using Rasberry pi and IoT. The parameters like temperature, heartbeat, blood pressure are monitored in real time and the values are sent to the doctor. Doctor can easily recognize the patient health condition and prescribe the treatment.

The doctors far in other countries can also be consulted using this system. The patients can easily carry this device with them. The methodology used consists of sensors that are installed that continuously monitor temperature, blood pressure, heart rate of the patient. The device sends the value of the parameters to the prescribed doctor via wireless network. Suppose a person suffers from chest pain. He has to just place his finger on the device and through wireless network doctor gets notified. The doctor can then prescribe treatment to the patient. The device helps to have routine check-up without going to the hospital. The system design is represented in figure 3.
The table below summarizes all the papers discussed above.

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Paper Title</th>
<th>Author</th>
<th>Technology used</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IoT-based patient health monitoring system using Arduino uno</td>
<td>V Akhila et al</td>
<td>IoT, Arduino uno, wifi</td>
<td>Continuous monitoring of heart rate, temperature, blood pressure</td>
<td>Other parameters like glucose, BMI etc can be considered.</td>
</tr>
<tr>
<td>2</td>
<td>Patient health monitoring using IoT</td>
<td>Prashant Patil et al</td>
<td>IoT, Arduino uno, wifi, sensors</td>
<td>Continuous monitoring of heart rate, temperature, blood pressure and notification is sent in case of emergency.</td>
<td>Only three parameters are considered.</td>
</tr>
<tr>
<td>3</td>
<td>Real Time Health Monitoring System Using Arduino Lab View With GSM Technology</td>
<td>Mohan Lal et al</td>
<td>IoT, GSM, Lab View, software</td>
<td>Real time monitoring with reduced cost.</td>
<td>Other parameters like glucose, BMI etc can be considered.</td>
</tr>
<tr>
<td>4</td>
<td>Remote Health Monitoring Using IoT</td>
<td>Mr Prashob Bharathan et al</td>
<td>IoT, raspberry pi</td>
<td>Portable device, improved disease management, human errors are reduced.</td>
<td>Only three parameters are considered additional parameters and services can be added.</td>
</tr>
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Table 1 summary of the papers discussed

### III. CONCLUSION

Healthcare is one of the most important concern for everyone whether they are young or old. As there is increase in the number of people with chronic diseases due to dietary habits, lack of exercise, smoking etc hence it is very important to regularly monitor health condition. Hospitals provide provision to monitor health of patients this can be more convenient if the patient can continuously monitor health at home. The survey of various approaches that are proposed to monitor patients health using IoT, Arduino Uno, Temperature sensors, Heart rate sensors, Blood pressure sensors, Raspberry pi are presented in the paper. Further more features like linking ambulance services, list of specialized doctors and other parameters like glucose level, BMI (Body Mass Index), waist circumference can be included.

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### REFERENCE


