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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.

Correctness and effectiveness are experimented using the simulated results. In the project PHMS required parameters like temperature, blood pressure, heart rate are collected using arduino device and the data obtained from IoT device is evaluated. Arduino provides reliability, easiness, open source programming and low cost because of which its widely used. The paper introduces the way of implementing PHMS with Arduino uno. Microcontroller ATMEGA 328P is used to process the data generated by the sensors.

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

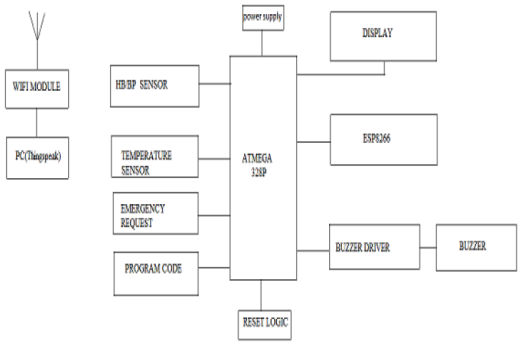

Fig.1 Iot Based Heath Monitoring System Using Arduino.

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In the paper Patient Health Monitoring System using IoT by Prashant Patil et all temperature, heart rate, blood pressure are frequently measured and sent to the server. There is a period of sending for eg 3 sec . Patient or the observer should learn specific threshold like 37^0 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

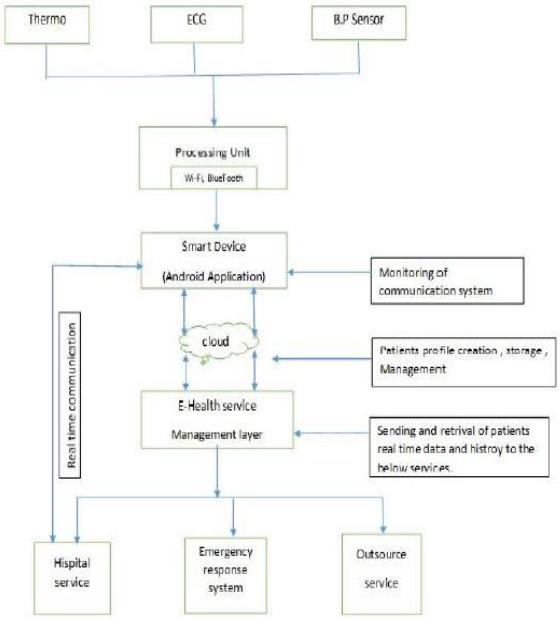

Fig. 2 System Architecture

In the paper Real Time Health Monitoring System Using Arduino Lab View With GSM Technology by Mohan Lal Sahu et all 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 in represented in figure 3

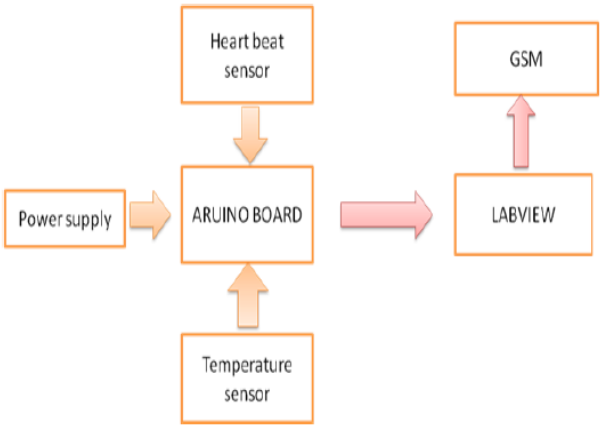

Fig. 3 Block Diagram of Health Monitoring System.

In the paper Remote Heath Monitoring Using IoT by Mr Prashob Bharathan et all 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 tp have routine check up without going to the hospital. The system design is represented in figure 3

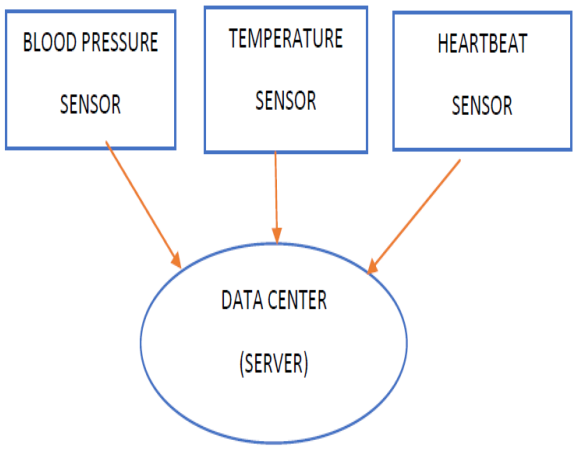

Fig.4 System Architecture

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The table below summarizes all the papers discussed above.

S.N.	Paper Title	Author	Technology used	Advantages	Disadvantages
1	IoT based patient health monitoring system using Arduino uno	V Akhila et all	IoT Arduino uno, wifi	Continous monitoring of heart rate, temperature, blood pressure	Other parameters like Glucose, BMI etc can be Considered.
2	Patient health monitoring using IoT	Prashant Patil et all	IoT Arduino uno, wifi, sensors	Continous monitoring of heart rate, temperature, blood pressure and notification is sent in case of emergency.	Only three parameters are considered.
3	Real Time Health Monitoring System Using Arduino Lab View With GSM Technology	Mohan Lal et all	IoT, GSM , Lab View software	Real time monitoring with reduced cost.	Other parameters like Glucose, BMI etc can be Considered.
4	Remote Heath Monitoring Using IoT	Mr Prashob Bharathan et all	IoT, raspberry pi	Portable device, improved disease management, human errors are reduced.	Only three parameters are considered additional parameters and services can be added

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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