Wireless Health Monitoring Using Iot And Python

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Abstract- *In today's era health problems are increasing day by day. Health problems like cardiac failure, lung failure are increasing in rate. Continuous monitoring of physical aspects of patients is necessary. So this problem was solved with a wireless technology. Hence an advanced wireless method of health monitoring is described here. As wireless technology using IOT is proposed. Here sensors like heartbeat and temperature are used which are interfaced with the microcontroller. As IOT is playing a vital role in this implantation. Using IOT concept, it can transport the information on particular website and to access this information remotely anywhere and anytime, the particular webpage has developed using HTML and python language which displays the health status of the patient. Accordingly doctor will suggest the medicines to patient.*

Keywords- Sensors, HTML, python, microcontroller, IoT

I. INTRODUCTION

Now-a-days, health problems are increasing day-by-day at a high amount. The death rate of 55.3 million people dying each year or 151,600 people dying each day or 6316 people dying each hour is a big issue for all over the world[1].we all agree that healthy life is our fundamental right which is main objective of world health organization. With the development of world health monitoring system is used in every field such as hospital, home, and sports.

This health monitoring system is used for chronical disease patient who have daily checkup. Normally it is difficult to keep track on abnormalities in heart beat count for patient itself manually. The patients are not well versed with manual treatment which doctor normally used for tracking the count of heart beat. There are many devices available in market to check internal body changes but there are many limits in maintenances part due to their heavy cost, size of instrument and mobility of patient.

So this paper proposes a healthy monitory system which is capable of detecting parameters like temperature sensor, heartbeat sensor Different platforms like microcontrollers are used to design the system based on performance. Different biomedical sensors like temperature sensor, heart beat sensor are used for monitoring health condition which is integrated on single system on chip if any varied change takes place**.** Using IOT and python this message is delivered to the doctor.

By using this method use of health monitoring in daily basis is very useful as it keeps data in very accurate manner and only access by authorized user remotely anywhere. Also it is very less time consuming. This paper will discuss the general overview of the proposed system details of design, operation of system in hardware and software domain. It concludes the observation made and the future expansion that can be made to the system.

II. COMPONENT DESCRIPTION

1) Microcontroller

The AT89S52 is a low power device. It provides high performance. It is an 8bit microcontroller with 4kB of flash programmable and erasable read only memory. It is also highly flexible and cost effective solution to many embedded control applications. It contains an integrated processor and memory. The programmable input/output peripherals of microcontroller are used to interact with things connected to the chip. Along with the usual arithmetic and logical elements of a general microprocessor, the microcontroller also has additional elements such as RAM for data storage, read-only memory for program storage, flash memory for permanent data storage, and other devices. Most of the times, microcontroller operates at low speed compared to microprocessors at clock speeds of around 32 kHz, but this is useful for many applications. They also consume very little power in milliwatts or even micro watts. They are also used in automatic devices, such as car engine systems, remote controls, machines, power tools, and toys. Use of microcontroller in solar system and anti-lock braking systems plays an important role. It has many uses in the medical field as well.

2) ADC

The Analog to Digital Converter (ADC) used here is 12 bit MCP3204. It is an IC converts a continuous quantity to a discrete time digital number. An ADC may also provide an isolated measurement. An ADC is an electronic device that

converts an input analog voltage or current to a digital number. The size of the number grows with an increase in the input voltage or current. Some non-electronic or only partially electronic devices, like rotary encoders, can also be considered ADCs. It combines high performance and low power consumption in a small package. It is ideal for embedded control applications. It has successive approximation register (SAR) architecture and an industry standard SPI serial interface. The features consist of 100k samples/second, 4 input channels, low power consumption and is available in 14pin PDIP, SOIC and TSSOP packages. Applications for the MCP3204 include data acquisition, instrumentation and measurement, multichannel data loggers, industrial PCs, motor control, robotics, industrial automation, smart sensors, portable Instrumentation and home medical appliances.

3) Heart Beat Sensor

It is design to give digital output of heart beat when finger is placed on it. Operating voltage is +5V, operating current is 100mA. The heat beat detection is indicated by LED. The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses results in variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate.

4) Temperature Sensor-LM35

It is an IC sensor that is used to measure temperature with an output voltage linearly proportional to the Centigrade temperature. The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. Normally LM35 possess low self-heating. It does not cause more than 0.1℃ temperature rise in still air. The operating temperature range is from -55°C to 150°C. The output voltage varies by 10mV in response to every °C rise/fall in ambient temperature, i.e., its scale factor is 0.01V/ °C.[4] The LM35 sensor has an advantage over linear temperature sensor, as the user has not to make the conversion of Kelvin to Centigrade. This is major significance of LM-35that it calibrates directly in Celsius and it is also suitable for remote applications.

III. METHODOLOGY

A. Block Diagram

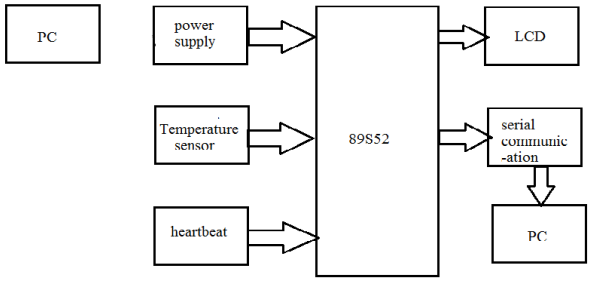

Fig: Block diagram of health monitoring system

B. System Operation

This project controls the health monitoring wirelessly using IOT and Python. In this, there is requirement of hardware as well software. Patient will have the hardware section and the doctor can access the information using software. Both sections work in parallel process. The hardware part will consist of sensors like temperature, heartbeat or some other sensors. These sensors are coupled to the patient's body hence implementation of hardware part plays an important role.

Sensors do their measurements and provide analog output regarding the sensed physical parameters of patient. These analog output signals are then sent to the microcontroller using sensor interfacing circuitry that converts analog signals coming from sensors into corresponding digital format and performs further signal conditioning. Sensors and microcontroller are interfaced to each other through an Analog to Digital Converter [1].

The microcontroller is connected serially to the system or computer. The information to be transmitted is uploaded on the system from the microcontroller and then it is uploaded on the webpage i.e. the collected user's data is saved over an internet cloud server or a web server. Using website designing and the Python language, webpage can be designed. This information can be accessed wirelessly by the means of IOT. IOT allows remote access across the network and it is responsible for availability and accessibility of data anywhere through the internet. So the doctors can access patient's information which will be displayed using the developed web page. This allows continuous remote health monitoring, which is of the benefits.

For the particular information only the authorized user can access the information, who knows the IP address of the designed webpage. According to the acquired information, doctors can suggest better medicines to the patient.

IV. SYSTEM DESIGN

A. *Use of IOT in health monitoring*

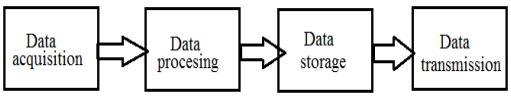

Fig: IoT application stages

The IOT is a vast network of devices connected to the Internet, including smart phones and tablets and almost anything with a sensor on it. These "things" collect and exchange data.

In this IOT system is used to store the information on particular website using programming like HTML. It is an ecosystem which is connected to physical objects that are accessible through the internet. The 'thing' in IOT could be a person with a heart monitor or an automobile with built in sensors, i.e. objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn affects the decisions taken. The quick expansion of Internet-connected objects is also expected to store and process the data more effectively.

Health sensing components can be worn by patients round the clock for monitoring. If these monitoring devices are equipped with unique IP address then those devices can be uniquely identified over the internet by users. It acts as an information retriever, retrieving information from the physical world to the digital world [5].

B. Use of python in health monitoring

Use of python language is that it saves the data of physical status of the patient's health so that we can access this information from anywhere as only authorized user can handle this site who knows the particular address of his page.
Python is a widely used general-purpose, high level programming language. It was mainly developed for emphasis on code readability. Python is an example of a high level language; other high level languages you might have heard of are C, C++, Perl, and Java. Python is considered an interpreted language. There are two ways to use the interpreter: interactive mode and script mode. In interactive mode, you type python programs and the interpreter displays the result. Alternatively, you can store code in a file and use the interpreter to execute the contents of the file, which is called a script. Python scripts have names that end with „py. To execute the script, you have to tell the interpreter ‟ the name of the file. Python features a dynamic type system and automatic memory management and includes object-oriented, imperative, functional programming, and procedural styles. It has a large and comprehensive standard library. Python interpreters are available for many operating systems, allowing Python code to run on a wide variety of systems. C Python, the reference implementation of Python, is open source software and has a community-based development model, as do nearly all of its variant implementations.

V. CONCLUSION

In this paper, we have analyzed Microcontroller based health monitoring system using IoT and python. Any abnormalities in the health conditions can be known directly and are informed to the particular person or doctor through web page via internet. The proposed system is simple, power efficient and easy to understand. It acts as a connection between patient and doctor. The hardware for the project is implemented and the output results are verified successfully. This project reduced the time as well as provides solution in emergency situation. It can be used anywhere and anytime but only by authorized users who knows the IP address of the same it can be used as assistance for physically challenged people. Continuous health monitoring in accurate numerical terms is possible. It is used in Military applications. It minimizes harmful effects due to cable attenuation.

REFERNCES

[1] Vivek Pardeshi[1], B.E.(EXTC) and Saurabh Sagar[2], B.E.(EXTC)., "*Health Monitoring Systems using IoT and Raspberry Pi-A Review*," in The International Conference on Innovative Mechanisms for Industry Applications(ICIMIA 2017)

[2] Ahmed Abdelgawad[1], Kumar Yelamarthi[1], Ahmed Khattab[1]
"*IoT-Based Health Monitoring System for Active and Assisted Living*," in The ICST Institute for computer sciences, social Informatics and Telecommunication Engineering 2017.O.Gaggi et al.(Eds.):GOODSTECHS 2016,LNICST 195,PP.11-20,2017

[3] Manisha Shelar, Jaykaran Singh, Mukesh Tiwari, "*Wireless Patient Health Monitoring System*," in The International Journal of Computer Applications(0975-8887),Volume 62. Number 6. January 2013

[4] Moeen Hassanalieragh, Alex Page, Tolga Soyata, Gaurav Sharma, Gonzalo Mateos, "Health Monitoring and Management using IOT sensing with cloud based

processing", 2015 IEEE conference on Services Computing.

[5] Thirumalasetty Sivakanth, S. Kolangiammal, 'Design of IOT based Smart Health monitoring and alert system', International Science Press, 2016

[6] Md. Shaad Mahmud, Honggang Wang, A. M. Esfar-E-Alam, Hua Fang, 'Wireless Health Monitoring System using Mobile Phone Accessories', IEEE IOT Journal