IoT Based Health Monitoring Using Raspberry pi

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Abstract: With the advancement in technology today IOT makes all objects interconnected and it has been recognized as the next technical revolution. And it is being used in different methodologies like smart home automation and patient health monitoring system etc. Among with these approaches a very useful approach is to monitor the health situation of a patient and screen it to the doctors and other paramedical staff through the IOT. As we know that it is very difficult to screen the patient for 24 hour. So here the status of patient health i.e Heart rate, Body Temperature, Position of the body, and Blood pressure and so on. All of these parameters can be measured by utilizing some sensors. The collected data through the sensors is then transferred to the internet. And Via internet this data is transferred to computers which are registered to the server of the database as well as the Smartphone of the doctors. After analyzing the data doctors can then prescribe the medication based on the data results shown by the system. This prototype will minimize the burden on patients to visit the doctors every time for monitoring of these health parameters.

Keywords: Raspberry pi, IoT, Sensors

I. INTRODUCTION

In current scenario on the earth, health related problems are increasing day to day. 151,600 people are dying per day. This graph can be reduced by modernization in the techniques used for patient monitoring. In the traditional approach the healthcare professionals play the major role. They need to visit the patient's ward for necessary diagnosis and advising. There are two basic problems associated with this approach. Firstly, the healthcare professionals must be present on site of the patient all the time and secondly, the patient remains admitted in a hospital, bedside biomedical instruments, for a period of time. In order to solve these two problems, the patients are given knowledge and information about disease diagnosis and prevention. Secondly, a reliable and readily available patient monitoring system (PMS) is required [1]. In order to improve the above condition, we can make use of technology in a smarter way. In recent years, health care sensors along with raspberry pi play a vital role. Wearable sensors are in contact with the human body and monitor his or her physiological parameters. We c an buy variety of sensors in the market today such as temperature sensors, pulse monitors etc. The cost of the sensors varies according to their size, flexibility and accuracy [2]. The Raspberry Pi which is a cheap, flexible, fully customizable and programmable small computer board brings the advantages of a PC to the domain of sensor network [3]. In our system we are measuring patient's parameters (Temperature , heart rate, pulse, etc) different available sensors. These sensors collected data i.e. biometric information is given to raspberry pi and then it is transferred to server. The data stored in a database and can be displayed in a website that can be accessed only by authorized personnel [4]. The doctors, RMOs, patient or his family members can be given authorization. The system even facilitates the doctor to view the patient's previous history from the data in memory.

II. LITERATURE SURVEY

Patient health signals using IOIO - OTG Microcontroller received. Android application is created for health Monitoring. IOIOOTG microcontroller is connected to android phone using USB cable (or) Bluetooth dongle. After collecting data, the wave is send to android application. Monitor and store health signals in that android based application. And monitors blood pressure level using Keep In Touch (KIT) and closed loop healthcare services. In KIT method, KIT is connected to the JAVA based mobile phone with the help of near field communication. It works on magnetic, inductive coupling and then the distance is short. After touching the KIT, the data is send to mobile phone. In closed loop services, t he data is getting from mobile phone, then the data is send to the secure website. Using this website anybody can monitor patient's blood pressure level.

III. SYSTEM ARCHITECTURE

Here, in this block diagram the whole system is controlled by Arm11 processor and this processor is implemented on Raspberry Pi Board. The system consists of Raspberry pi, sensors, SD card and personal computer. Those all components are connected by USB adaptors. Raspberry pi is the key element in processing module.

a) Raspberry pi

A Raspberry Pi is a thirty five dollar, credit card sized computer board which when plugged into an LCD and attachment of a keyboard and a mouse, it is able to complete the functions of any regular PC can. Like a PC, it has RAM, Hard Drive (SD Card), Audio and Video ports, USB port, HDMI port, and Ethernet port. With the Pi, users can create spread sheets, word-processing, browse the internet, play high

definition video and much more. It was designed to be a cost friendly computer for users who needed one. There are two models, Model A,B and 3. Model 3 is the faster containing 1GB of RAM as well as the ability to over clock.

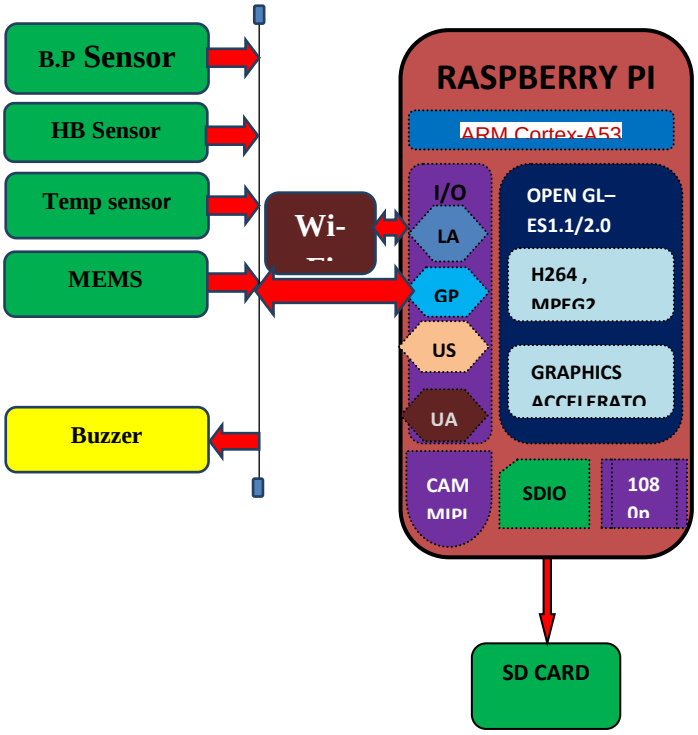
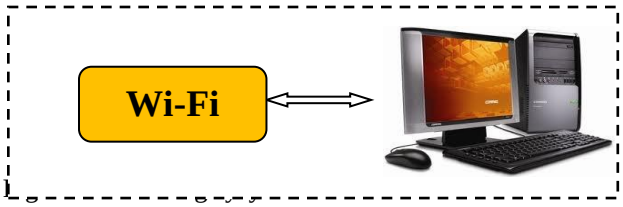


Figure: system architecture for product label reading



It is a powerful, low cost, and a small card sized device which is a perfect platform for interfacing with many devices. The board contains a processor, graphics chip, RAM memory, interfaces to other devices and connectors for external devices, of which some are necessary and some are optional. There are much versions of Raspberry Pi but the CPU (BCM2837) of all the models of Raspberry Pi remains same. The CPU is somewhat cheap, powerful and efficient and it does not consume a lot of power. It works in the same way as a standard PC requiring a keyboard for giving commands, a display unit and power supply.

Figure: Raspberry pi

b) Blood pressure sensor

The blood pressure sensor is designed to measure human blood pressure. It also measures the systolic and diastolic pressure and pulse rate is also recorded by this sensor. It is more accurate and reliable than the sphygmomanometer, the instrument attached to inflatable air bladder cuff and used with a stethoscope for measuring blood pressure in an artery. In simple word, pressure o f blood against blood vessels walls or arteries is measure using blood pressure sensors.

c) **Temperature Sensor-LM35**

This sensor used to sense the temperature more accurately having an accuracy of +/-0.4°C and works on the principal of thermocouple. It has better accuracy than that of the thermistor and does not undergo any oxidation as it is sea led. It does not need amplifying the output voltage. It is an analog type of device. It gives the output voltage proportional to the °C temperature .

Pulse rate Sensor

It is used to measure the heartbeat of the patient. It gives a digital output of heart beat when a finger is placed on it. It is compressed in size. The working voltage of heart beat sensor is +5V DC. It works on the principle of light modulation by blood flow thro ugh finger at each pulse. Heart beat sensor is used to measure heart beat which normally lies between 60-100bpm.

d) MEMS

MEMS accelerometers are one of the simplest but also most applicable micro-electromechanical systems. Accelerometer is an electromechanical device that measures acceleration forces. These forces may be static, like the constant force of gravity pulling at our feet, or they could be dynamic - caused by moving or vibrating the accelerometer.

IV. SOFTWARE REQUIREMENT

a) Python

Python is a widely used general-purpose, high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. The language provides constructs intended to enable clear programs on both a small and large scale. Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles .It features a dynamic type system and automatic memory management and has a large and comprehensive standard library.

V. RESULTS

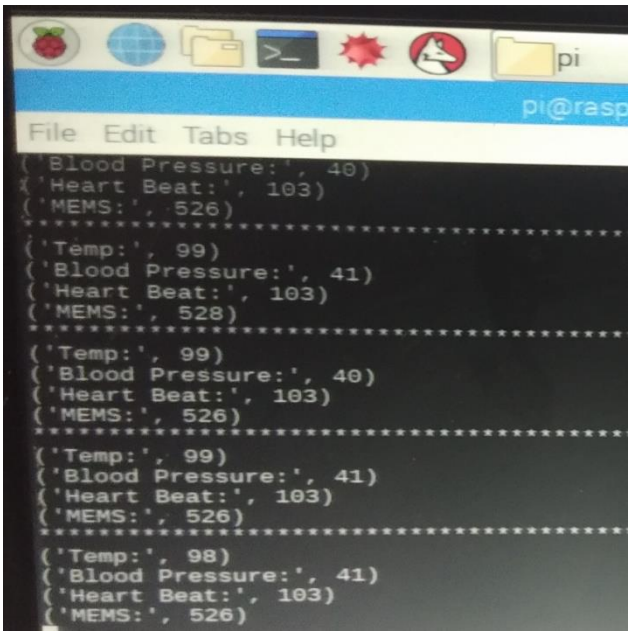


Figure: Terminal Window Execution

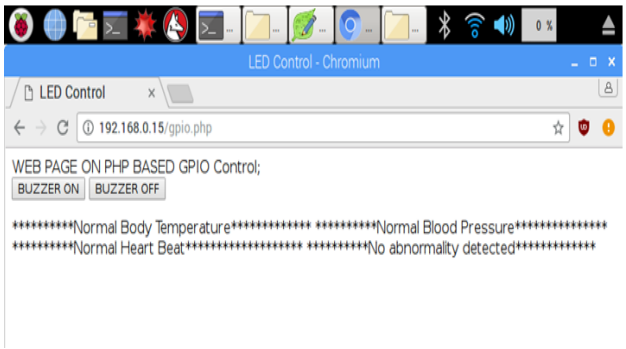


Figure: Webpage Results

VI. CONCLUSION

Process is developed to monitor the current status of the patient irrespective to the presence of the doctor. This paper concentrates on calculating the parameters like Temperature, Heartbeats, Blood Pressure and Acceleration Monitoring altogether on a single kit, with the help of server doctors as well as patient collect the information of the patient. With the right information at the right time, the sensor based medical system can help medical patient to easily track and monitor their health record. In Future medical application we can use our system Using MQTT and COAP protocols means, it will give high speed data processing

VII. REFERENCES

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