IOT Based Architecture for Patient Health Monitoring System

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ABSTRACT: In today's world many Health monitoring systems are designed by considering different environmental parameters. Now-a-days Health care Environment has totally adapted based on technology. In this fast pace of life Peoples are facing a many problems of unexpected disease and death   the main reason is heart attack, Humans are facing these problems because they are unable to get the medical treatments, as well as lack of medical care at right time to patient. To avoid such kind of death rate we are using Body Health Monitoring. The people who are having This Body Health Monitoring system they will be carrying hardware having sensors and android phone application. This system works like first the sensors will sense the body temperature and heart rate of heart attack patient and by collecting this information is transferred to android smart phone applications via Bluetooth, Wi-Fi. System has another facility to store the cloud database and these database stores all information of patient's health based on this information the Doctors will prescribe medicine to patient. By using this device the patient can move freely and also monitored continuously.

KEYWORDS: IOT monitoring system, Sensor, Android smart phone application.GPS system.

I. INTRODUCTION

In this paper is to build and design a sensing and also data conditioning system to get the accurate heart rate, ECG, blood pressure, and body temperature. To-day several devices are commercially available for personal health care, fitness, and activity awareness. In hospitals where the patients must be under continual observation or under active medical care for longer duration for this purpose the constant monitoring is required. By using internet of things we are monitoring various parameters of the patient. The patient monitoring system based on Internet of things project and the real-time parameters of patient's health are sent to cloud using the connection of internet. The user can get these details anywhere in the world because the parameters are sent to remote Internet location so that user can get the information

The IOT based patient health monitoring system; details of patient health can be seen by users. The reason in this system is that the information needs to be monitored by meting a URL or website. There is a comparison between SVM and IOT based patient health monitoring system. The GSM based patient monitoring system, in this system the patient health parameters are sent by using GSM via SMS. The IOT based monitoring system, in this system the detail information of the patient health can be seen by users. The main advantage of IOT based patient monitoring system data can be seen by using desktop computer, laptop, and also using android smart phone, tab or Tablet. To view this data the user required a working internet connection. One more alternative way to view the data this is possible by using the various cloud services. There are many cloud service providers namely Things speak, Sparkfun and IOTGeek .

The today generation technology mainly focuses on monitoring and controlling of different activities. To monitor and assess the conditions in case of exceeding the prescribed level of parameters and these parameters required an efficient environmental monitoring system. In hospital there are emergency for regular monitoring of patients. The

patient heartbeats are regularly monitored. When the patients return to home there is no emergency to check the parameters. If there is again a chance that the disease come back then the patient's data information like temperature, heart rate, position) will be determined and send to server. The sending measured data to server, period of sending is fixed that is every 3 min. Doctor's by using android application in there smart phone, they can view his patient's health condition. If any problems or parameter goes beyond the threshold value he will get an alert notification.

II. LITERATURE SURVEY

Luigi Atzori et.al [1] In his paper addresses the Internet of Things. The main advantage of this enabling factor is promising paradigm is the combination of some technologies and communications solution. Tracking technologies and identification, wireless and wired sensor as well as actuator networks, well developed communication protocols also distributed intelligence for smart objects are just most important. The results of Internet of things are synergetic activities gathered in various fields of knowledge, like telecommunications, informatics, social science and electronics. This survey is pointed to those who want to approach this complicated discipline and contribute to its development

Eleonara Borgia et.al [2] In this paper the Internet of Things (IoT) means that a new paradigm that makes a combination of aspects and technologies which are coming from various approaches. To form system some devices are combined together such devices are Internet Protocol, sensing technologies, communication technologies, and embedded device etc. The system where the real and digital worlds meet and are continuously in symbiotic interaction. The building block of the IoT vision is a smart object. The smart objects mean they are not only able to collect the information from the environment and interact/ control the physical world, but also to be interconnected with each other through Internet to exchange data as well as information. In this paper we present the some key words and features as well as the driver technologies of IoT

Gennaro tartarisco et.al.[3] this paper includes the information about how to build or develop a new computational technology based on clinical decision support systems, information processing, wireless communication and also data mining kept new premises in the field of Personal Healthcare systems. This architecture is developed to gather and manage a huge amount of data which supporting the physicians in their process of decision through a continuous similar remote monitoring model. This architecture is useful to evaluating stress state of individual subject perfect for stress monitoring during the period of normal activities described. The some novel integrated processing approach are based on the factors are autoregressive model; artificial neural networks are helpful for identifying stress conditions. The architecture is designed to get the classification terms of stress conditions.

III. METHODOLOGY

IOT patient monitoring has 4 sensors. First one is a temperature sensor, second is Heartbeat sensor and the third one is humidity sensor. Fourth one is motion sensor. The project is based in RFID and GPS is used to send message in time of emergency. This project is very useful since the doctor can monitor patient health parameters just by visiting website or URL.

Figure.3: Block diagram of Health monitoring system

3.1 Arduino Uno

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P .It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without warring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.

3.2 Heart rate sensor

The heartbeat sensor is based on the principle of photo phlethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by blood, the signal pulses are equivalent to the heart beat pulses. 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 causes a 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. Thus the major requirement is to isolate that AC component as it is of prime importance.

3.3 SPO2

SpO2 stands for peripheral capillary oxygen saturation. This sensor is useful in making Pulse oximetry, which is a test that measures what proportion of the oxygen-carrying molecules in the blood (called hemoglobin) are actually carrying oxygen. This is known as oxygen saturation or SpO2. One hundred percent oxygen saturation is attained when all hemoglobin in the blood is completely saturated with oxygen. This simple test does not require a blood sample and is called non-invasive.

3.4 RFID-

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC).

3.5 GPS

The Global Positioning System (GPS), originally Navstar GPS,[a][b] is a space-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geo location and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver. However, the US government can selectively deny access to the system, as happened to the Indian military in 1999 during the Kargil War.

IV. RESULTS

The heart of the embedded system is a RISC family microcontroller like PIC 16F84/Atmel 8051/ Motorola 68HC11 and so on. Most important thing that differentiates these microcontrollers with microprocessors like 8085 is their internal read/writable memory (EPROM). So You can develop your light weight program (in Assembly language or using Embedded C with software like Keil) and "burn" the program into the hardware. These programs keep on running in a loop. Interestingly in most embedded system a single program is burn with several subroutines. So unlike your PC, microcontroller device in an embedded system runs a single program infinitely. You can connect several input and output devices with these microcontrollers which are either memory mapped or IO mapped.

(a)

(b)

Figure 4: (a) Block diagram of Embeded System (b) Block diagram of Ubidots Cloud
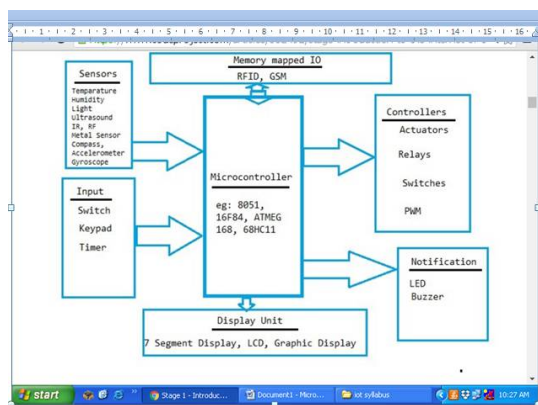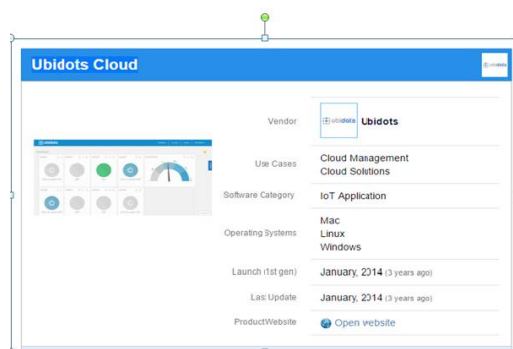
This simple hardware includes LCD display, buzzers, keypad (numpad) or even a printer. You connect several sensors through A/D interface. Ubidots was first born as an engineering services firm, specializing in hardware and software development for IoT projects izn Latin America. After going through the Boston Mass Challenge Accelerator -with a purpose of turning ourselves into a global product-based startup- the idea of an IoT cloud was born; specially one that understood the real needs of hardware engineers monitoring i.e. connecting all the objects to internet for quick and easy access.

IV. CONCLUSION

In this paper with the wide use of internet this work is focused to implement the internet technology to establish a system which would communicate through internet for better health. Internet of things is expected to rule the world in various fields but more benefit would be in the field of healthcare. Hence present work is done to design an IOT based smart healthcare system using a PIC18F46K22 microcontroller. The Future work of the project is very essential in order to make the design system more advanced. In the designed system the enhancement would be connecting more

sensors to internet which measures various other health parameters and would be beneficial for patient monitoring i.e. connecting all the objects to internet for quick and easy access.

REFERENCES

[1]   Luigi Atzori et al, "The Internet of Things: A survey", Computer Networks, Vol.54, pp. 2787-2805, 2010.
[2]   Eleonora Borgia, "The Internet of Thigs vision: Key features, application and open issues", Computer Communication, Vol.54, pp. 131, 2014.
[3]   Gennaro Tartarisco, Giovanni Baldus, Daniele Corda, Rossella Raso, Antonino Arnao, Marcello Ferro, Andrea Gaggioli, Giovanni Pioggia, "Personal Health System architecture for stress monitoring and support to clinical decisions", Computer Communications Vol.35, pp.1296–1305, 2012.
[4]   Franca Delmastro, "Pervasive communications in healthcare", Computer Communications Vol.35, pp.1284–1295,2012. Aruna Devi.S et al. / International Journal of Computer Science & Engineering Technology (IJCSET) ISSN : 2229-3345 Vol. 7 No. 03 Mar 2016 72
[5]   Tao Liu , Yoshio Inoue, Kyoko Shibata, "Development of a wearable sensor system for quantitative gait analysis", Measurement Vol. 42, pp.978–988, 2009.
[6]   Stefano Abbate, Marco Avvenuti, Francesco Bonatesta, Guglielmo Cola, Paolo Corsini, Alessio Vecchio, "A smartphone-based fall detection system", Pervasive and Mobile Computing Vol. 8,pp.883–899 , 2012.
[7]   Mohammed Riyadh Abdmeziem, Djamel Tandjaoui, "An end-to-end secure key management protocol for e-health applications", Computers and Electrical Engineering Vol.44, pp.184-197, 2015.
[8]   Boyi Xu, Li Da Xu, , Hongming Cai, Cheng Xie, Jingyuan Hu, and Fenglin Bu, "Ubiquitous Data Accessing Method in IoT-Based Information System for Emergency Medical Services", IEEE Transactions on Industrial Informatics, Vol. 10, No. 2, May 2014.
[9]   Long Hu, Meikang Qiu, Jeungeun Song, M.Shamim Hossain and Ahmed Ghoneim, "Software Defined Healthcare Networks", IEEE Wireless Communications, Vol. 22 No. 6, pp. 67-75, 2.
[10] H. Alemdar, C. Ersoy. "Wireless sensor networks for healthcare: A survey." Computer Networks, Vol. 54, No. 15, 2010.