

Smart Health Care System using IOT

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Abstract: The recent advancements in technology and the availability of the Internet make it possible to connect various devices that can communicate with each other and share data. The Internet of Things (IoT) is a new concept that allows users to connect various sensors and smart devices to collect real-time data from the environment. This paper describes the design of a simple, low-cost controller based wireless Multipatient health monitoring system using ZIGBEE, RFID, GSM with wireless automatic doctor alerting through SMS. For the medical professionals it becomes important to continuously monitor the conditions of a patient. In a large setup like a hospital or clinical center where a single doctor attends many patients, it becomes difficult to keep informed about the critical conditions developed in each of the patients. This project provides a device which will continuously monitor the vital parameters to be monitored for a patient and do data logging continuously. If any critical situation arises in a patient, this unit also raises an alarm and also communicates to the concerned doctor by means of an SMS to the doctor.

Keywords: Internet of Things, GSM, RFID Card, ARM Controller, Heart beat sensor, Temperature sensor, Accelerometer and Zigbee.

I. INTRODUCTION

In the new era of communication and technology, the explosive growth of electronic devices, smart phones and tablets which can be communicated physically or wirelessly has become the fundamental tool of daily life. The next generation of connected world is Internet of Things (IoT) which connects devices, sensors, appliances, vehicles and other “things”. The things or objects may include the radio-frequency identification (RFID) tag, mobile phones, sensors, actuators and much more [1]. With the help of IoT, we connect anything, access from anywhere and anytime, efficiently access any service and information about any object. The aim of IoT is to extend the benefits of Internet with remote control ability, data sharing, constant connectivity and so on. There are so many people in the world whose health may suffer because they do not have proper access to hospitals and health monitoring. Due to the latest technology, small wireless solutions which are connected to IoT can make it possible to monitor patients remotely instead of visiting the physical hospital. A variety of sensors which are attached to the body of a patient can be used to get health data securely, and the collected data can be analyzed (by applying some relevant algorithms) and sent to the server using different transmission media (3G/4G with base stations or Wi-Fi which is connected to the Internet) [4]. All the medical professionals can access and view the data, take decision accordingly to provide services remotely. Internet of Things gains its full potential by utilizing the key role playing objects i.e. “Smart” objects which use various sensors and actuators that are able to perceive their context, and via built in networking capabilities they could communicate to each

other, access the open source Internet services and interact with the human world. This not only makes the world connected but also robust and comfortable. The Internet of things in the field of healthcare also plays a major role in providing ease to patients and doctors. It consists of a system that communicates between network connected systems, apps and devices that can help patients and doctors to monitor, track and record patients’ vital data and medical information. A lot of advancement and significant changes are occurring in the field of IOT healthcare. The way of interacting and communicating with humans and other devices is changing and getting better day by day. Management of healthcare results and reduction of healthcare costs is enabled by the ever growing information and communication solutions. The healthcare services are getting better and less costly by collecting, recording, analyzing and sharing new data packets in real time and efficiently. Also, as the world is adopting this ever growing technology of IOT, many of the inefficiencies in healthcare will be reduced. For example, various medical devices like fitness bands, health monitoring systems, medication boxes has smart sensors embedded into them that allows to collect the raw data, store it, analyze it, and conduct tests which are further used by medical experts to take proper decisions. To take the full advantage of revolutionizing IOT in healthcare, the consumers, patients and other health experts need to think of some innovative and more reliable methods. And with the help of IoT’s potential they are now able to collect realtime raw data from unlimited number of patients for a continuous period of time through smart devices connected on an interconnected network. It will take time to fully realize the technology’s capabilities. We will be able to see medical experts carrying out diagnosis and critical tasks in a more better and reliable way. This will ensure them not only

International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE) Vol 4, Issue 5, May 2017

with reliable results but also time saving which will be of maximum benefit. The possibilities of IOT are truly unlimited and ever growing. This paper proposes an IoT based health monitoring system which would collect all the medical data of a patient including his heart rate, temperature and movement and would send alerts to the patient's doctor regarding his/her full medical information, providing a fast and reliable healthcare service. Moreover, in today's world everyone is busy neglecting their small healthcare problems like high blood pressure, low pulse rate etc. The paper helps to find a better and robust solution to this challenge.

II. LITERATURE SURVEY

Karan deep Malhi et al [1] develop Zigbee smart noninvasive wearable physiological parameters monitoring device has been developed and reported in this paper. The system can be used to monitor physiological parameters, such as temperature and heart rate, of a human subject. The system consists of an electronic device which is worn on the wrist and finger, by an at risk person. Using several sensors to measure different vital signs, the person is wirelessly monitored within his own home. An impact sensor has been used to detect falls. The device detects if a person is medically distressed and sends an alarm to a receiver unit that is connected to a computer. This sets off an alarm, allowing help to be provided to the user. Rubina.a.shaikh, et al [2] Design a module to monitoring of remote patients, after he is discharged from hospital. I have designed and developed a reliable, energy efficient remote patient monitoring system. It is able to send parameters of patient in real time. It enables the doctors to monitor patient's parameters (temp, heartbeat, ECG) in real time. Here the parameters of patient are measured continuously (temp, heartbeat, ECG) and wirelessly transmitted using Zigbee. B. sirisha et al [3] describes a solution for enhancing the reliability, flexibility by improving the performance and power management of the real-time multi-patient monitoring system (MPMS).

III. EXISTING SYSTEM

Currently there are number of health monitoring systems available for the ICU patients which can be used only when the patient is on bed. This system is wired everywhere. The patient is monitored in ICU and the data transferred to the PC is wired. Such systems become difficult where the distance between System and PC is more. The available systems are huge in size. Regular monitoring of patient is not possible

once he/she is discharged from hospitals. These systems cannot be used at individual level. The other problem with these systems is that it is not capable of transmitting data continuously also range limitations of different wireless technologies used in the systems. So to overcome these limitations of systems we have proposed a new real time health monitoring system of patient based on ZIGBEE, GSM, and SMS is designed and developed in this project.

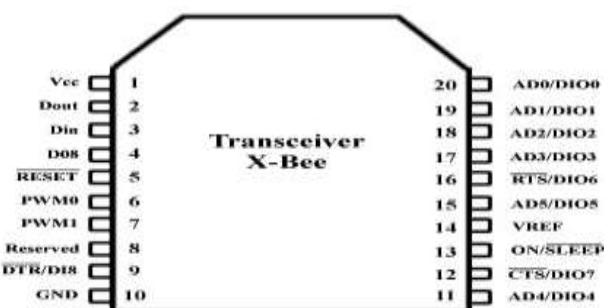


IV. PROPOSED HARDWARE SYSTEM

Microcontroller: The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate.

RFID Reader: RFID Reader Module, are also called as interrogators. They convert radio waves Returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to communicate.

ZIGBEE Transmitter: ZIGBEE is a PAN technology based on the IEEE 802.15.4 standard. Unlike Bluetooth or wireless USB devices, ZIGBEE devices have the ability to form a mesh network between nodes. Meshing is a type of daisy chainin from one device to another. This technique allows the short range of an individual node to be expanded and multiplied, covering a much larger area.



Accelerometer: An accelerometer is an apparatus, either mechanical or electromechanical for measuring acceleration or deceleration. Micro-Electro- Mechanical Systems (MEMS) is the integration of mechanical elements, sensors, actuators, and electronics on a common silicon substrate through micro fabrication technology.

GSM Modem: GSM/GPRS RS232 Modem from rhydo LABZ is built with sim com Make SIM900 Quad-band GSM/GPRS engine, works on frequencies 850 MHz, 900 MHz, 1800 MHz and 1900 MHz It is very compact in size and easy to use as plug in GSM Modem.

Temperature sensor LM35: LM35 series are precision integration-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. The LM35 does not require any external calibration or trimming to provide typical accuracies. This is 3 legs IC that directly gives analog output. This unit requires +5VDC for it proper operation.

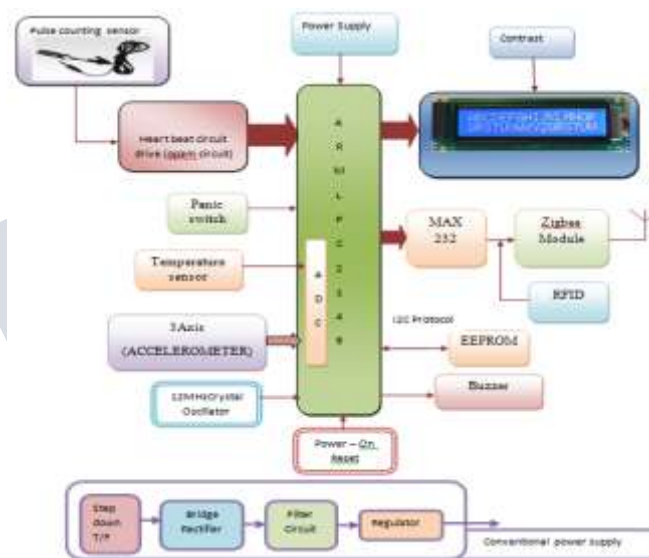


HEART BEAT or PULSE SENSOR: The heart beat is sensed with help of an LED and LDR arrangement. The LED is a high intensity type LED. Here the LDR is the sensor. As

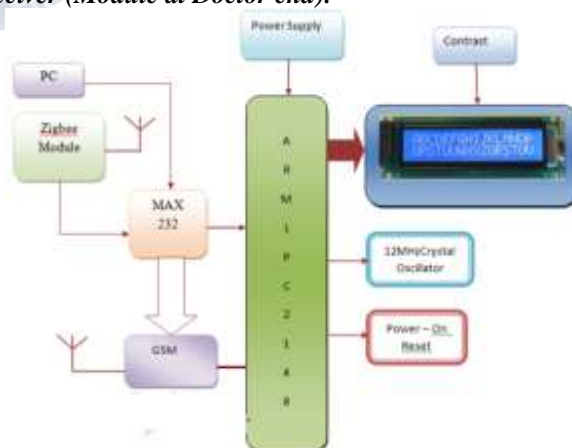
Sensor, a photo diode or a photo transistor can be used. The skin may be illuminated with visible (red) or infrared LEDs using transmitted or reflected light for detection. The very small changes in reflectivity or in transmittance caused by the varying blood content of human tissue are almost invisible.

V. DESIGN OF PROPOSED SYSTEM

Transmitter (Module at patient end):



Receiver (Module at Doctor end):

**Transmitter:**

Transmitter:

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International Journal of Engineering Research in Electronics and Communication Engineering (IJERCE) Vol 4, Issue 5, May 2017

system using Zigbee, RFID, GSM with wireless automatic doctor alerting through SMS. For the medical professionals it becomes important to continuously monitor the conditions of a patient. In a large setup like a hospital or clinical center where a single doctor attends many patients, it becomes difficult to keep informed about the critical conditions developed in each of the patients. This project provides a device which will continuously monitor the vital parameters to be monitored for a patient and do data logging continuously. If any critical situation arises in a patient, this unit also raises an alarm and also communicates to the concerned doctor by means of an SMS to the doctor. In this project, we are sensing the heart beat rate, movement and temperature sensor. If the heart/temperature is above/below the normal rate, then the heart rate/temperature information is sent as SMS through the GSM modem & simultaneously updates the information in IOT, Transmitter communicates to receiver through the zigbee and rings the buzzer. If you want the heart rate/temperature at any time of the person then it can be viewed through the website or app provided by the hospital by using IOT. Here we are using different sensors to monitor the health conditions of two patients even though they are at remote place.

Receiver:

The information will be wirelessly carried to doctor by using an advanced XBEE communication device at both ends. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red Device sensors and the rate is then averaged and displayed on a text based LCD), various temperature ratings of patient and display it wirelessly at receiver end. Here we are providing a panic switch to each patient to indicate any adverse conditions to doctor. And in case of any drastic health changes automatically a SMS will be given to the doctor, with that we are providing a MEMS based device

ADXL3XX to patient for giving an alerting signal to nurse for basic necessities. Once the patient is going to discharge from hospital the patient is provided with RFID based card to have the patient details bestored in. This reduces the problem to user instead of carrying report while leaving from hospital.

VI. CONCLUSION

The main idea of the proposed system is to provide better and efficient health services to the patients by implementing a networked information cloud so that the experts and doctors could make use of this data and provide a fast and an efficient solution. The final model will be well equipped with the

features where doctor can examine his patient from anywhere and anytime. Emergency scenario to send an emergency mail or message to the doctor with patient's current status and full medical information can also be worked on. The proposed model can also be deployed as a mobile app so that the model becomes more mobile and easy to access anywhere across the globe.

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