

Automated Health Monitoring System Using GSM and IOT

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ABSTRACT

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The current hospital-centric healthcare becoming inefficient to treat those conditions that demand immediate treatment with the availability of 24 hours. like Comma or unconsciousness is the state wherein the patient cannot respond to any internal or external stimulus. In this situation, patients have no physical control over their entire bodies. Such cases require serious attention and continuous monitoring to save a patient's life. There is a very big issue to monitoring these patients by hospital nurses and there is also the availability of nurses is low for every patient. So in this paper, we propose an automated health monitoring system based on a global system for mobile (GSM) and IoT. We also introduce the GSM module in our health monitoring system to send an alert message to the prospective doctor. We measure patients heart rate and temperature using IOT sensors which are connected with the XBEE module.

Keywords : GSM, IoT, XBEE, Monitoring

I. INTRODUCTION

Coma or many heart diseases is a medical state wherein the patient cannot respond to any internal or external stimulus. Such cases require serious attention and continuous monitoring to save the patient's life. Thus, it is not an easy task to monitor every patient regularly. Nowadays, having someone to watch critically ill people is very costly and needs experienced staff. In Health Monitoring Systems, a surgeon can continuously monitor more than one patient, generally, doctors and nurses are facing two basic problems to monitor patients' health. The first problem is the need for health care providers to present bedside the patient, while the second one is

the patient is restricted to bed and wired to large machines.

In this paper, we propose a health monitoring system based on the Global system for mobile (GSM) and Internet of things (IoT). Our system is continuously supervised patients and send SMS message about the health condition of the patient to the doctor or person in charge only when attention is needed or in any emergency cases. Wearable sensors are in contact with the human body which measures physical conditions. This will let the coma patient's family check their relative patient online without any need to stay in the hospital or call the doctor. We Develop a Graphical User Interface (GUI) for live monitoring of the heart rate and temperature of the patient and

physical body movements using sensors. The system can also monitor patient conditions online and store data on the cloud. We are also using ZIGBEE in our health monitoring system in which the patient's health is measured and the data is sent to the centralized arm controller for data analysis. We use the raspberry pi as a personal server and it can be accessed with the LAN [1].

II. LITERATURE / BACKGROUND

During the past decade, there has been rapid growth in health monitoring systems. As the whole world is facing the covid19 pandemics there is a very need for an automated health monitoring system to maintain the social distancing and also prevent doctors to get affected by these covid19 pandemics. An automated health monitoring system can reduce the healthcare system burden from all medical staff of the hospital. Although this technology is becoming more sophisticated, there are still concerns with the quality of medical data, security of patient medical information, stability of complex monitoring systems, usability, acceptability by the medical staff as well as patients, and the frequency of false alarms being generated.

• Wearable Sensors

A smart and wearable sensor is incorporated in a vest. A variety of sensors are integrated into the fabric of his garments. The parameters which are measured by the sensors include ECG, Heart rate, Blood pressure, Body temperature, and also patients skin response is measured [2]. Sensors are connected with the system monitor to measure patient's behavior during daily activities. The cloud server receives all the information/data which is sent by the sensors by measuring the patient's health [3].

III. PROPOSED SYSTEM / METHODOLOGY

In our system model, there is a block diagram and a flow chart. First of all our system takes data from the sensor which is connected with the patient's body and then the data is sent to the Arm controller which is connected with the ZIGBEE application. Then our GSM modem is also connected with the Arm controller to receive the data/information of the patient. The doctor's phone is connected with the GSM modem to receive an alert message which is sent by the system; also the Doctors pc is connected with ZIGBEE [4].

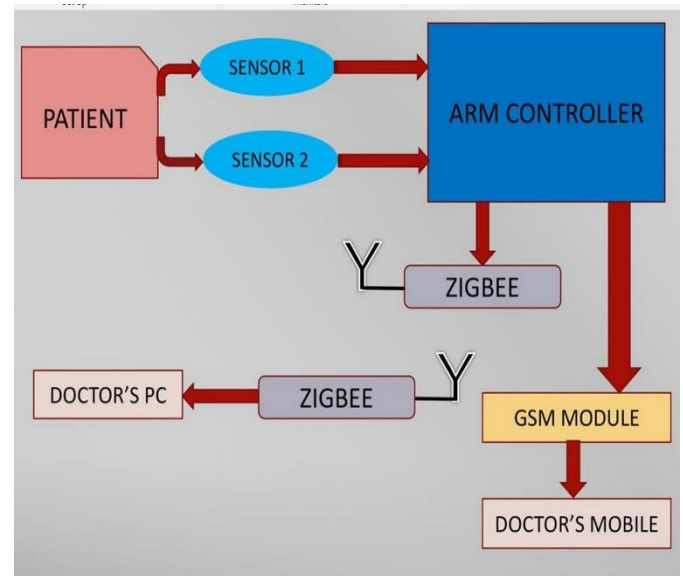


Fig.1 : Block diagram of proposed system

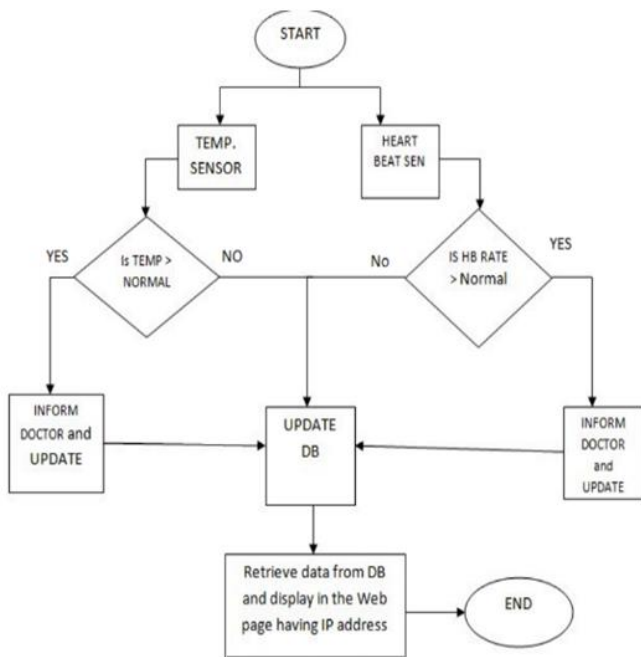


Fig. 2: Flow chart of automated health monitoring system

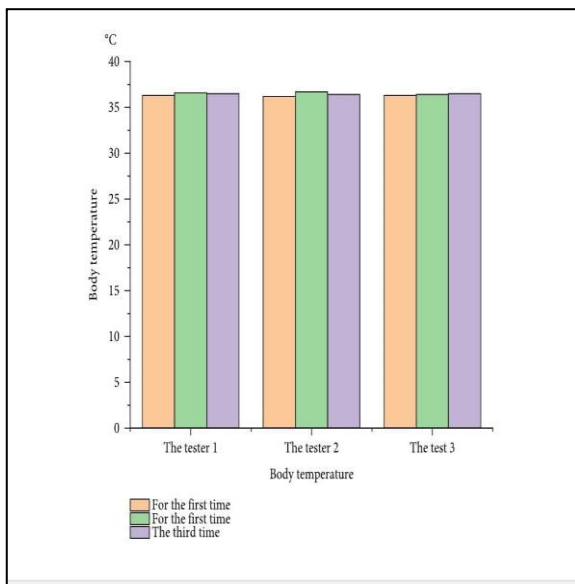


Fig. 3: Representation of three person’s temperature by using a thermometer

IV. TOOLS & TECHNOLOGY

HARDWARE DETAILS

1) XBEE radio module: It is the radio module which is launched by Digi international company. This works on 802.15.4 standard. There are two flavors of the XBEE series namely S1 and S2. This idea employs

XBEE S2 over S1 because the range of coverage for S2 is more than S1 and the output power is also more in S2 than S1. XBEE S2 is a twenty-pin chip that operates at a 3.3V power supply and it functions in two modes namely API (Application Programming Interface) mode and AT (Attention) Mode.

2) Temperature Sensor: LM35DZ sensor is employed in the implementation to collect the temperature information from the patient. LM35 is a more accurate sensor with an accuracy of +/- 0.4C. It has a low self-heating capability and draws only 60 microamps of current.

3) Heartbeat count sensor: AD 8232 and reflectance-based sensor from Li2 Technologies are used to capture heartbeat graph and heartbeat counts respectively. The heartbeat count sensor from Li2.

4) Raspberry Pi: Raspberry Pi is a credit card-sized CPU developed by Raspberry Foundations in the UK. Raspberry Pi kit includes an ARM1176JZFS700 MHz processor, Video Core IV GPU, and was originally comes with 256 megabytes of RAM. It supports different programming platforms like java, python, Perl, Ruby, etc. In this work, the author is using Raspberry Pi to build a personal server that stores the data in a database. The raspberry pi is consists of four USB ports, one Ethernet port, and a power port. There are three versions of raspberry at present namely models A, B, and B+. The proposed work is employing the Raspberry Pi B+ model [5].

5) GSM modem: This modem is used to send SMS to the concerned doctor if any of the parameters exceeds the normal value. This idea employs SIM900 as a GSM modem [6].

6) X-CTU Tool: This is the XBee chip configuration tool given by Digi internationals. Through this software utility tool, XBEE chips can be configured as Coordinator, router, or end devices. One chip can be configured as a transmitter and the other as a receiver to set up a simple Zigbee network [7].

7) Python programming: Raspberry Pi is configured as a personal web server using python programming. The reason for using Python is that it is an interpreted

language and it has a very large library in terms of Terabytes. It is easy to maintain the code and it provides an interface to all commercial databases. So, the python platform is chosen over other programming platforms [8].

V. ADVANTAGES OF PROPOSED SYSTEM

- ✓ Reduced human error.
- ✓ Improved patient monitoring and management.
- ✓ Enhanced provider-patient communication.
- ✓ More comprehensive reporting.
- ✓ Increased decision support for improved patient safety.
- ✓ Enhanced clinical precision.
- ✓ Quicker retrieval of data.

VI. CONCLUSION AND FUTURE SCOPE

In this study, the wireless sensor technology is combined with the human health monitoring terminal based on the Internet of Things to test the health-related indexes. The test results are analyzed. It is observed that the human health monitoring system of the Internet of Things (IoT) and GSM is relatively stable and has functions such as an accurate collection of patient's health, checking with real-time monitoring, and sending an alert message whenever an emergency case happened.

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