

# HUMAN HEALTH MONITORING SYSTEM

C. Premalatha<sup>1</sup>, R.P. Keerthana<sup>2</sup>, R. Abarna<sup>3</sup>

<sup>1</sup>Assistant Professor<sup>1</sup>, Department of Information Technology, Sri Ramakrishna Engineering College, Coimbatore, India

<sup>2</sup>Student, Department of Information Technology, Sri Ramakrishna Engineering College, Coimbatore, India

<sup>3</sup>Student, Department of Electronics and Instrumentation Engineering, Sri Ramakrishna Engineering College, Coimbatore, India

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**ABSTRACT:-** Moving into a new era of healthcare, new tools and devices are developed to extend and improve health services, such as remote patient monitoring and risk prevention. In this concept, Internet of Things (IoT) and Cloud Computing present great advantages by providing remote and efficient services. In India many patients are dying because of heart attacks and reason behind that they are not getting timely and proper help. To give them timely and proper help first we want to continuous monitoring of patient health. The fixed monitoring system can be used only when the patient is on the bed and this system is only available in hospitals. The system is developed for home use by patients that are not in critical condition but need to be constant or periodically monitored by clinician or family. In any critical condition the SMS is send to doctor or any family member. In this paper, a prototype of a wireless health monitoring system capable of sending SMS related to the health status of the patient is developed.

**Keywords:** IoT, Cloud Computing, SMS, wireless Health Monitoring System

## 1. INTRODUCTION

Body sensor network systems can help people by providing healthcare services such as medical monitoring, memory enhancement, medical data access, and communication with the healthcare provider in emergency situations through the SMS or GPRS. Continuous health monitoring with wearable or clothing-embedded transducers and implantable body sensor networks will increase detection of emergency conditions in at risk patients. Not only the patient, but also their families will benefit from these. Also, these systems provide useful methods to remotely acquire and monitor the physiological signals without the need of interruption of the patient's normal life, thus improving life quality. Now days, heart diseases are exceeds up to dangerous level which leads to death of human being. Monitoring the patient constantly is difficult or doctors are also unable to monitor particular patient for total working hours. In many critical conditions such as patient is located far away from hospitals or also in case of old patient who suffering with heart diseases and physical disorders. This module consists of heart rate sensor and temperature sensor which measures the heart rate and body temperature and sends SMS through GSM module to the medical advisory for the preliminary precautions so that patient can be prevented from serious

situations before reaching to the hospital. The data are stored in the cloud for the physician reference.

## 2. HEALTH MONITORING SYSTEM

The proposed system mainly focuses on the situation where the doctors and patients are at distant location and it is very important to give the entire details about the heart beat and temperature of the patient to the doctor. In "WIRELESS HUMAN HEALTH MONITOR" system, the parameters of the patient's health details such as heart beat and temperature are measured using pulse sensor and temperature sensor. The data collected by these sensors are sent to the arduino. The arduino then transmits the data to the user in the form of SMS using GSM modem. The recordings of patient health parameters are sent as an SMS to a doctor or a family member which have been given as the recipient. Not only we send the information through GSM module as an SMS also stores data in the cloud. Arduino UNO board continuously read input from these two sensors then it sends the data to the cloud by sending this data to a particular URL. Then this action of sending data to IP is repeated after a particular interval of time.

### 2.1 ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega 328. The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. The Arduino Uno has a number of facilities for communicating with a computer, another arduino or other microcontrollers. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the arduino board. The Arduino Uno can be programmed with the arduino software.



Fig.1 Arduino uno

### 2.2 LM35 TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit LM35 temperature sensors, whose output voltage is linearly proportional to Celsius temperature. The LM35

sensor thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 sensor does not require any external calibration or trimming to provide typical accuracies of  $\pm 1/4^{\circ}\text{C}$  at room temperature and  $\pm 3/4^{\circ}\text{C}$  over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

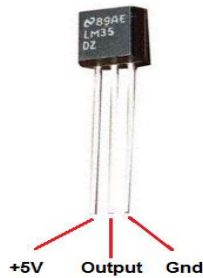


Fig. 2 LM35 Temperature sensor

### 2.3 HEARTBEAT SENSOR

The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified through an amplifier which outputs analog voltage between 0 to +5V logic level signal. It works on the principle of light modulation by blood flow through finger at each pulse.



Fig.3 Heart beat sensor

### 2.4 GSM MODULE

GSM module is used to establish communication between a computer and a GSM system. GSM module consists of a GSM modem assembled together with power supply circuit and communication interfaces (like RS- 232, USB, etc) for computer. GSM MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network.



Fig 2.4 GSM module

### 2.5 ARDUINO IDE

Arduino consist of both a physical programmable circuit board (microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The arduino software (IDE) contains a text editor for writing code, a message area, a text console, a tool bar with buttons for common functions and series of menus.

### 2.6 CLOUD

The information from the sensors is received by the Arduino board and from Arduino the data are transferred to the cloud. The data are sent to the cloud continuously where doctors are able to view the patient details. Patient health parameter data is stored over the cloud. So it is more beneficial than maintaining a record on printed paper. The digital records are kept in a particular computer or memory device like pen-drive because there are chances that these devices can get corrupt and data might be lost. In case of IOT, the cloud storage is more reliable and has less chances of data loss.



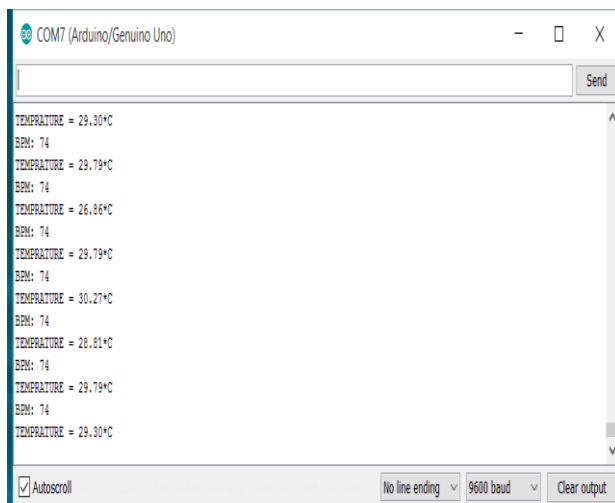
Fig.5 Cloud storage

### 3. SYSTEM IN WORK

Health monitoring system is mandatory to constantly monitor the patient's physiological parameters. Although present systems allow constant monitoring, these systems require the sensors to be placed in such a way that it limits the patient to his bed. This paper focuses on creating a Health monitoring system using Wireless Body sensor networks (WBAN) and can help people by providing

healthcare services such as medical monitoring, medical data access, and communication with the health provider. The system contains three sensors to monitor the human body temperature and pulse rate. The sensed information is sent to arduino.

A desired amount of sensor value is set and if it is exceeded the sensor information will be transmitted from the patient unit to the main controller unit. The main controller unit will send the sensed data of the patient by the help of a GSM module to the physician. The message is sent to a mobile phone using GSM modem. This would benefit the patient as the patient will no longer be confined to the hospital bed as the sensors are wearable nor any assistant doctor or any nurse will be required to log the health vitals of the patient manually thus reducing any possible human error. The main objective is that the specialist staying at a distance can monitor the patient condition so that he can save the life of the patient. This system is to be available t reasonable prices. Embedded technology is to be use so that we can monitor the patient condition easily. The main goal of this paper is to monitor the temperature of the patient's body and display the same to the doctor. In hospitals, the temperature of a patient's body need to be monitored constantly that is generally made by the staff members of the hospital. They notice the temperature of the patient's body constantly and keeps a record of it.



#### 4. CONCLUSION

Modern technologies have developed that promotes comfortable and better life which is disease free. The paper provides the low-cost solution to enhance the remote monitoring capability of existing health care system by using arduino, wifi and GSM modem. It uses two sensors such as pulse rate and body temperature. The sensors are operated and vital information is transmitted to the microcontroller. By using this prototype circuit the hardwares circuit the messages can be transmitted in case the value of any parameter falls below a predetermined value to the corresponding medical expert so that necessary medications can be given to the patient.

#### 5. REFERENCES

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Fig.6 Monitoring of patient heart and pulse rate through IoT