

# Rural Healthcare Based IoT System using GSM

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## Abstract

In India poor rural people have far worse health indicators than the general population. Technology plays the vital role in healthcare not only for sensing health parameter but also in communication, recording and display device. The latest trend in healthcare communication method using IOT is adapted. Here the embedded sensors are used to collect the information and to detect the health changes in a body. Arduino picks up the sensory data and display it on LCD. Also it sends the collected information to the doctor through GSM network. Individual person has RFID tag, which is used to store their health information and also it update the health status through GSM.

**Index terms:**Internet of Things, Arduino, Embedded sensor, LCD, GSM, RFID tag.

## I. INTRODUCTION

In rural areas, the facilities for health care are limited. Everyone should get the knowledge of own health as easy and early as possible. Nearly half of the people in rural areas may not aware of any disease. It was essential to enhance clinic and hospital in rural areas. Identifying the problem in beginning stage may help to cure the disease. This smart monitoring device gives more proficient service to patient. The body temperature, heart rate, blood pressure, respiration rate are prime parameters to diagnose the disease. Throughout the world, all of these Time-consuming jobs could be terminated and patients could be liberated from instrumentation.

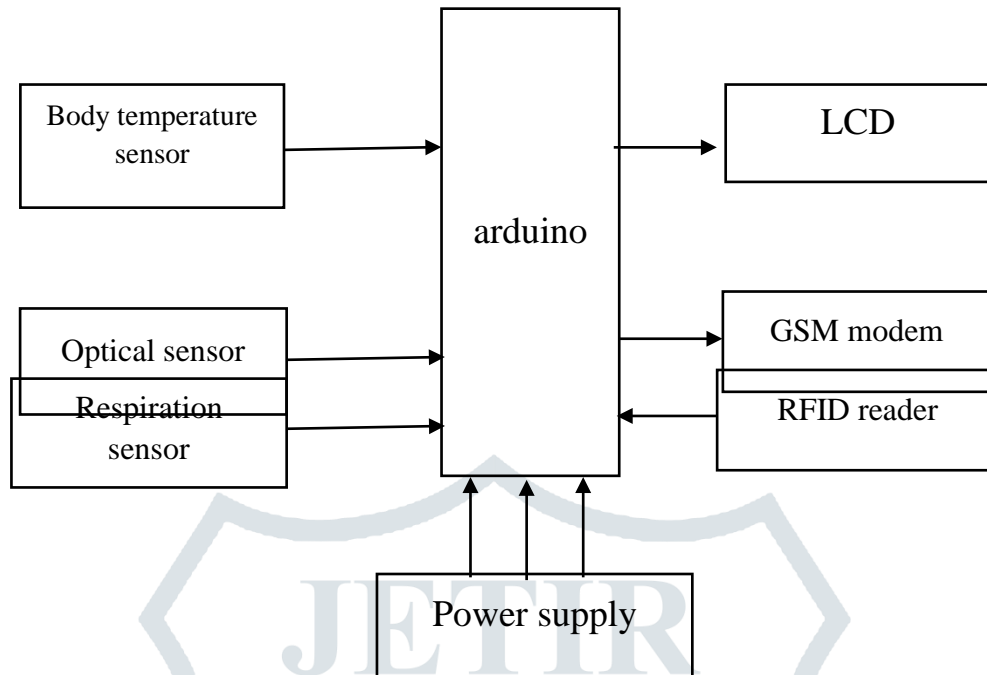
Healthcare monitoring system uses the sensors to measure various parameters of the patient's like respiration, pulse, body movement. The patient's status will be updated in the database in cloud storage. Embedded sensors are used to collect the information of the health parameters like body temperature, pulse rate and respiration cycle and to detect the health changes in a body. The information gathers from sensor are picked by Arduino and display in a LCD. The patient details are send to doctor through GSM technology.

Our objective is

- To reduce cost expensive for rural people.
- To update the health screening status through GSM.
- To authenticate the patient information using RFID tag.

## II. PROPOSED SYSTEM

The proposed system is designed to reduce the difficulties of people in rural areas. Because there is no proper network coverage so we propose system which monitor their health parameter and send SMS to doctor through GSM technology.



The model consists of Arduino uno, Temperature sensor, Optical Sensor, Liquid Crystal Display, GSM Modem, Regulated Power Supply. In this system Arduino uno collects the data from the sensors and sends the data through GSM technology. The data sent can be seen by doctors anytime in their mobile and able to give treatment to the patients. The Arduino is connected to GSM Modem which provides information to doctor when the heart rate is greater than 90 or less than 60 and when the temperature is less than 20 or greater than 35. During this time the LCD is connected to arduino to display the output data.

### Hardware Description A)

#### Arduino Uno:

The Arduino Uno is Associate in Nursing ASCII text file microcontroller board supported the micro chip ATmega328P microcontroller. The board is supplied with sets of digital and analog input/output (I/O) pins, fourteen Digital pins, 6 Analog pins and programmable with the Arduino IDE (Integrated Development Environment) via a kind B USB cable. The Uno board is that the initial in a very series of USB Arduino boards and also the reference model for the Arduino platform.



### **B) Liquid Crystal Display (LCD)**

A liquid crystal display could be a flat panel show or different electronically modulated device that uses the light modulating properties of liquid crystals. Small digital display screens area unit common in transportable client devices like digital cameras, watches, calculators, and mobile telephones. LCD screens area unit out there in a very wider vary of screen sizes than gas-discharge tube and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to very large television receivers.



### **C) GSM Modem**

GSM electronic equipment could be a specialized form of electronic equipment that accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network.



### **D) RFID reader**

Radio frequency identification (RFID) uses magnetic force fields to spot and track tags hooked up to things. The tags contain electronically-stored information. Passive tags collect energy from a close-by RFID reader's. Active tags collect energy from hundred meters from the RFID reader.



**E) Body Temperature sensor**

Body temperature sensor is a device which is designed specifically to measure the hotness or coldness of our body. The LM35 is Associate in nursing micro circuit detector which will be accustomed live temperature with Associate in Nursing electrical output proportional to the temperature (in °C).

**Optical sensor**

Optical sensors are electronic detectors that convert light into an electronic signal. They are utilized in several industrial and client applications. An optical detector is usually a part of a trigger system that integrates a supply of sunshine, a measuring device and the optical sensor. Optical switches area unit optoelectronic devices which may be integrated with electronics circuits.

**F) Respiration sensor**

Respiration sensor measures respiratory rate and relative depth of abdominal or body part respiratory. It is provided with elastic band and can be worn over clothing. The Respiration detector is sometimes placed over the abdomen. Respiration is often used in combination with the Blood Volume Pulse Sensor for HRV Training.

**III. RESULTS**

Proposed system display our health parameters like body temperature, respiration rate and pulse rate in LCD board.



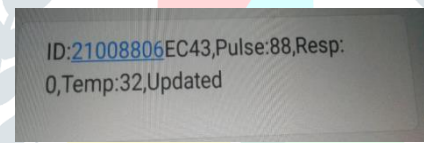
**Step 1:**First we want to read our RFID tag in RFID reader.



**Step 2:**Then it start to measure our health parameter by using sensor. These data are picked by arduino and display in LCD.



**Step 3:**The SMS send to doctor's mobile through GSM technology.

A screenshot of an SMS message on a mobile phone. The text of the message is: 'ID:21008806EC43,Pulse:88,Resp:0,Temp:32,Updated'.

ID:21008806EC43,Pulse:88,Resp:  
0,Temp:32,Updated

#### IV. CONCLUSION

“Health is wealth and Healthy society leads to better nation”. Even though there were facilities existing in the past, due to lack of awareness, the utilization of these facilities were very minimal. Due to the technology advancement, the information flow became much easier and faster. The major achievements of this approach were that, doctors were able to access the medical history of the patient and start treatment remotely. There are lots of remote villages where people are relying on medical facilities far away from their living places. These situations need to be changed by giving proper facilities as well as education on existing systems to the people living in the remote villages, so that they will be able to utilize them effectively. Without life the world won't exist and hence it is our duty to make use of Science and Technology for the sustainability of human beings on the Earth.

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