

IoT Based Health Monitoring System

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Abstract. According to a recent study, many individuals die as a result of a lack of competent and timely medical care, particularly in India. According to a recent study in India, there is one doctor for every 1456 people, making traditional treatment challenging for ordinary people. As a result, some automation in the healthcare system is essential. The major goal of this project is to allow clinicians to remotely monitor patients in order to reduce burden and address the pandemic's grave situation. We use various sensors like Temperature sensor (LM35), Pulse sensor (SEN11574), Glucose monitoring system to continuously monitor the patient's daily health, such as pulse checking, temperature checking, heartbeat checking, or any other metrics. Temperature abnormalities, for example, can be a sign of a variety of diseases, including the corona virus and malaria. Heart rate abnormalities can cause the heart to malfunction, resulting in heart attacks, heart failure, and other serious complications. The goal of this system is to keep track of the patient's temperature and heart rate, and the information is sent over the air through GSM to a doctor's or caretaker's phone, as well as shown on an LCD. As a result, information is conveyed through SMS with an emergency alarm through the GSM module.

Keywords: Monitoring, GSM module, LCD, SMS, Emergency Alarm.

1 Introduction

A remote health monitoring system is an add-on to a hospital's medical system that allows doctors to monitor a patient's vital functions from afar. Detection systems used to be predominantly found in hospitals, and they were distinguished by big, sophisticated circuitry that consumed a lot of power. Now in advanced technology, a greater number of sensors and microcontrollers are present. which is cost-wise low, the speed of operation is high and power consumption is low. This progress has led to remote monitoring of important life signs of patients, particularly the elderly and

persons in quarantine who are ill. A hospital's medical system is supplemented with a remote health monitoring system that allows for remote monitoring of the crucial body status of a patient. A remote health monitoring system was employed in the following scenarios:

- Critical body organ situation
- Corona virus affected quarantine people. In the following cases, the remote health monitoring system can be used:
 - A patient has been diagnosed with a medical ailment involving an unstable regulatory body system. When a patient is given a new medicine, this is what happens.
 - Situation with a critical body organ
 - The circumstances surrounding the emergence of a potentially fatal illness. This is for people who are past retirement age and may be suffering from failing health.
 - People in quarantine were infected with the Corona virus.

To solve the challenge of remote health monitoring, a variety of novel technologies have recently been developed. Several technologies have recently been developed to solve the problem of remote health monitoring.

A detecting system that is wireless included in the systems, which provides sensor data to a distant server through wireless transmission. Some have even implemented a subscription-based service model. This is a stumbling block in developing countries since some people are unable to use them owing to financial constraints. Because of the related expenditures, some people are unable to use them. There's also the issue of internet access, which some systems require in order to function. High-speed internet is required for real-time distant connections. In undeveloped countries, Internet penetration is still a concern. which is a stumbling block because some people cannot afford to use it. There's also the matter of internet access, which is required for some systems to operate. High-speed internet is required for real-time distant connections. Internet access is a problem in developing countries due to the high cost of access. There's also internet access, which in some situations necessitates high-speed internet for remote connections in real time. There is still a long way to go in terms of Internet penetration. Due to the limitations that they confront, the electronic equipment that surround the high cost of connection makes Internet penetration difficult in developing countries. Internet access is also available. patients must also be automated. Furthermore, the spread of communicable diseases will be facilitated by patients' frequent contact.

2 Problem Statement

Continuous manual monitoring of the patient's temperature and pulse rate is required, which is inconvenient during the COVID phase. Patients with physical limitations require an automated environment.

2.1 Objective: To design a real-time patient monitoring system. Continuously monitor the patient's temperature and pulse rate. Using a GSM module and SMS to keep track of the patients.

3 Components

The following components are used in a proposed system

- A.** Arduino Uno R3
- B.** Temperature sensor (LM35)
- C.** Pulse sensor (SEN11574)
- D.** LCD display (LM044L)
- E.** GSM module
- F.** Buzzer

A. Arduino

The Arduino UNO R3 is a Microchip ATmega328P-based microcontroller board. It receives signals from a number of sensors, including a pulse sensor (SEN11574) and a temperature sensor (LM35). These signals are analyzed by a microprocessor, which then sends them to a GSM module, a buzzer, and an LCD display (LM044L).

B. Temperature Sensor

The LM35 is a temperature detecting device. Which output voltage is directly proportional to the temperature in degrees Celsius. The LM35 device is rated for a temperature range of 55°C to 150°C, while the LM35C is rated for a temperature range of 40°C to 110°C (with enhanced accuracy of 10°). Body temperature is measured with the LM35. In about one minute, this device will measure one's mean artery pressure (MAP), and the precise body temperature will be presented on the LCD. The Temperature sensor pin 1 is connected with power supply, pin 2 is connected with Arduino Uno pin A0 and pin 3 is connected with ground. It is used to determine the temperature of the human body. When patients check their health, a temperature sensor measures the human body's temperature and sends the information temperature level to the Arduino.

C. Pulse Sensor

The photoelectric technique is used by pulse sensors. Changes in blood flow during cardiac beats are detected as a shift in the amount of light transmitted through the body by transmission types. It has three pins,

- Vcc
- Ground
- Signal

The ground pin is linked to the ground, the Vcc pin to the power supply, and the signal pin to the Arduino Uno pin 4. The variable resistor is also connected to this sensor. This sensor measures the heartbeat rate of the human body and sends the heartbeat level to the Arduino while the patients are examining their health.

D. LCD Display

The data signal and the control signal are the two types of signals used by liquid crystal displays. The on and off condition of RS pin out can be used to determine the presence of these signals. The Read/write pin can be pulled out to read data. It displays the output of the body's heartbeat and temperature. The Arduino Uno is used to connect it. The Arduino Uno provides the signals.

E. GSM Module

GSM global system for mobile communication and is a mobile communication modem (GSM). It is the world's most commonly utilized mobile communication system. In a GSM system, there are different cell sizes such as macro, micro, Pico, and umbrella cells. The Arduino Uno is connected to the GSM module. The GSM Rx pin is linked to the Arduino Tx pin, while the GSM Tx pin is linked to the Arduino Rx pin. When the patients' health is checked, the Arduino Uno sends the temperature and heartbeat level to the GSM module, which subsequently sends the SMS to the patients 'attenders (or) caretakers' registered cell number.

F. Buzzer

A buzzer is an alerting audio device. It has two legs in it. Piezo buzzer is a device generally used to produce sound. When Piezo buzzer subordinated to an interspersing electronic field they stretch or compress, in agreement with the frequency of the signal thereby producing sound. Buzzer is connected with Arduino Uno pin 8. Any changes in the case's health data are honored by the Arduino Uno, which latterly sends signals to the buzzer. The buzzer will sound to draw the attention of the case's caregivers.

3 Methodology

IoT Based health care monitoring is mainly focused for the doctors and patients during this COVID period. This Automated system is to provide quick health monitoring. The Temperature

Sensor and Pulse Sensor is connected to provide the temperature and pulse rate of patients through the LCD Display. The Patient informations are Shared with the patient attender and also doctor. The informations are shared through GSM module for the registered mobile number via SMS. The data's can be stored in cloud for future use.

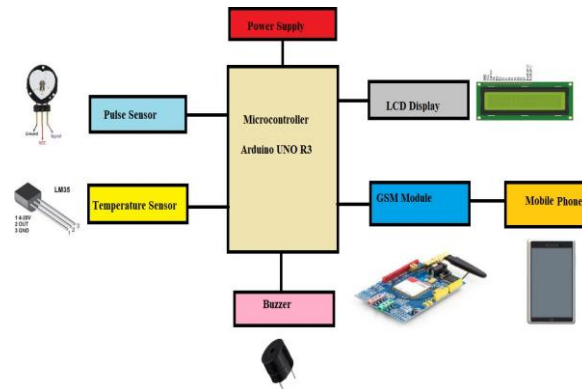


Fig. 1. Block Diagram

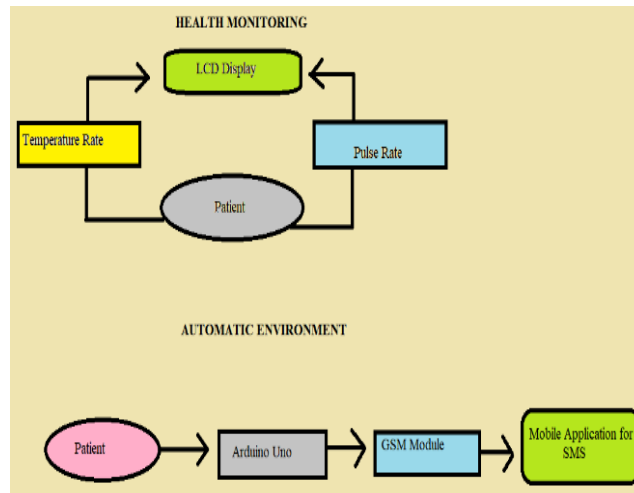


Fig. 2. Proposed System

4 Modelling and Analysis

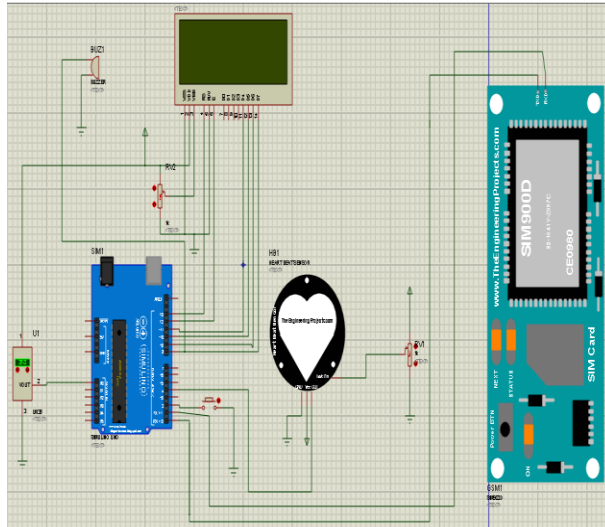


Fig. 3. Simulation Model

The connections are given as per the circuit diagram and it is simulated in proteus software.

5 Results and Discussion

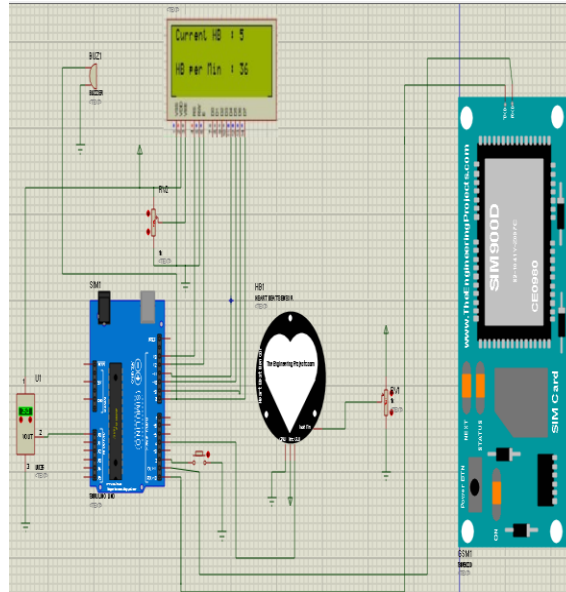


Fig. 4. Simulation Result of Circuit Diagram

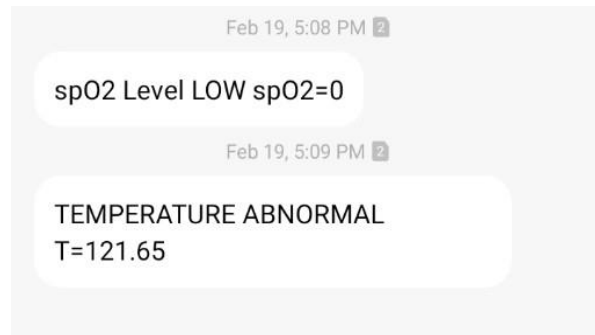


Fig. 5. Results Displayed in Mobile

The major goal of the suggested system is to improve the healthcare monitoring system. No one has time to constantly look after others in the current scenario. As a result, all levels of employees require a continual monitoring system. The current communication technology concepts were used to create this new device. IoT is important in a variety of fields. The suggested system's major goal

is to improve the quality of healthcare monitoring. Nobody has time to consistently look after others in the current situation. As a result, all levels of employees must use a constant monitoring system. The current communication technology concepts were used to construct this new device. The Internet of Things (IoT) is important in a multitude of sectors. With the use of an internet connection, IoT establishes communication between numerous items and devices. Most healthcare businesses have used the Internet of Things (IoT) concept to collect continuous real-time data. Continuous monitoring is required in the health-care system. Temperature and pulse sensors are used to build this proposed device. The real-time human body informations are collected using these sensors. With the use of an internet connection, IoT establishes communication between numerous items and devices. Most healthcare businesses have adopted the Internet of Things (IoT) concept to collect real-time data on a continual basis. Continuous monitoring is required in the healthcare system. This proposed device constructed by using temperature sensor, pulse sensor. The central microcontroller is linked to these sensors. The data is analyzed by the microcontroller and sent to the GSM module. The data is sent to the caregivers and doctors via the GSM module. This technique is extremely beneficial for elderly, physically challenged, and Covid-affected patients at home or in hospitals. When compared to other monitoring devices, the suggested gadget produces better results and is simple to operate.

6 Conclusion

The main aim of the proposed system is developing the healthcare monitoring system in better way. This system is very useful for elderly people, physically challenged people and covid affected people in home or hospitals. Compare with other monitoring devices the proposed device is provide a better result and easy to use.

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References

[1] Amir Javadpour, Hamaidrezadeh – Tehran “A temperature Monitoring System”,2015 International Conference on Smart Sensors and Applications (ICSSA).

- [2] K. Meena Kumari, Sandeep Kumar & B. Sreenivasu (2017), "International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)", Health Care System by Monitoring the Patient Health Using IOT and GSM, ISSN: 2278 – 909X, Vol. 6, No. 11.
- [3] K. M. Monica, S. Sridevi & G. Bindu (2020), "An Effective Patient Monitoring System using IOT", International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Vol. 8, No. 5, pp 808-813.
- [4] M. Babu Prasad (2018), "2018 GSM based Health Care Monitoring System", International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Vol. 8, No. 2S2, pp. 253-255.
- [5] S. Nirmala SugirthaRajini & E. Mercy Beulah (2016), "Cloud Based Architecture for Healthcare System", Asian Journal of Microbiology, Biotechnology & Environmental Sciences, Vol. 18, No. 4, Pp.1017-1018.
- [6] R. Tamilarasi & S. Nirmala SugirthaRajini (2016), "Efficient and Secure Way of Keeping Patient Healthcare Records and Access Control Strategies for Data Stored in Clouds: A Survey", Asian Journal of Microbiology, Biotechnology & Environmental Sciences, Vol. 18, No. 4, Pp. 939-940.
- [7] Sara Fatima & Amena Sayeed (2017), "IoT Based Health Care Monitoring and Tracking System Using Gps and Gsm Technologies", International Journal of Professional Engineering Studies, Vol. VIII, No. 5, Pp. 115-119.
- [8] Gulraiz J. Joyia, Rao M. Liaqat, Aftab Farooq, and Saad Rehman, Internet of Medical Things (IOMT): Applications, Benefits and Future Challenges in Healthcare Domain, Journal of Communications Vol. 12, No. 4, April 2017.
- [9] Mr. Bhavin Mehta, Ms. Divya rengarajan, Mr. Ankit Prasad "Real time patient Telemonitoring system using Labview" International Journal of science & engineering research, volume 3, issue 4, April 2002.
- [10] Manju babu, roshna rose raju, sunil Sylvester, teenu mary Mathew, k m abubekar, "Real time patient monitoring system using labview", international journal of advanced research in computer and communication engineering, volume 5, issue 3, march 2016.
- [11] M.P. Nirmala, Rampriya mahendra, "Home based wireless health monitoring system", international journal of advanced research in electrical electronics and instrumentation engineering, vol.3, issue 11, November 2014.

[12] Gunalan .M.C, Satheesh.A, “, Implementation of Wireless Patient Body Monitoring System using RTOS”, International Journal of Engineering Research and General Science, Volume 2, Issue 6, pp.-207-208, October-November, 2014.