International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 08 | August - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

# HUMAN HEALTH MONITORING WITH ALERT SYSTEM USING IOT AND GPS

Albin paul [1], T.Kirubaharan[2], M.Nidhyanand[3],J.Sriman[4] ,S.Bharath[5]

[1]*B.E. Student, Department of Electrical & Electronics Engineering,Sns College of Technology, Coimbatore. Email:* albintp.eee.2019@snsct.org[1]

[2]*B.E. Student, Department of Electrical & Electronics Engineering,Sns College of Technology, Coimbatore. Email: kiruba.t.eee.2019@snsct.org [2].*

[3]*B.E. Student, Department of Electrical & Electronics Engineering,Sns College of Technology, Coimbatore. Email: nidhyan.m.eee.2019@snsct.org [3].*

[4]*B.E. Student, Department of Electrical & Electronics Engineering,Sns College of Technology, Coimbatore. Email: sriman.j.eee.2019@snsct.org [4]*

*.[5]Assistant Professor,Department of Electrical & Electronics Engineering,Sns College of Technology, Coimbatore. Email: bharath.s.eee@snsct.org [5]*

## Abstract

This project is an innovative technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. One main area of research that has seen an adoption of the technology is the healthcare sector.The people in need of healthcare services find it very expensive this is particularly true in developing countries. As a result, this project is an attempt to solve a healthcare problem currently society is facing. The main objective of the project was to design a remote healthcare system. It's comprised of three main parts. The first part being, detection of patient's vitals using sensors, second for sending data to cloud storage and the last part was providing the detected data for remote viewing. Remote viewing of the data enables a doctor or guardian to monitor a patient's health progress away from hospital premises.

The Internet of Things (IoT) concepts have been widely used to interconnect the available medical resources and offer smart, reliable, and effective healthcare service to the patients. Health monitoring for active and assisted living is one of the paradigms that can use the IoT advantages to improve the patient's lifestyle. In

this project, I have presented an IoT architecture customized for healthcare applications. The aim of the project was to come up witha Remote Health Monitoring System that can be made with locally available sensors with a view to making it affordable if it were to be mass produced.

Hence the proposed architecture collects the sensor data through Arduino microcontroller and relays it to the cloud where it is processed and analyzed for remote viewing. Feedback actions based on the analyzed data can be sent back to the doctor or guardianthrough Email and/or SMS alerts in case of any emergencies.

## INTRODUCTION

A Human health monitoring system is an extension of a hospital medical system where a patient's vital body state can be monitored Humanly. Traditionally the detection systems were only found in hospitals and were characterized by huge and complex circuitry which required high power consumption. Continuous advances in the semiconductor technology industry have led to sensors and microcontrollers that are smaller in size, faster in operation, low in power consumption and affordable in cost.

This has further seen development in the Human monitoring of vital life signs of patients especially the elderly. The Human health monitoring system can be applied in the following scenarios:

1. A patient is known to have a medical condition with unstable regulatory body system.
2. This is in cases where a new drug is being introduced to a patient.A patient is prone to heart attacks or may have suffered one before. The vitals may be monitored to predict.

The situation leading to the development of a risky life-threatening condition. This is forpeople at an advanced age and maybe having failing health conditions.

Single parameter monitoring system:

In this instance, a single parameter is monitored e.g. Electrocardiogram (ECG) reading. From the ECG or heartbeat detection, several readings can be got depending on the algorithm used. An ECG reading can give the heart rate and oxygen saturation.

## PROBLEM STATEMENT

Human health monitoring can provide useful physiological information in the home. This monitoring is useful for elderly or chronically ill patients who would like to avoid a long hospital stay. Wireless sensors are used to collect and transmit signals of interest and a processor is programmed to receive and automatically analyze the sensor signals. In this project, you are to choose appropriate sensors according to what you would like to detect and design algorithms to realize your detection. Examples are the detection of a fall, monitoring cardiac signals.

Using a single parameter monitoring system an approach to a Human health monitoring system was designed that extends healthcare from the traditional clinic or hospital setting to the patient's home. The system was to collect a heartbeat detection system data, fall detection system data, temperature data and few other parameters. The data from the single parameter monitoring systems was then availed for Human detection. During design the following characteristics of the future medical applications adhered:

a) Integration with current trends in medical practices and technology,

b) Real-time, long-term, Human monitoring, miniature, wearable sensors and long battery life of a designed device.

## LITERATURE SURVEY

Nowadays, Heart-related diseases are on the rise. Cardiac arrest is quoted as the major contributor to the sudden and unexpected death rate in the modern stress filled lifestyle around the globe. A system that warns the person about the onset of the disease earlier automatically will be a boon to the society. This is achievable by deploying advances in wireless technology to the existing patient monitoring system. This paper proposes the development of a module that provides mobility to the doctor and the patient, by adopting a simple and popular technique, detecting the abnormalities in the bio signal of the patient in advance.

The post-operative patients can develop complications once they are discharged from the hospital. In some patients, the cardiac problems may reoccur, when they start doing their routine work. Hence the ECG of such patients needs to be monitored for some time after their treatment. This helps in diagnosing the improper functioning of the heart and take precautions. Some of these lives can often be saved if acute care and cardiac surgery is provided within the so-called golden hour.

So, the need for advice on first-hand medical attention and promotion of good health by patient monitoring and follow-up becomes inevitable.

## BLOCK DIAGRAM

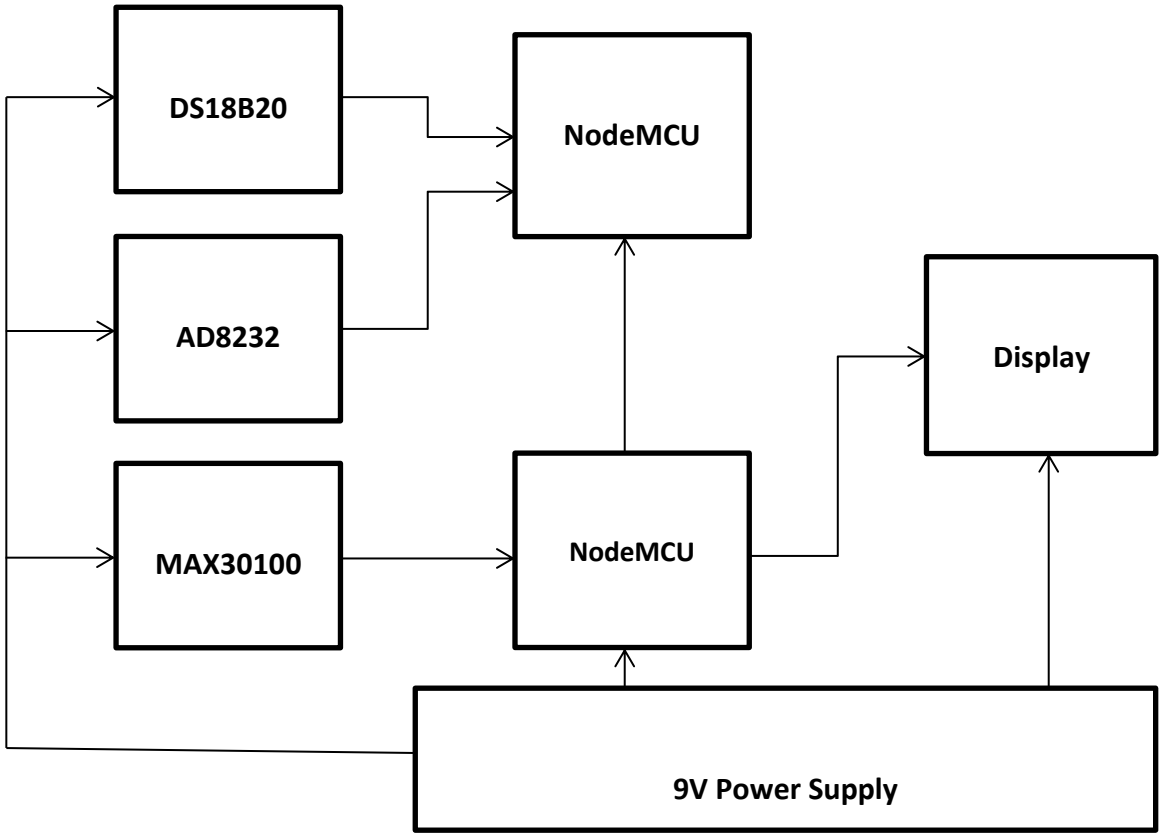



Fig 3.1 Block diagram of monitoring system

This Block diagram represents the Node MCU are connected to an web application and to the Mobile app. This health monitoring system consists of sensors and a microcontroller. The Node MCU as the microcontroller, and the sensors are MAX30100 (pulse rate and SPo2 measurement sensor) and LM35 (body temperature measurement sensor). To connect the NODE MCU with the mobile application and LCD display. All the needed components for the health monitoring system.

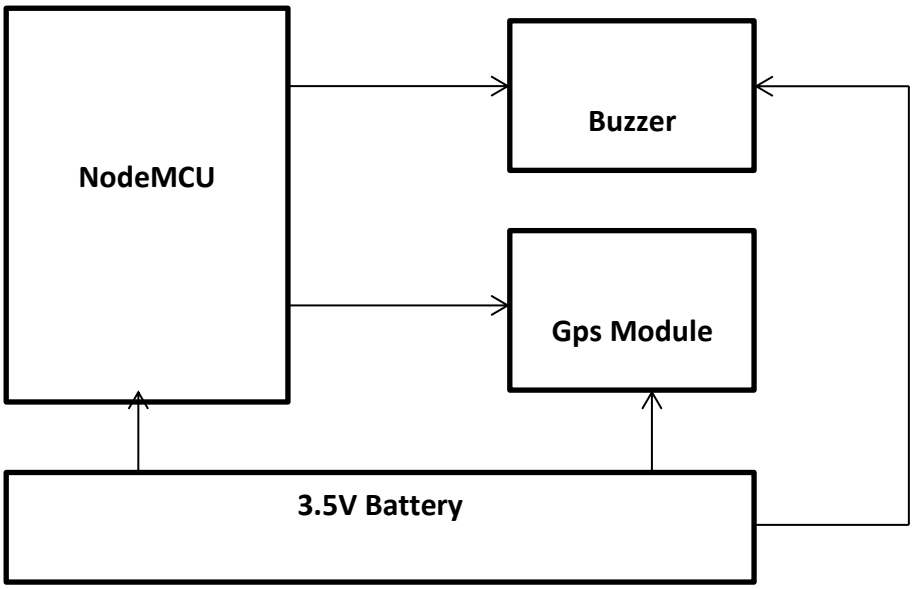



Fig 3.1 Block Diagram of alerting system

## EXISTING SYSTEM

In the existing system, active network technology can be used to network various sensors to a single PMS. Patients' various critical parameters are continuously monitored via single PMS and reported to the Doctors or Nurses in attendance for timely response in case of critical situations. The sensors are attached to the body of the patients without causing any discomfort to them.

In this PMS any one can monitor the important physical parameters like body temperature, ECG, heart beat rate and blood pressure using the sensors which are readily available. Thus, the analog values that are sensed by the different sensors are then given to a microcontroller attached to it. The microcontroller processes these analog signal values of health parameters separately and converts it to digital values using ADC converter.

## IMPLEMENTATION

This project has been developed with NODE microcontroller Unit connected with sensors which are attached to the patient. All the sensors and data sent from microcontroller to MySQL database into the IOT. A doctor or guardian can log in to web portal to monitor patient's data at any point in time.

In case of emergencies, like temperature spike or heartbeat spike or detection of toxic gas etc. At anytime can be checked by doctor and guardian's mobile or PC respectively. And at any point of time either a doctor or guardian can log into web portal with patient unique credentials and can track patient's location which would help medical services to send appropriate help in case of emergencies.

## SYSTEM DESIGN

Systems design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. Overall product architecture, the subsystems that compose the product, and the way subsystems are allocated to processors are depicted using the System Design. UML is used to model system designs. Unified Modelling Language is a standard object-oriented analysis and design language. Use Case diagram and Sequence diagram, which are types of UML diagrams, of the application are shown below.

## WORKING PRINCIPLE

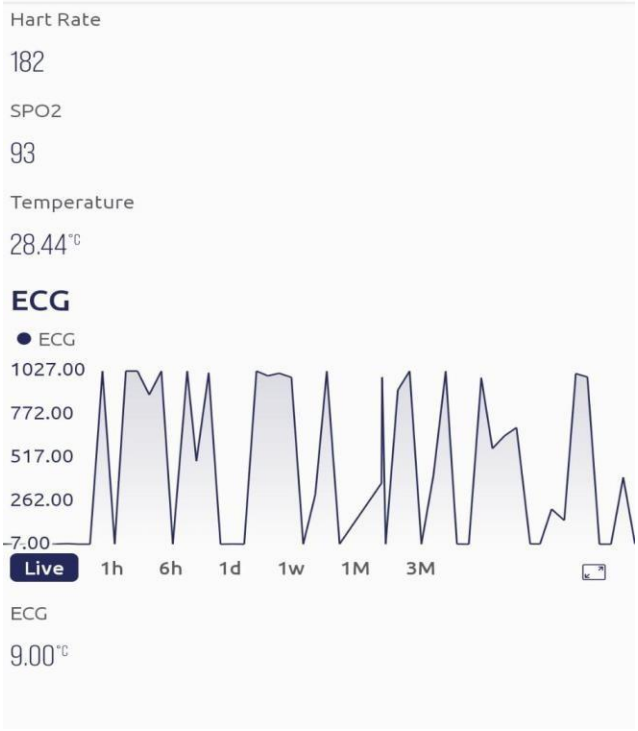
### Graphical User Interface

This Project is designed to make sure that user interface pages are easily understandable and the navigation between pages is obvious. Below are list of web pages that user can navigate between and are shown in details.

## PATIENT'S VITAL MONITORING PAGE

After doctor or care taker login successfully, either can able to view live patient's vital information which includes temperature, heartbeat, ECG etc. In order to protect privacy of the patient's data, data is encrypted while sending it to MySQL database server and is decrypted while relaying same data on web page.

In case device is not connected or any of the sensor is not attached to patient, then all the readings or respective reading would be shown as zero in case of digital values. In case device is switched off then this page would display only last known readings that were stored in database.



## HARDWARE MODEL

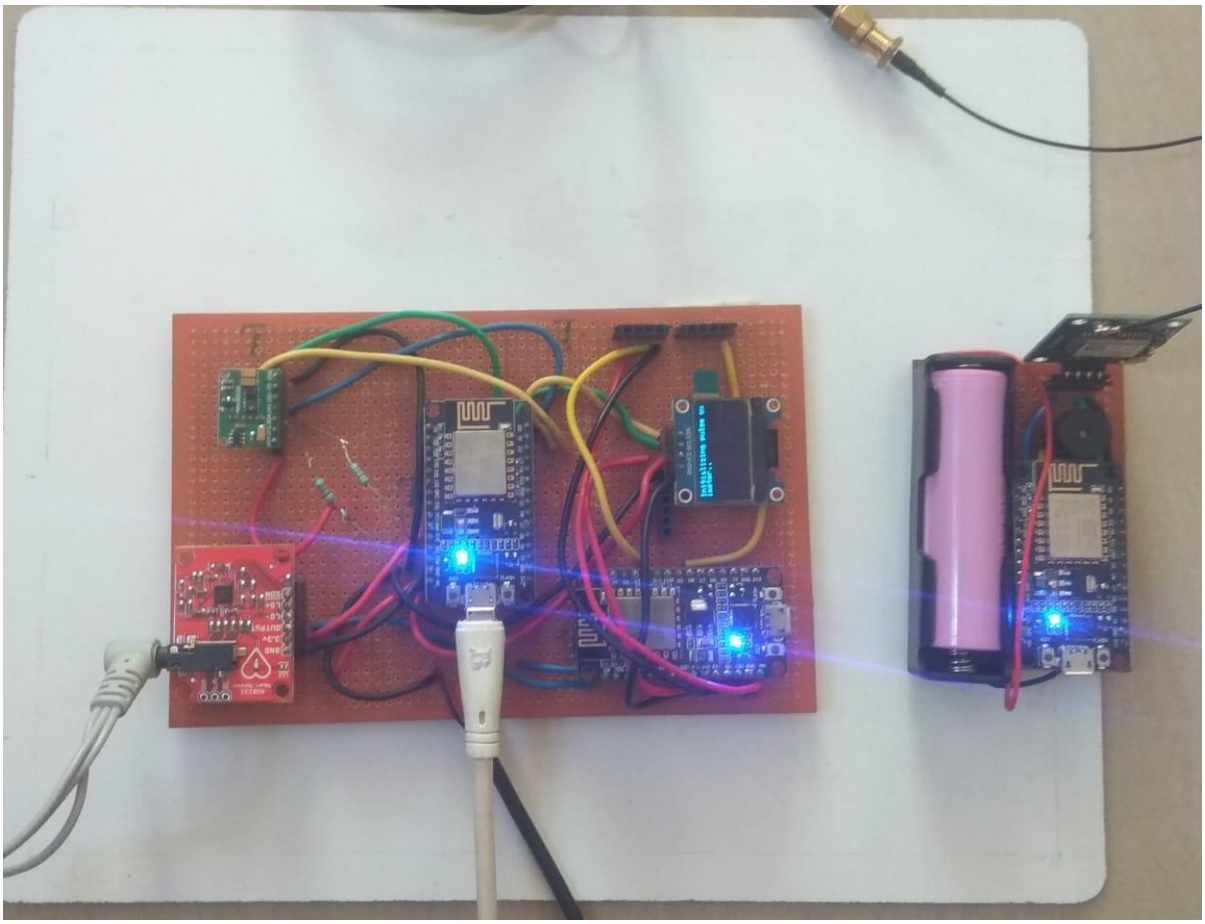


Fig 5.1 Project Hardware

## CONCLUSION

The main objective of the experiment was successfully achieved. All the individual modules like Heartbeat detection module, fall detection module etc. and Human viewing module gave out the intended results.

The designed system modules can further be optimized and produced to a final single circuit. More important fact that came up during project design is that all the circuit components used in the Human health detection system are available easily.

With the development in the integrated circuit industry, Micro Electro Mechanical Systems (MEMs) and microcontrollers have become affordable, have increased processing speeds, miniaturized and power efficient. This has led to increased development of embedded systems that the healthcare specialists are adopting.

These embedded systems have also been adopted in the Smartphone technology. And with increased internet penetration in most developing countries through mobile phones, and with use of Internet of things (IoT) will become adopted at a faster rate. The Human Health Care system utilizes these concepts to come up with a system for better quality of life for people in society.

From an engineering perspective, the project has seen concepts acquired through the computer science and embedded study period being practically applied. The Electric circuit analysis knowledge was used during design and fabrication of the individual modules.

Electromagnetic fields analysis used in the wireless transmission between microcontrollers and Software programming used during programming of the microcontrollers to come up with a final finished circuit system.

## FUTURE WORK

a) Physiological data collection

1. Home Ultrasound

2. Brain signal monitoring

b) Remote viewing of data

Problems associated with having data online. Tackle Distributed denial of service. DDOS, and Data privacy/security especially of medical systems.

c) IoT based Remote Patient Monitoring System can be enhanced to detect and collect data of several anomalies for monitoring purpose such as home ultrasound, Brain signal monitoring, Tumor detection etc.

d) More research on problems associated with having data online, data privacy as IoT is managed and run by multiple technologies and multiple vendors are involved in it. Security algorithms and certain precautions by the users will help avoid any security related threats in IoT network.

e) The interface can be designed to control which sensors can be used by consumers according to their needs.

Web UI can be enhanced to perform several activities which include controlling the hardware, real-time graphs, history and analysis graphs to observe anomalies etc.

## REFERENCES

[1] C. O'Brien and C. Heneghan, "A comparison of algorithms for estimation of a respiratory signal from the surface electro cardiogram" 2007;305-314.

[2] R.E. Nappi, E. Martini, L. Cucinella et al., "Addressing vulvovaginal atrophy (VVA)/genitourinary syndrome of menopause (GSM) for healthy aging in women" 2019;561-572.

[3] A. Bansal, S. Kumar, A. Bajpai et al., "Human health monitoring system for detecting cardiac disorders " 2015;309-314.

[4] G. Dhiman, D. Oliva, A. Kaur et al., "BEPO: a novel binary emperor penguin optimizer for automatic feature selection " 2021;106-102.

[5] K. Gatsis and G. J. Pappas, "Wireless control for the IoT" 2017;341-342.

[6] S. Kaur, L. K. Awasthi, A. L. Sangal, and G. Dhiman, "Tunicate swarm algorithm:

a new bio-inspired based metaheuristic paradigm for global optimization" 2020;102-112.

[7] G. Dhiman and A. Kaur, "Spotted hyena optimizer for solving engineering design problems" 2017;114-119.

[8] G. Dhiman and A. Kaur, "STOA: a bio-inspired based optimization algorithm for industrial engineering problems" 2019;148-174.

[9] G. Dhiman and A. Kaur, "A hybrid algorithm based on particle swarm and spotted hyena optimizer for global optimization" 2019;599-615.