iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** VI **Month of publication:** June 2023

DOI: https://doi.org/10.22214/ijraset.2023.53679

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue VI Jun 2023- Available at www.ijraset.com

IOT Based Heart Attack Detection and Heart Rate Monitor

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Abstract: ***In today's world, many people are losing their lives due to heart attacks and the shortage of specialist doctors available to take immediate action. Hence this system provides the implementation of heart rate monitoring and controlling of a patient. For this, we have used the technology called the "GSM" to detect and monitor the heart rate of a patient. In this system, the patient will be equipped with the hardware consisting of sensors and other devices for measuring the heartbeat along with the notification unit to notify and provide data in real-time. The heartbeat sensor with advance measuring technique will calculate the heartbeat of the patient, and transmit it over the internet that can be easily accessed by the patient itself and the doctors through different electronic devices such as tablets, phones, and computers. The heartbeat limits are set on a system that informs about the high and low rate of heartbeat. It also provides continuous data for analyzing the chance of an attack on a patient.***
Keywords: GSM, Heartbeat sensor, heart attack detection, etc.

I. INTRODUCTION

The Heart is an important organ in the human body. It is used to pump blood and oxygen in the entire body through the circulatory system, keeping the functionality of the body organized. As the pollution in the environment is increasing and also the food habits of the people becoming worse due to which rate of heart attack has been increased. It has been found that about 1 million people die due to heart diseases every year. A Heart attack generally occurs when a particular part of the heart dies resulting in the blockage of blood flow to the heart muscle. It has been observed that a heart attack takes 3 attempts to kill people and is considered to be a serious medical emergency and needs immediate medical action. Many people are losing their lives due to the heart attack which is the major issue to think over. As in the advancement of technology, it is possible to reduce the death rates by controlling the heart attacks. The IoT (internet of things) which is the most emerging technology has brought a tremendous change in the field of health care. The IoT provides the connectivity to several devices that can transmit data over the network without human interference. The "things" can be any physical objects present in the world along with the human being. In this technology, each device or object in the network is assigned a unique identifier to exchange real-time data and this data can be accessed with ease. IoT uses sensors and actuators for the communication between the physical objects or devices. With the help of these devices pulse rate of a human can be gathered and observed frequently to prevent the heart attack. It is always not possible for the patient to be treated by a doctor when needed because of the busy schedule of the doctor. So this methodology of integrating sensors with IoT environment makes it possible to monitor and manage the patient remotely. The parameters like heart rate, heart rate variability, the temperature needs to measured regularly to ensure the safety of the patient. Some of the control constraints are set in these devices which alerts the doctor as well as relatives of the patient whenever violated through the internet.

II. LITERATURE SURVEY

Peter Leijdekkers et al. [1] of University of Technology, Sydney proposed an arrangement of individual trial application, which diminishes defer time between beginning of heart assault and a notification to the crisis administrations. The individual test comprehends these issues by utilizing inescapable innovation: a cellular device and a little ECG sensor which can be worn and is effectively conveyed by the individual. By soliciting a set from inquiries, the individual acknowledges what they went through can be a heart assault. The application additionally investigations two ECG chronicles on the cellular device for heart assault signs to affirm this. In this way, the application can rapidly survey the client's condition and give suitable exhortation without the intercession of a therapeutic expert. It additionally directs the client and spectators in getting the correct help via computerizing the call. The ECG is recorded and dissected progressively on the cellular device utilizing a 2 terminal, 1- lead heart monitor. The calculation utilized here can identify the heart beat anomalies, for example, ventricular tachycardia.

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In the event that the application finds out that the user is in danger it encourages the user to notify the authorized administration right away. In a situation that user has a heart failure the system consequently decides the present area of the user and alarm the emergency ambulance and other required people to the user's area.

Dr.A.A.Gurjar et al. [2] of Sipna COET, Amravati, proposed a framework where heartbeat is checked and heart assault location is noted. The sensor used is interlinked to a microcontroller that allows reading pulses and sending them over Internet. The user may set the high and low limits of heartbeat. Later, monitoring begins to check if the heartbeats are crossing the limits either way. The transmitting circuit with the patient and the other circuit with the authorized personnel are used. Heartbeat sensor is used to identify the current pulse rate and display it on the LCD screen. This suggested system can be used in all places without any constraints. There is no obligation to stay at home and use the device.

Nikunj Patel et al. [3] of CSPIT, CHARUSAT proposed a framework which has a distinction of identifying heart assault with assistance of watching pulse dependent on web of thing. Our strategy utilizes a heartbeat sensor, Arduino board and a Wi-Fi module. In the wake of setting up the framework, the beat sensor will begin detecting pulse readings and will show the heartbeat of individual on LCD screen. Likewise, with the utilization of Wi-Fi module it will transmit the information over web. Framework permits a set point which can help in deciding if an individual is sound or not by checking his/her pulse and contrasting it and set point. In the wake of setting these limits, the framework will begin checking the pulse of patient and quickly the pulse goes above or beneath as far as possible the framework will send an alarm message. As a piece of this undertaking we are executing an android application show that will follow the heartbeat of specific patient and screen it effectively and give the crisis message on odds of heart assault.

K.S.Abbirame et al. [4] of KVCET, Chennai, Tamil Nadu, India proposed a developing framework which will diminish the demise rate because of heart assault by early location of heart assault. In our framework we are utilizing pulse sensor, GSM and GPS to quantify the pulse and offer the data. The pulse sensor will ceaselessly screen pulse of a client. We effectively set the edge an incentive in the framework. When it goes beneath or over the edge esteem, the microcontroller will initiate the GSM and GPS to share the data with area of the client to the closest wellbeing division and to the relatives. The structure will create a message at whatever point the client's pulse ends up unusual, with his/her area to the closest wellbeing area and to the recently put away relatives number.

A.Dutta et al. [5] of Institute of Engineering and Management, Salt Lake, Kolkata , built up a gadget utilizing miniaturized scale controller and heart beat sensor. It identifies beat rate as well as demonstrates the infection suggested by the example portrayed by the pulse. The client first sets his age and sexual orientation before running the machine. The miniaturized scale controller checks the bit rates consistently and passes on the patient through its presentation and alert segment the state of the patient. Understanding is additionally guided for the need of any crisis drug or discussion with a specialist. There will likewise be arrangement for demonstrating the client his/her most extreme work force with the goal that they can push their limits prompting a sound way of life. Gadget is utilized for 24 hours and recorded information stays accessible for examination. The client can comprehend what is the genuine state of the working of his heart without relying upon doctors. This gadget is a stage forward to bio-electro joint effort. This is a wired gadget further act of spontaneity of remote element can be introduced to it. Direct specialist video connection can be give or appended to it. Wi-Fi association with the Smart gadgets can be set up in it. This gadget all in all substance cannot just control (to some degree) essential heart issues which is an issue of each family unit yet can likewise give an inspiration to expanding working limit by demonstrating the individual the degree of his pulse. This gadget can even control demise the same number of individuals bite the dust on their approach to clinics since they can't be furnished with the essential controlling drug which can deal with their circumstance for some additional time.

Samar Ali et al. [6] of Abu Dhabi University, UAE, they proposed a system that checks for vehicle impact through the identification of heart assaults that drivers may experience the ill effects of. They introduced the system of the administration empowered through a technology for IoT systems and two varieties. They proposed a voice controlled mobile heart attack detection service display and a motion controlled show. Both fuse sensors from savvy; provided its fame with clients and expanding accessibility. The principal variety of real time mobile heart detection system just thinks about what the client could utilize administration in vehicles, while second variety helps the client outside vehicular system settings. They additionally talked about the system and presented associated work and foundation data of the innovations that it uses. They likewise wanted to consider programmed recognition of heart assaults through the usage of the heart's movement when solid FDA-endorsed ECG sensors are fused in wearable gadgets.

Pughazendi N et al. [7] implemented a system where protection evaluative measures for both driver and the vehicle are enhanced. The paper suggests the usage of sensors. Heartbeat sensor is utilized for screening heartbeats in 60 seconds of the driver continually and keeps mishaps from occurring by controlling through internet.

Internet is connected to various devices and thus passes on the crisis notification to the required authorized people. Traffic light sensor is utilized to pursue the traffic principles and guidelines by the driver. In the event of the red light being ON, at that point the vehicle consequently stops before it reaches the said fixed line. Fuel level sensor is utilized to quantify fuel level of the vehicle and figure if accessible fuel is sufficient to achieve to goal or not, in the event that it isn't sufficient, at that point guide will recommend the driver to achieve the close-by petroleum bunks.

III.SYSTEM DESIGN

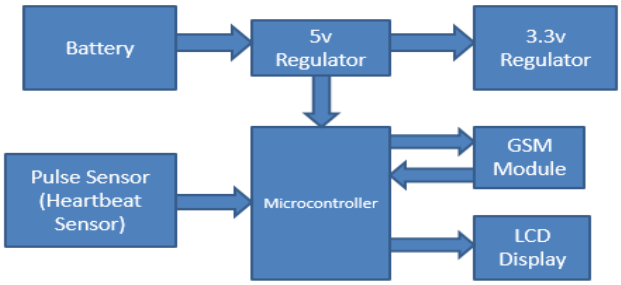


Fig 1. Block Diagram

The proposed system has eminence of detecting heart attack with help of observing heart rate based on internet of thing. Our method uses a pulse sensor, Atmega 328 and a GSM module. After setting up the system, the pulse sensor will start sensing heart rate readings and will display the heartbeat of person on LCD screen. Also, with the use of GSM module it will transmit the data. System allows a set point which can help in determining whether a person is healthy or not by checking his/her heartbeat and comparing it with set point. After setting these limits, the system will start monitoring the heart rate of patient and immediately the heart rate goes above or below the certain limit the system will send an alert message.

As a part of this project we are implementing a system that will track the heartbeat of particular patient and monitor it correctly and give the emergency message on chances of heart attack.

Following figure shows the flow of system:

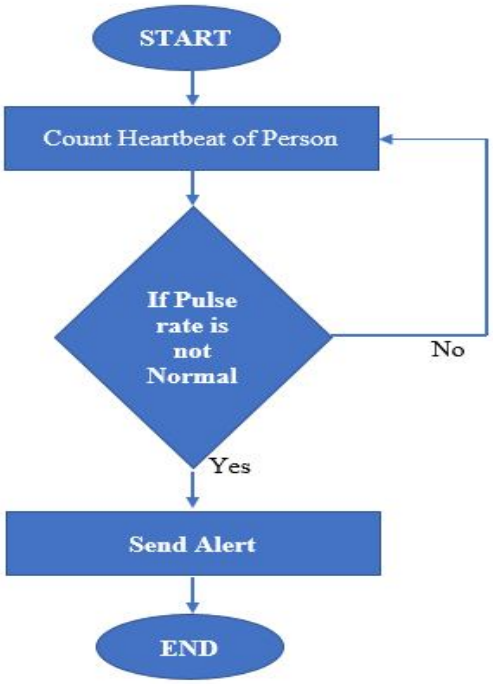


Fig2. Flowchart

IV. RESULTS AND DISCUSSIONS

After successful assembling of the hardware parts and the configuration of the software components, the functionality of the system was tested on a built model.

After setting up the system, check all the connections. Once the system is ready upload the source code. After uploading the code place the index finger on the heartbeat sensor. The heartbeat sensor will start monitoring the pulse rate. LCD is used for displaying the calculated pulse rate.

The system has configured maximum range of heart beat. Once the system starts measuring the Human heart beat, if it crosses the set limit then the system will send alert about heart rate. Also the system alerts for lower heart rate.

In this exploration we have attempted to propose a total project on detecting heart attack by monitoring the heartbeat of person. The heart beat sensor which is interfaced with microcontroller senses the heartbeat of person and transmits them over GSM module. System allows setting limits of heart beat. After setting these limits person can start monitoring the heart beat and whenever the person's heart beat goes above certain set point they can get an alert on high heart beat and also about chances of heart attack. Also the system alerts for lower heartbeat.

A. Hardware Assembly of Project

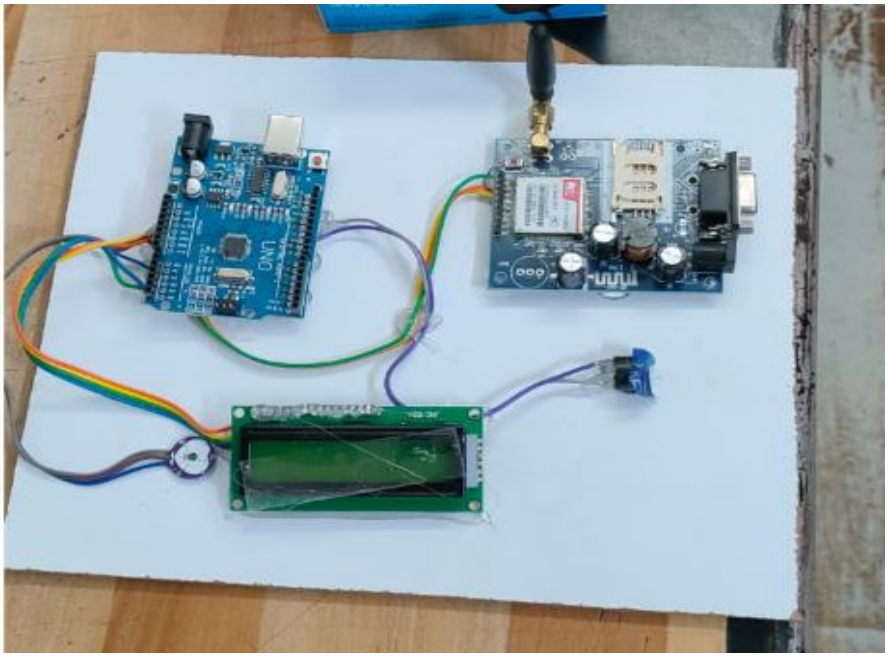


Fig 3. Hardware Assembly

V. CONCLUSIONS

Wireless and mobile technologies are key components that would help enable patients suffering from chronic heart diseases to live in their own homes and lead their normal life, while at the same time being monitored for any cardiac events. This will not only serve to reduce the burden on the resources of the healthcare center but would also improve the quality of healthcare sector.

In this project, the heart beat rate of the patient will be sensed. When the implant detects a heartbeat rate, it will alert the microcontroller which in turn will automatically send the message and provide the patient's condition so that the patient will be given medical attention within the first few critical hours, thus greatly improving his or her chances of survival.

VI. ACKNOWLEDGMENT

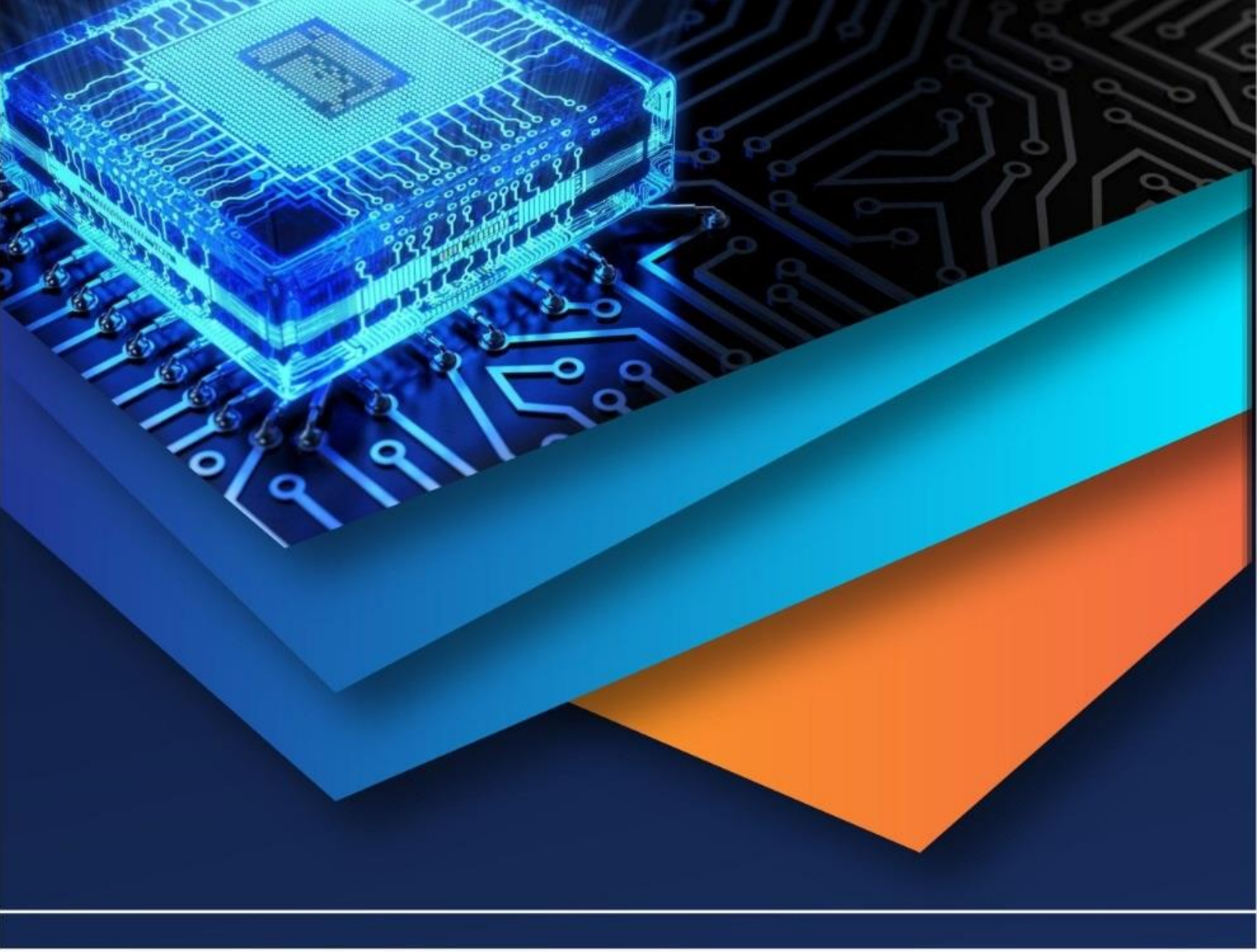
We would also like to show our gratitude to, *Prof. Ms. S. O. Ahire (Asst. professor, department of Electronics and Telecommunication Engineering, AISSMS Institute of Information Technology, Pune, Maharashtra, India.)* for sharing their pearls of wisdom with us during the course of this research. We are also immensely grateful to him for his comments on an earlier version of the manuscript, although any errors are our own and should not tarnish the reputations of these esteemed persons.

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