

# EARLY STAGE PREDICTION OF HEART DISEASE USING IOT

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## ABSTRACT

*One of the greatest contributions of technology to humanity is wireless transmission. It has been improved to provide consumers with information rapidly. Heart rate, body temperature, and blood pressure are three very important human bodily parameters. Doctors assess these parameters using a variety of medical equipment, such as a thermometer to check body temperature, a blood pressure monitor to measure blood pressure, and a heart rate monitor to measure heart rate. This emphasis on measuring and keeping track of different biological data using an Android app and a web server with IOT. On his or her smartphone, the doctor can keep an eye on the patient's health.*

## Keywords

Heart attack, Heart rate, Body Temperature, Blood Pressure, Wireless Transmission, Web Server.

## 1. INTRODUCTION

The term "Internet of Things" (IoT) refers to a general idea for network devices' capacity to detect and gather data from the surrounding environment before sharing that data online, where it can be treated and used for a variety of interesting uses. IoT predictions for the Internet and economy are astounding, with some anticipating up to 100 billion connected IoT devices and an \$11 trillion+ global economic effect by 2025. IoT in healthcare is important for tracking some health behaviors and diagnosing issues that are connected to these activities. The internet-connected gadgets have been made available to patients in a variety of ways. Whether information originates from connected electrocardiograms, blood pressure monitors, temperature sensors, or other sources. The internet-connected gadgets have been made available to

patients in a variety of ways. Whether information is derived from linked blood For some people, monitoring their health regularly with devices that measure their blood pressure, electrocardiograms, temperature, or blood sugar levels is essential. Many of these actions necessitate further communication with a medical expert. These data are always sent to a remote cloud, where numerous types of analyses reports are generated. The cloud then transmits the pertinent findings to the patient or medical staff via mobile phone or other active devices.

The healthy heart pulses 60 to 100 times per minute. However, a higher chance of heart attack may be associated with heart rates greater than 76 beats per minute while at rest. An irregular pulse does not necessarily indicate a heart attack. However, if it's a novel symptom or if you have chest pains or breathing issues, it could be an early sign of a heart attack. Only when passing out, feeling dizzy, being short of breath, or experiencing chest discomfort are slow rates problematic. In this essay, various heart-rate-related health data are used to dispel these myths and forecast heart attacks.

## 2. RELATED WORK

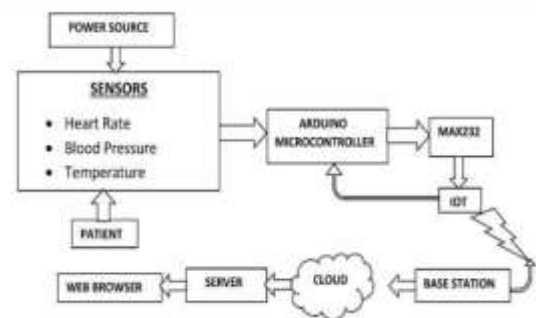
A Bluetooth-based wireless sensor network has been developed for continuously monitoring the physiological signals of a patient. This new technology has potential for offering a wide range of benefits to patients, medical personnel, and society through continuous monitoring feature, early detection of abnormalities with high reliability and security, and potential knowledge discovery through data mining of all collected medical data [1]. In [2][3] a Patient Monitoring System using GSM technology typically involves using sensors to collect data on a patient's vital signs, such as heart rate, blood pressure, and temperature. This data is then transmitted wirelessly using GSM (Global System for Mobile

Communications) technology to a central monitoring system, which can be accessed by healthcare professionals in real-time. [4]health monitoring system using smartphone accessories. Our proposed system is lightweight, cost effective and user friendly. The major advantage of our device is that the users do not have to carry an extra device while maintaining their health and safety.[5]A Zigbee and GSM-based patient health monitoring device has the potential disadvantage of not offering real-time monitoring. Zigbee is a wireless communication technology with minimal power and limited bandwidth that works over short distances, usually up to 100 meters. On the other hand, GSM is a cellular network system that offers greater coverage, though it might not be accessible everywhere.[6]This paper proposes a scalable system for heart disease monitoring using on Spark and Cassandra frameworks. This system focuses on applying realtime classification model on heart disease attributes for continuous monitoring of the patient’s health. [7][10] Machine learning algorithms can also be used to predict disease progression and treatment outcomes, allowing healthcare providers to personalize treatments and improve patient outcomes. Additionally, machine learning can be used to identify high-risk individuals and provide targeted interventions, improving population health outcomes.[8]The study found that Twitter data can provide real-time information about the spread of flu and cancer, and could be used to complement traditional disease surveillance methods. The findings suggest that social media data can be a valuable tool for public health officials in identifying and responding to disease outbreaks. [9] PCA is a technique used to reduce the dimensionality of a dataset by identifying patterns and correlations among variables. This can be useful in predicting heart disease as it allows for the identification of important risk factors and can improve the accuracy of predictive models.K-means clustering is a machine learning algorithm that groups similar data points together. This can be useful in predicting heart disease as it can help identify groups of patients with similar risk profiles.

**3.BLOCK DIAGRAM AND WORKING**

The Propsed system suggested system substitutes Internet of Things (IoT) technology for GSM. IoT technology tracks patient wellness and stores the information in the cloud. Whenever a

patient requires immediate attention, the suggested system notifies the predefined users and looks up local emergency contacts, such as an ambulance. The internet is used by IOT technology to transmit patient medical data constantly to an IoT-based ECG monitoring system that was suggested.This device determines the patient's heart rate and transmits that information beats per minute (bpm) of the heart to a cloud-based library.The crucial parameters sent by this system can be analyzed by hospital doctors using this system.Doctors can also examine a patient's real-time health-related data if they are not hospitalized.



3.1 Block Diagram

**3.1.1 ARDUINO MICRO CONTROLLER**

Arduino board designs use a variety of microprocessors and controllers. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino module will send this data to doctor through SMS using GSM module and also save this data over a cloudcloud.



Fig 3.1.1 Arduino Microcontroller

**3.1.2 MAX232**

It is commonly used in microcontroller-based projects and in communication between devices such as personal computers and peripherals, modems, and various other serial communication

devices. In summary, the MAX232 is an important component for serial communication in many electronic devices and is widely used in various industries such as telecommunications, industrial automation, and consumer electronics.



Fig 3.1.2 Max 232

**3.1.3 CLOUD STORAGE SYSTEM**

cloud storage allows users to access their files from multiple devices and locations, without the need for physical storage devices such as hard drives or USB drives. Cloud storage is also often more secure than local storage, as data is stored on servers with advanced security measures and encryption.

**3.1.4 INTERNET OF THINGS**

IoT can be used in heart disease prediction through the use of wearable devices that collect data on a person's heart rate, blood pressure, and other vital signs. transmit this data to healthcare providers in real-time. providing more accurate and timely data, enabling earlier detection and intervention, and improving communication and collaboration between patients and healthcare providers.

**3.1.5 TEMPERATURE SENSOR**

Temperature sensors can be used to continuously monitor body temperature and provide data to



Fig 3.1.5 Temperature Sensor-LM35

healthcare professionals for analysis. This information can be used to identify patterns and trends in temperature that may be indicative of early stages of heart disease.

**3.1.6 HEART RATE SENSOR**

The heart rate is the number of times the heart beats per minute and can be an indicator of overall cardiovascular health. Studies have found that a high resting heart rate is associated with an increased risk of cardiovascular disease, including heart attacks and strokes. with temperature sensors, heart rate sensors should be used in conjunction with other diagnostic tools and medical expertise to accurately assess an individual's cardiovascular health.



Fig 3.1.6 Heart Rate Sensor

**3.1.7 BLOOD PRESSURE SENSOR**

Blood pressure sensors can be used to monitor an individual's blood pressure continuously and provide data to healthcare professionals for analysis. blood pressure sensors can be used to detect abnormal blood pressure changes during exercise, which can be an early warning sign of underlying heart disease.



Fig 3.1.7 Blood Pressure Sensor

**4. CONCLUSIONS**

Due to patient attitudes towards these devices and the need to take allergy illnesses into account with this wearing, wearable devices are finding a sufficient amount of acceptance. A device's powering down due to an energy-related issue, such as a dead battery or other difficulties, may produce poor or interrupted results. This outcome might be the reason why the analysis summary was

inaccurate. Therefore, the top priority for every task must be developing a mature infrastructure for everything connected to this testing and finalising it for actual calculation.

## 5. REFERENCES

1. *Y. Zhang and H.Xiao*- “Bluetooth-Based Sensor Network for Remotely Monitoring the Physiological Signals of Patient”-Bluetooth Technology, 2009.
2. *Jaiesitaram, Adivareka, Amisha Dilip Chordia*- “Patient Monitoring System Using GSM Technology.”-GSM & VLSI Technology, 2013.
3. *Shrenik Suresh Sarade, Nitish Anandrao Jadhav, Mahesh D. Bhambure* – “Patient Monitoring And Alerting System By Using GSM”-GSM Technology, 2015.
4. *Md. Shaad Mahmud , Honggang Wang, A.M. Esfar-E-Alam, Hua Fang*-“ A Wireless Health Monitoring System Using Mobile Phone Accessories”-GSM Technology, 2016.
5. *Purnima, Neetu Rout, Rahul Tiwary* –“ Zigbee And GSM Based Patient Health Monitoring System”-GSM & ZIGBEE Technology, 2014.
6. *Abderrahmane Ed-daoudy , Khalil Maalm*- “Realtime machine learning for early detection of heart disease using big data “-Machine Learning Technology, 2020.
7. *Min Chen, Yixue Hao, Kai Hwang, Lu Wang*- “Disease Prediction by Machine Learning Over Communities Big Data From Healthcare Communities”-Machine Learning, 2018.
8. *Kathy Lee, Ankit Agrawal, Alok Choudhary*- “Real-Time Disease Surveillance Using Twitter Data: Demonstration on Flu and Cancer”, 2018.
9. *Md. Touhidul Islam Sanjida Reza Rafa Md. Golam Kibria* – “Early Prediction of Heart Disease Using PCA and Hybrid Genetic Algorithm with k-Means”-PCA Technology, 2021.
10. *Aditi Gavhane, Gavhane Gowthami, Isha Pandya, Kailas Devadkar*- “Prediction of Heart Disease Using Machine Learning”-Machine learning Technology”, 2020.

