

IoT Based Health Monitoring Device

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Abstract: *If patients aren't given the right care when they need it, their health will be terribly compromised, and a lot of infections could spread. The past few years have made challenging to practise patient observation. As a result, a solution is needed so that doctors can always keep an eye on their patients whenever needed. An answer is anticipated for this with the occurrence of the web of Things (IoT) devices in recent years. The importance of health in our daily lives Researchers and industry professionals will find this paper beneficial in understanding the enormous potential of IoT in the medical domain and identifying significant IoT problems. To attempt to carry out the daily work properly, good health is essential. With the use of smartphones and Internet of Things technologies, this project intends to create a sensor that can be used to track a patient's heartbeat in real-time. In this project, a portable framework is shown that uses a Wi-Fi module to continuously monitor the patient's heart rate, temperature, and various room-related metrics. There is a suggested IoT-enabled smart home and health monitoring system where the permitted personal data may be accessed using any IoT platform and the specific disease is diagnosed by a doctor even at a distance based on the output values received. An easy way to keep track of your blood pressure that is both affordable and convenient. An Internet of Things-based blood pressure monitoring system employing wireless technologies is created by fusing a Node MCU, a pressure sensor, and other Internet of Things principles. The project's goal is to put up a network that will allow concerned parties to access patients' blood pressure measurements from a distance. Results can be accessed on a mobile, tablet, laptop, and other handheld devices using Bluetooth and Wi-Fi technologies.*

Keywords: ESP32, GSM, Blynk Cloud, Node MCU

I. INTRODUCTION

The Internet is a global system that can be used for sharing information and providing worldwide services and communication. The main purpose of IoT devices is to generate real-time data that we can then analyze and use to create desired business outcomes. In an Internet of Things (IoT) ecosystem, two things are very important: the Internet and physical devices like sensors and actuators [1]. A healthcare monitoring system is necessary to constantly monitor the patient's physiological parameters. The main advantage of this system is the result can be viewed at any time and place. The doctors can be notified using mobile phone messages if a patient's health is abnormal. The system was using both the sensors like heartbeat sensor, temperature sensor, and blood pressure sensor. Every day, more gadgets are added to the IoT's expanding network. The majority of these technologies are being efficiently developed in healthcare. In this project, we outline a number of scenarios in which the health monitoring system might be helpful to both patients and doctors. When there are car accidents, health monitoring systems are helpful since they allow for patient monitoring all the way to the hospital. A health monitoring system can be used for patients whose long-term surveillance makes hiring a nurse more expensive necessary. Patients who reside in remote places without access to a hospital are helped by the module.

Objectives:

In this project, we provide an IOT-based system for tracking patient health. It aids in taking care of the patient's health in accordance with the doctor's instructions. Additionally, we may monitor health changes without incurring excessive costs by visiting labs. Our project's primary goal is to create a portable IoT device that is priced affordably for everyone.

Scope of Project:

Future research in the area of robotics and medical automation has the potential to enhance ECG monitoring systems, facilitate robotic assisted surgery operations, facilitate senior care, and facilitate uninterrupted remote and in-hospital patient monitoring. Robotic surgery should be performed with more control, vision, and precision, paving the way for the revolutionary healthcare of the future. Two more possible study areas include comprehending the usage of the incredibly rapid IoT and connected smart gadgets for preventative healthcare as well as assisting in the identification of patients' particular medical difficulties or a change in behavioural qualities. The usage of highly customised tracking systems that are engaging, and allow for specific setups and alterations according to user's preferences for a superior quality of life should also be taken to the limit. Adding more sensors to the carpet to accurately track patients' movements in order to create behavioural patterns and spot any anomalies, as suggested in [16], is another way to increase the intelligence of the environment around the patients

Modules:

- ESP8266(32) Module
- Pulse Oximeter Max30100
- PCB Board
- Male/Female Jumper Wire
- Soldering Wire
- AD8232
- DHT11/LM35
- Buzzer
- BMP180
- LCD Display
- GSM module

II. LITERATURE REVIEW

With the development of IoT networking, many researchers can evaluate the monitoring of essential parameters for healthcare services.

Tanveer Reza et al. [1] concentrate on an android-based pulse monitoring system that interferes with a cardiac monitor. The European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 7, Issue 4, 2020 2648 user created an app for mobile devices using Android Studio and a web portal as the doctor's interface. The app used Bluetooth module HC-05. The created algorithm analyses the website's individual users' beats per minute data and predicts them as a graph. Arduino serves as the system's gateway and is connected to the pulse sensors in the system's architecture.

Ravi Kishore Kodali et al. [2] present the experimental configuration for the healthcare-based IoT device that uses XBee S2 modules' network protocol to monitor a patient's temperature.

The system connected the LM 35 temperature sensor to Intel Galileo version 2 through its gateway. Using the Internet of Things, Surya Deekshith Gupta et al. [3] present the system design for healthcare.

The Raspberry Pi and GSM module are combined in this system to observe various ECG processes that are tracked to determine the sort of heart ailment by utilising Python coding techniques. Using the MySQLdv module, the outcome of heartbeat data is automatically updated in the website database. Additionally, a USB 2.0 connector with an Ethernet interface for networking can be used to obtain Wi-Fi updates.

Punit Gupta et al [4] 's service survey of the idea of medical care offers medical data information by connecting a temperature and heart rate sensor to the internet via Wi-Fi/Ethernet. The created system uses a second-generation Intel Galileo board and a Xampp-based database server to monitor patient data on a live graph and analyse health reports for further tracking.

Using phonocardiography, Jusak Jusak et al. [5] investigated a smart method for recording all the heart's sounds throughout a cardiac cycle (PCG). A framework based on the Internet of Medical Things was created, similar to the

mobile module. Using a heart sound sensor, cardiac activity can be found as an ECG or PCG signal. Data about patients can be accessed by doctors,

Using a cloud data centre, media may be accessed from anywhere. In terms of sampling frequency band ratio and bandwidth utilisation characteristics, the system's performance is evaluated.

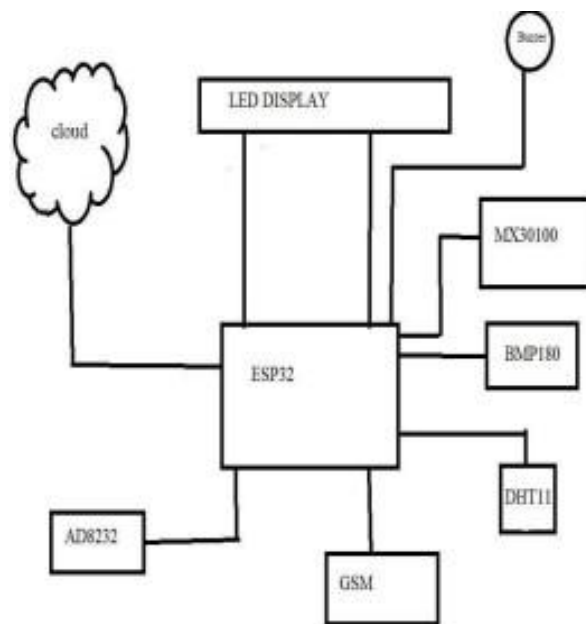
Two transceivers are used in the system established by Omar S. Alwan et al.

[6] to monitor the body temperature parameter cone. The wireless transmission system is made up of two devices: an Arduino connected to a Zigbee shield and a Raspberry Pi 2 for the first device.

R. Kumar et al. [7] describe a smart monitoring system that uses a Raspberry Pi without the addition of environmental sensors or alert customization. Emre Oner Tartan et al. [9] present an Android application for alarm system-based geo-location-based health monitoring consultancy. Real-time remote heart rate monitoring, patient location tracking, decision-making for various warning circumstances on smartphones, and consultation modules with medical professionals are all included. The prototype framework is outfitted with an Arduino Uno board and Bluetooth HC-05 module for wireless sensor data transmission to a smartphone (GPS sensor and pulse sensor). Based on 3G and 4G wireless technology, cellular networks provide internet access

III. METHODOLOGY

3.1 Block Diagram



IV. CONCLUSION

Globally, IoT-based health monitoring is expanding more quickly. Because the internet is so widely used, this work is focused on using internet technology to create a system that would communicate via the internet for better health. The healthcare industry is one of several areas where the Internet of Things is king. As a result, the current effort is being done to design an ESP32-based Internet of Things-based smart patient health monitoring system. In this, a pulse rate sensor is used to detect the heartbeat, a bp sensor to check the bp, an ECG sensor for ECG report, and a temperature sensor to read the temperature and sends the data to the cloud using the internet. This information is also sent to the LCD display, so the patient can easily know their health status. During critical situations to alert the doctor, a warning message is sent to the doctor's phone and at the same time buzzer turns to alert the caretaker. The doctor can view the sent data by logging the specific website or IP address. Hence continuous patient monitoring system is designed

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