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A futuristic digital interface with a glowing Earth globe in the center. The background is dark blue with various data visualizations including bar charts, line graphs, and pie charts. Text elements like 'BUSINESS', 'NETWORK SEARCH', and 'WORLD' are visible. A person's hand is seen at the bottom, interacting with the interface.

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# Real Time Cloud Based Health Tracking and Monitoring System

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**ABSTRACT**-Technology is crucial in healthcare, not just for sensory equipment but also for recording and communication. It is crucial to follow several medical guidelines and postoperative days. IoT is therefore the most current innovation in healthcare communication approach. IoT is a catalyst for the healthcare industry and has a notable impact on several applications. In this project, an arduino serves as a communication gateway. This system presents a clever patient health monitoring system that uses sensors to track patient health and utilizes the internet to notify worried doctors or concerned family members of any emergencies. A buzzer is also attached to the arduino to notify the carer of changes in detector output. A sensor network is attached to the arduino to monitor the patient's condition, which is connected to an LCD display as well as a wireless local area network connection for the purpose of alert transmission. The system instantly sends a notification to the doctor detailing the patient's state through IoT if it notices any changes in the patient's pulse rate or blood pressure. It also displays the patient's temperature, blood pressure, and heart rate information live via the cloud. In order to efficiently monitor patient health and promptly save lives, IoT-based patient health monitoring systems leverage the internet. This makes using this method for quick conditional medication simple. This system can perform well and respond quickly, and it is also simple to set up.

**KEYWORDS:** Embedded system, IoT, Patient monitoring system, Arduino.

## 1.INTRODUCTION

Nowadays, the internet has emerged as one of the essential elements of our everyday lives. Methodologies for how people live, work, play, and learn have been adjusted. The internet is a tool for a variety of reasons, including those related to education, finances, business, industry, leisure, social networking, shopping, and more. IoT is a future internet megatrend. IoT allows for the visualisation of a world in which many items sense, converse, share data across a personal network protocol or open networks. The linked items periodically gather data, analyse it, and take the necessary actions, offering associated intelligent networks for planning, developing, and making decisions[1]. This is the Internet of Things universe. IoT is primarily thought of as a means of attaching objects to the internet and exploiting that controlling these things or observing them remotely. The creation of a dazzling invisible network that can be detected, controlled, and programmed[3] is the definition of IoT, though. The embedded technology used in the IoT-based products allows them to exchange information with other devices or the internet, and it is estimated that 8 to 50 billion devices are currently in use, all linked by 2020. As these gadgets have been connected to the internet, they have improved lifestyles, made communities safer and more active, and revolutionised healthcare. Because of a variety of risk factors, including nutritional imbalance and physical inactivity, there is an increasing number of people with chronic illnesses in poor and medium income nations. According to a WHO research, smoking causes 4.9 million cases of cancer, 2.6 million cases of being overweight, 4.4 million cases of excessive cholesterol, and 7.1 million cases of high blood pressure[1]. Chronic illnesses have a wide range of symptoms, stages of development, and treatments. These will cause the patient's death if they are not monitored and treated promptly. For a number of years, specialised medical facilities calculated the standard measurements of blood sugar, blood pressure, and heart rate. Since the

Due to advancements in technology, it is now possible for patients to take their vital signs on a regular basis using devices like a blood pressure cuff, glucometer, pulse monitors, and electrocardiograms.



The daily readings are submitted to the doctors, who are then able to recommend the medications and fitness regimen that will help the patient enhance their quality of life and beat the condition. In order to improve people's quality of life, Internet of Things is being used increasingly often in the healthcare industry to monitor and care for patients. It is possible to programme the Arduino, a machine that can observe and respond to its surroundings. The innovative method of using Arduino and the Internet of Things integrating IoT into patient monitoring systems in healthcare. The sensor, gateway, and wireless network that change how users connect and access information underpin the overall Internet of Things (IoT) idea. IoT provides additional assurance in the area of health awareness. Using innovation for improved well-being is vital since, as the adage goes, "Health is wealth"[4]. The data from the sensor is gathered by Arduino Uno and sent to the IoT platform.

## II. LITERATURE SURVAY

### A. EXISTING SYSTEM:

The fixed monitoring device that is used for health monitoring is only detectable while the patient is in a hospital or asleep. recent systems available are enormous in size and exclusively found in hospitals' intensive care units[5]. Zigbee may now be utilised to provide patient information to worried family members or clinicians.

### B. DRAWBACKS:

For ongoing patient monitoring under the current approach, the patient must be admitted to the hospital. Once he or she is let go by the hospital. You can't utilise this system at home. The patient's health parameters are measured by the current systems and sent through Bluetooth, ZigBee, and other protocols. They are only used for data transport over short distances in communication. The doctor can't always get these facts.

The system we would like to create would assist in keeping tabs on the patient's health both while he is in bed and when he is not. The system's central concept is to submit data via a website to an online patient monitoring system that runs continuously. Such a device would continuously monitor vital physiological

## III. PROPOSED SYSTEM

functions like temperature and heart rate and compare them to established ranges; if these numbers exceeded a particular threshold, it would quickly inform the doctor. With this system, data transmission is handled by a microcontroller. It is connected to the Internet of Things, which gives doctors and carry information. Health information about the patient is kept on the cloud. The physician can. The patient's health may be easily accessed by the doctor at any time, from anywhere. The microcontroller is also linked to an LCD and a buzzer. enable the patients to see a live feed of their health state. In an emergency, it would send an SMS notification to the patient's doctor and a relative. In such a scenario, the patient will receive prompt medical assistance and the family, who are unable to always be at the patient's side, will also save time and energy.

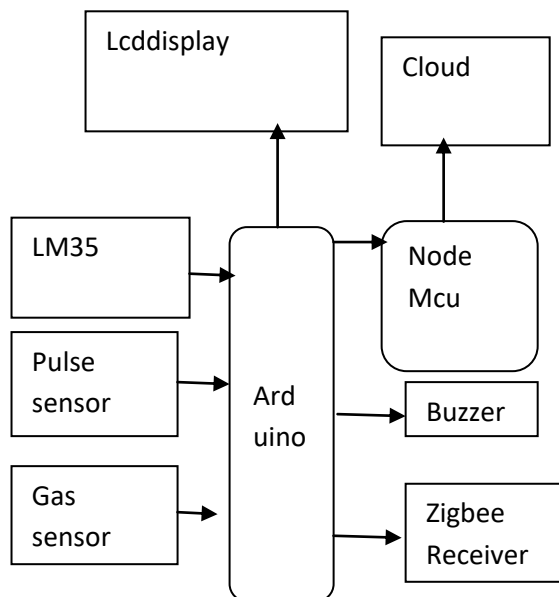




TABLE1.List of the major Hardware components,quantity and cost of the product.

Serial	Item description	Quantity	Price BDT
1	Arduino Uno	1	450
2	Node Mcu	1	490
3	Temperature sensor	1	270
4	Pulse sensor	1	400
5	Gas sensor	1	200
6	LCD display	1	205
7	Buzzer	1	20

**A.TEMPERATURE SENSOR:**

The output voltage of the integrated circuit temperature sensors of the LM35 series is proportional to the temperature in Celsius. Thus, a temperature sensor is preferred to a linear temperature. Sensors calibrated in kelvin don't need the operator to subtract a significant amount of constant conductivity from the output in order to convert to centigrade scaling[4].A temperature sensor is a device that detects temperature fluctuation.

**B.PULSE SENSOR:**

When a finger is placed on a heartbeat sensor, a digital output of pulse rate is produced. Here, we'll create a cavity with one powerful Light Emitting Diode and one Just to its opposite, LDR. The heart's pulse may be found by placing the finger between the Light Emitting Diode and LDR. LED flashes in time with each heartbeat when the heartbeat detector is functional. The microcontroller may be directly linked to the digital output to measure the Beats Per Minute (BPM) rate. It operates on the idea that each pulse causes a change in the amount of light that is modulated.

**C. IoT**

Typically, the Internet of Things is thought of as the process of attaching objects to the internet and using that connection to access a specific object. The Internet of Things platform, which gathers data from various devices and stores it in the cloud, is connected to remote devices and items with built-in sensors elsewhere. And then transfers the data to that particular website.

**D.Arduino:**

An open source microcontroller called Arduino UNO is based on the mega 328p chip. This features several beneficial amenities like they simply transmit the necessary data using a PC or another microcontroller. In a nutshell, we state that the microcontroller's software code is entirely responsible for the project's success.



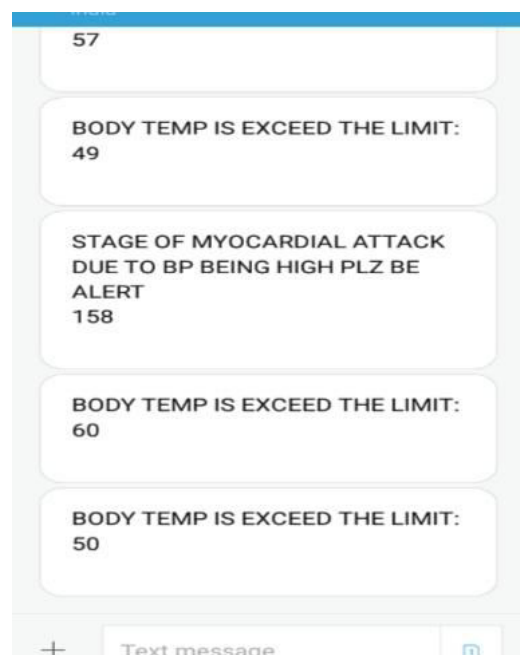
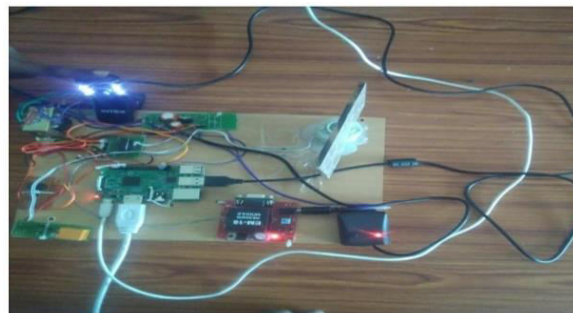
**IV. IMPLEMENTATION**

This project uses the Internet of Things to identify the patient's numerous metrics. The real-time variables in IoT-based health monitoring systems via an internet connection, are uploaded to the cloud. The user may get the details at any time by having the data supplied to any location in the world. This is its main benefit over systems that monitor health via SMS. Doctors or the patients' loved ones frequently see the patient health data in IoT-based patient health monitoring systems. The data must be retrieved by going to a website or computer address, but with a patient



monitoring system based on the Global System for Mobile communication, the health parameters are available immediately.. A temperature sensor is the first one, followed by a cardiac monitor and a breathing sensor. This is quite helpful because With just a simple internet website visit or IP address, the doctor may determine the patient's health factors. Moreover, a number of IoT apps are now being created. So, using Android applications, the doctor and the patient's family will keep tabs on the patient's health. You will need the following to run an IoT-based health tracking system: a WiFi connection. With a Wi-Fi module, the microcontroller or Arduino board connects to the Wi-Fi network. When there is no Wi-Fi network, this system will not function. Three senses are continuously scanned by an Arduino UNO device. The information is then sent to a specified URL or IP address and sent to the cloud. Thereafter, for a certain amount of time, this process of speeding data to the cloud is repeated.

## V. RESULTS



## VI. SCOPE AND APPLICATION

The most recent development in the medical sector is IoT healthcare. This project mostly serves elderly homebound individuals. Also, it benefits elderly people who live alone or with one or two people. When family members or relatives must leave the house for unforeseen circumstances, this is quite beneficial. Any individual with a disability can utilise this initiative. Those with disabilities who have trouble visiting doctors on a regular basis or those who require ongoing care from a doctor[3]. When we need to record, monitor, and track changes in the patient's health indicators, IoT tracking comes in particularly handy. IoT healthcare is the most current innovation in the medical field. This project mostly helps older people who are housebound. Also, it helps elderly individuals who live alone. or in

groups of one or two. This is very useful when family members or relatives have to leave the house due to unforeseeable circumstances. This project is open to all people with disabilities. people who require continuing medical treatment from a doctor or those with impairments who find it difficult to visit doctors frequently[3]. IoT tracking is very helpful when we need to document, watch over, and track changes in the patient's health indicators.

## VII. CONCLUSION

The widespread usage of the internet makes this task focused on implementing internet technologies to create a method that would better interact over the internet health. The Internet of Things dominates the world in a number of ways areas, mostly in the healthcare industry. Hence, the current work is developed to create a smart patient via the Internet of Things. utilising an Arduino microcontroller for a health tracking system. In The heartbeat is detected using a pulse rate sensor, and temperature sensor that transmits data after reading the temperature across the internet to the cloud. Also receiving this information is the Patient may quickly see their health condition thanks to an LCD monitor. A warning message is sent to the control room in emergency scenarios to inform them, and a buzzer switches on to alert the carer at the same time. The physician can see the By recording the precise website or IP address, data is transferred. Hence a mechanism for continuous patient monitoring was created.

## VIII. FUTURE WORKS

The project's future work is absolutely necessary to progress the design system. In the In order to improve the intended system, more sensors that assess other health metrics would be connected. We can In an IoT-based health monitoring system employing an Arduino and Wi-Fi module, add a GPS module as well. Using longitude or latitude, the GPS module will determine the patient's location or position. latitude obtained. Then, using the Internet of Things, it will send the patient's location to the cloud so that physicians may access it in case they need to take any preventive measures. Alternatively, the nearest hospital will be notified automatically by GPS, and an ambulance will be dispatched to the patient. Also, the communication range will be increased by constructing a Wi-Fi mesh network

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