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IOT Based Patient Health Monitoring system

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Abstract: In this project, the internet of things (IOT) is used to develop and design a patient health monitoring system. These days, new devices are being created. Experts are constantly searching for cutting-edge electrical equipment that make it simple to find anomalies in the body. Patients can do examinations at home thanks to the patient health monitoring system. A patient health monitoring system is shown in this project. For other people, visiting the hospital frequently or purchasing hospital supplies from a shop is too expensive. We have created a system that allows us to continuously monitor the patient's blood oxygen levels, heart rate, and body temperature. Additionally, our desired check-up output is delivered to your mobile device via email**.** The advantage of this gadget is that, regardless of where the primary household member is located, he may access your health check-up information on a variety of devices.

Keywords: IOT, Health Monitoring system, Arduino uno, ECG Sensor, Cloud server, etc.

I. INTRODUCTION

Today, 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 technology that may be used for a variety of things, including social networking, shopping, banking, business, and education.

IoT is a future internet megatrend. IoT allows for the visualisation of a world in which many items sense, converse, and share data across a personal net protocol or open networks. The linked items periodically gather data, assess it, and take the necessary actions, offering associated intelligent networks for planning, designing, and making decisions. This is the Internet of Things universe. IoT is mostly conceived of as the connection of devices to the internet and the use of its affiliates for administration or remote monitoring of these objects. The creation of a dazzling invisible network that can be detected, controlled, and programmed is the definition of IoT, though. By 2020, it is predicted that 8 to 50 billion devices will be connected, thanks to integrated technology that enables IoT-based items to share information with one another or via the internet. Since these gadgets have been connected to the internet, they have improved lifestyles, made communities safer and more active, and transformed healthcare.

Because to 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 report, 4.9 million people die from smoking-related cancer, 2.6 million people are overweight, 4.4 million people have excessive cholesterol, and 7.1 million people have high blood pressure. Chronic illnesses have a wide range of symptoms, stages of development, and treatments. Some will cause the patient's death if they are not monitored and treated promptly. For a number of years, specialised medical facilities computed the standard measurements of blood sugar, blood pressure, and heart rate. Due to technology advancement, a wide range of continuously operating sensors providing vital signs, such as blood pressure cuffs, glucometers, pulse monitors, and electrocardiograms, enable patients to take their vital signs on a regular basis.

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. The Arduino is a programmable gadget with environmental sensing and interaction capabilities. The innovative method of integrating IoT into patient monitoring systems in healthcare is the combination of Internet of Things and Arduino. 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. Utilising innovation for improved well-being is vital since, as the adage goes, "Health is wealth". The data from the sensor is gathered by ESP8266 and ESP32, which then sends it to an IoT website.

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II. Block Diagram

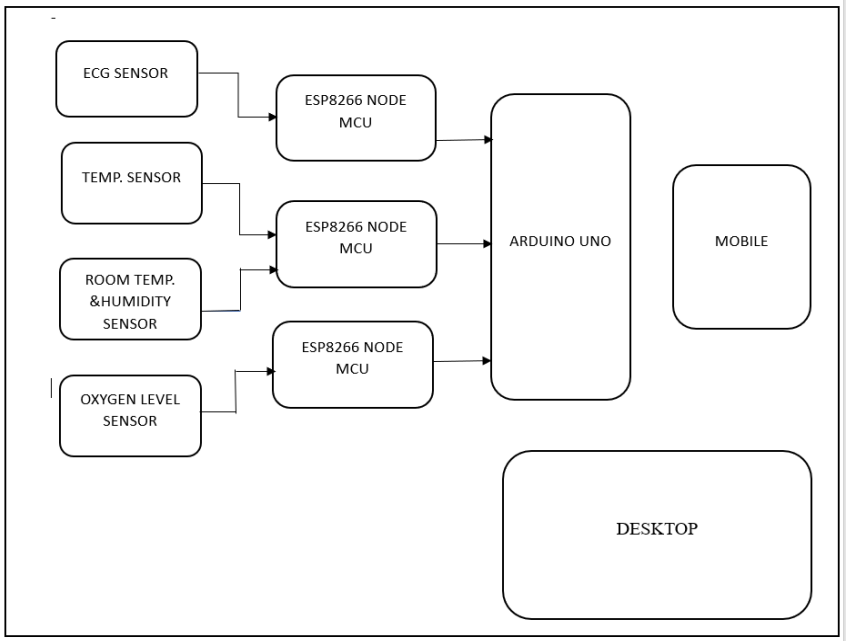

Fig. 1. Block Diagram

III. Hardware Required

A. ESP8266 node MCU

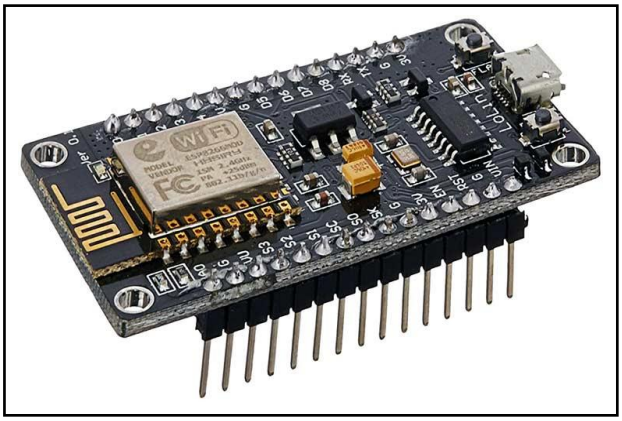

Fig. 2. ESP8266 node MCU

The ESP8266-based open-source platform Node MCU allows for the connection of devices and the transmission of data via the Wi-Fi protocol.

B. Arduino Uno

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Fig. 3. Arduino Uno

A specific kind of microcontroller board is the Arduino Uno, which was created by Arduino.cc. It is possible to construct it using an Atmega328 microprocessor.

C. ECG Sensor AD8232

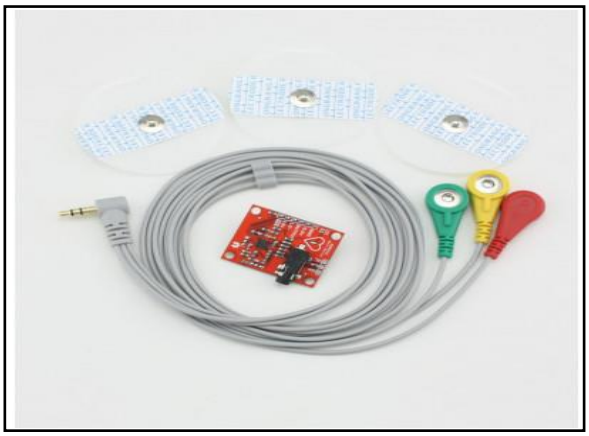

Fig. 4. ECG Sensor AD8232

An ECG or electrocardiogram can be used to track this electrical activity and provide an analogue readout. The AD8232 single lead heart rate monitor functions as an op amp to assist in obtaining a clean signal from the PR and QT Intervals with ease.

D. MAX30100

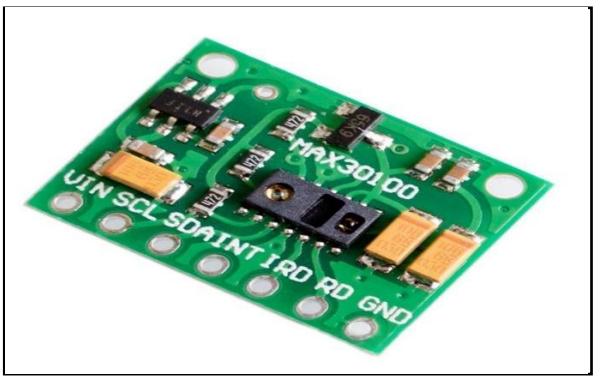

Fig. 5. MAX30100

The combined pulse oximetry and heart rate monitor sensor system known as the max30100. To detect pulse oximetry and heart rate signals, it incorporates two LEDs, a photodetector, improved optics, and low-noise analogue signal

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processing. The max30100 runs on 1. 8v and 3. 3v power sources and may be switched off using software. It uses very little standby current, thus the power supply can always be attached.

E. DHT11

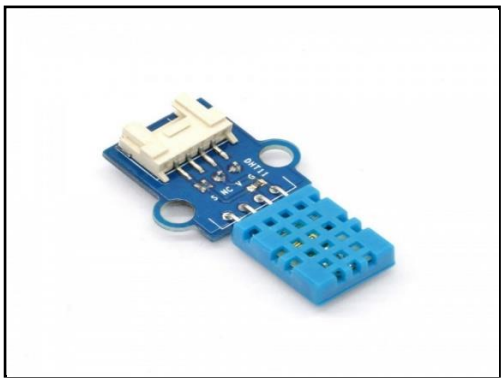

Fig. 6. DHT11

A basic, extremely affordable digital temperature and humidity sensor is the DHT11. It can measure temperature and relative humidity, which is the difference between the amount of water vapour in the air and its saturation point.

F. Dallas Temperature Sensor

Fig. 7. Dallas Temperature Sensor

This digital temperature sensor probe is 1 metre long, waterproof, sealed, and pre-wired. It uses the DS18B20 sensor. When you need to measure anything far away or in damp conditions, it comes in quite helpful. You don't experience any signal deterioration even across vast distances because they are digital.

G. 5v Power Supply

Fig. 8. 5v Power Supply

One of the most widely used power sources in use today is the 5V power supply (also known as the 5VDC power supply). diodes, and transistors are often used in conjunction to convert a 50VAC or 240VAC input into a 5VDC output.

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IV. OPERATION

A. ECG Monitoring operation : The ECG monitoring device is equipped with the presenting the user's or the patient's ECG waves is an option. By collecting ECG signals and uploading data to the cloud network, a patient's medical report is made public. allows for user input based on the information that has been gathered.

B. BPM Operation: High blood pressure is a sign that the heart is working hard to pump blood throughout the body. The Internet of Things (IoT) technique encourages the identification and treatment of health issues, such as high blood pressure, low haemoglobin, high blood sugar, and aberrant cell development. An Internet of Things system for managing diabetes, obesity, and blood pressure.

C. Oxygen Level monitoring: The pulse oximeter is used to continually measure the amount of oxygen in the blood. There are technological applications for the usage of IoT with pulse oximetry. CoAP-based health care system research explore the advantage of IoT-based pulse oximetry.

D. Body Temperature operation: Controlling and monitoring body temperature is a crucial part of health applications. According to the m-IoT concept, the body's temperature affects how the homeostasis changes. The body temperature control device is mounted on the home port on top of an IoT device. It enables the temperature infrared detection and RFID module's control and computation.

E. Room Temperature& Humidity Monitor Operation: Our humidity sensor is a DTH11 sesnor. The right humidity level is crucial for human health. This amount of humidity ranges from 40% to 60%. The system will email the employees if the humidity level rises. As you are aware, we keep an eye on the room's temperature using a DTH11 sensor. The system will email the personnel if the room temperature rises.

F. Alert System operation: Our system will send an email to, acting as an alert system for all medical professionals, when any predefined value increases or decreases.

V. CIRCUIT DIAGRAM

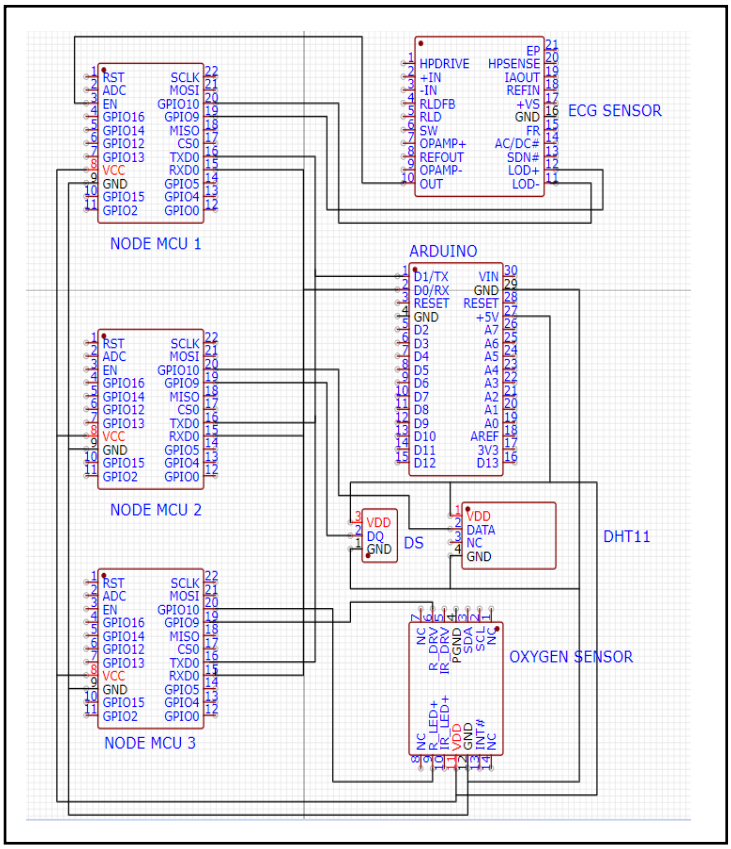

Fig.9.Circuit diagram

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VI. FLOW CHART

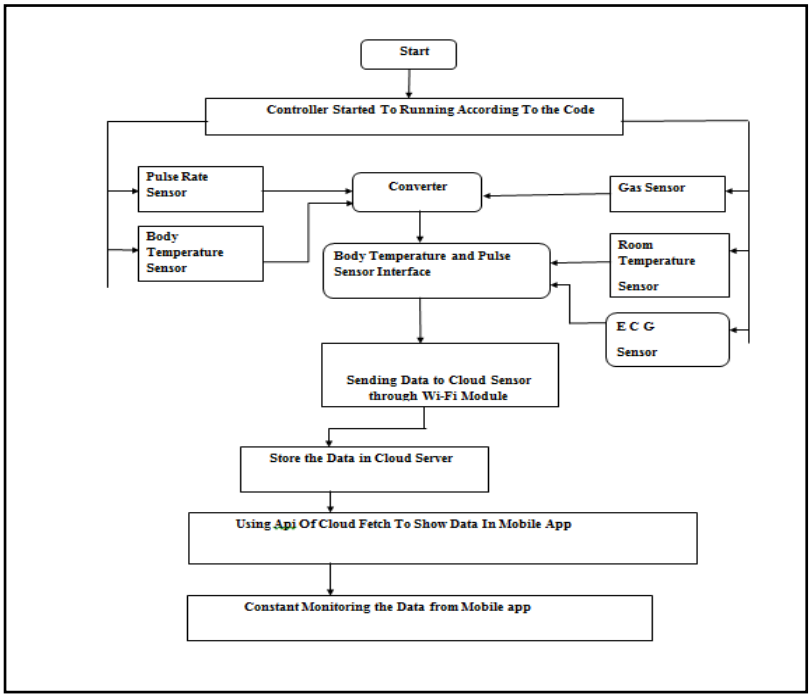
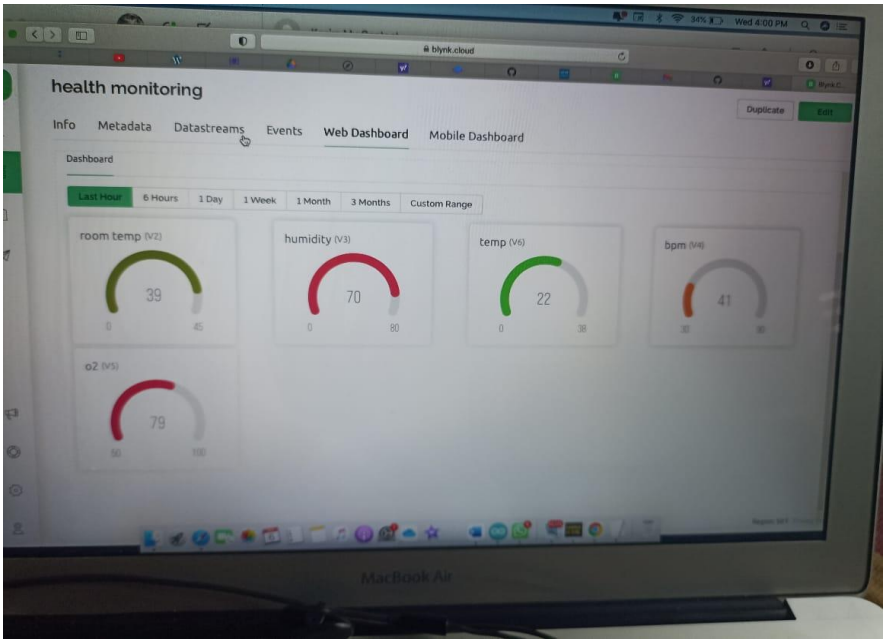


Fig.10.Flowchart

VII. RESULT



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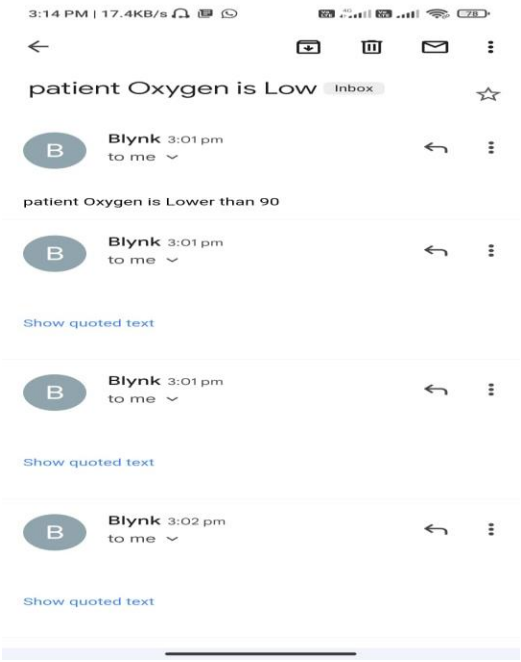

Fig.10.Result

VIII. CONCLUSION

The proposed framework will be a sample version that offers a financially advantageous, time-saving, and technically straightforward way of differentiating things. This framework employs the Internet of Things (IoT), which was cited as one of its most significant applications as the primary distributor of healthcare systems. helps to improve the delivery of healthcare by removing constraints related to time, geography, and other factors, while also expanding its coverage and efficiency.

FUTURE SCOPE

In the Internet of Things ecosystem, transmitting data securely is essential. There is a need to preserve the privacy of healthcare data when it is transmitted over an untrusted network since there are many opportunities for data theft inside the IoT platform because IoT devices are often accessible over an untrusted network.

ACKNOWLEDGMENT

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