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IOT Cloud Based-ECG Monitoring System

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Abstract: This project introduces an innovative IoT- based health monitoring system employing the ESP32 Wi-Fi module. The Internet of Things (IoT) serves as a vast interconnected network linking both devices and individuals, facilitating the collection and dissemination of data pertaining to their usage and the surrounding environment. The proposed system incorporates diverse sensors to measure critical health parameters, including blood pressure (BP) and electrocardiogram (ECG), enabling real- time monitoring and seamless data transmission. By leveraging the capabilities of the ESP32 Wi-Fi module, this system offers a robust and efficient platform for health monitoring, promising enhanced accessibility and timely interventions for proactive healthcare management With IoT serving as the linchpin connecting devices and individuals, our proposed system harnesses a network of sensors to measure crucial health parameters such as blood pressure (BP) and electrocardiogram (ECG). This innovative approach not only facilitates real-time data collection but also ensures seamless transmission, promising a transformative leap in healthcare management through proactive monitoring and timely interventions.

Keywords: ECG sensor, LCD Module, Arduino IDE Software Tool

I. INTRODUCTION

In today's technology-driven healthcare landscape, sudden cardiac deaths due to delayed medical intervention remain a pressing concern. To combat this, our project leverages Body Health Monitoring, utilizing wearable sensors and an Android app to track patients' vital signs, including temperature and heart rate. This data is transmitted to the cloud via Bluetooth/Wi-Fi, enabling continuous monitoring and storage in a cloud database. Doctors can access this information to prescribe medication, while patients can move freely without restrictions. The Android app detects heart attack indicators and alerts the patient's doctor, relatives, and hospitals in case of anomalies. By harnessing IoT technology, our system revolutionizes healthcare management through proactive monitoring and timely interventions, embodying the adage "Health is Wealth." Our innovative approach combines IoT, cloud computing, and ECG monitoring to provide a comprehensive solution for cardiovascular healthcare, transforming the way we manage patient care. Shopping trolleys, are useful tools for customers moving items around briefly before checking out. Since its creation, shopping carts have seen very few modifications. Its weight and capacity have been modified in the majority of expansions. Most of people go to shopping malls in a rush to buy food products, clothing, toiletries, gardening equipment, electrical appliances, and other daily requirements.

When they shop, customers frequently run into issues and inconveniences. They want a sufficient budget and quick payment. They are concerned that the money they have got will not cover the cost of the things they have purchased. Sometimes, customers were impatient with the wait and wasted time at the counter. They also encounter inadequate information about the products, such as the cost of each item they wish to buy. The purpose of the Smart Shopping Cart is to provide customers with easy, comfortable and effective shopping experiences. Customers may quickly and easily determine the price of each item by utilizing this trolley. They can also determine the total cost of the products, which helps them estimate how much they will spend.

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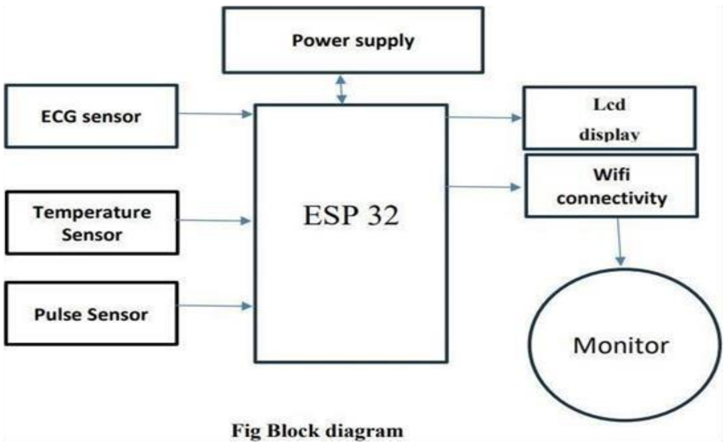
II. BLOCK DIAGRAM

Fig.1: Block Diagram of ECG monitoring system



Block diagram of ECG Monitoring System This is a prototype model for an IoT-based pulse rate monitor, which can be designed as a wearable watch or earplug. In a wearable design,

III. WORKING

This is a prototype model for an IoT-based pulse rate monitor. It can be designed as a wearable device, like a watch or earplug. In a wearable design, the character LCD can be removed, and the entire circuit can be shiftedto a small controller board or So C. When powered by the battery, the ESP32 reads the pulse rate from the pulse sensor and the ambient temperature from the LM-35 temperature sensor. The pulse sensor uses an infrared LED and a phototransistor to detect the pulse at the fingertip or earlobe.

The IR LED flashes with each detected pulse. The phototransistor detects this flash, and its resistance changes with each pulse. A normal adult's heartbeat ranges from 60 to 100 beats per minute (BPM). To detect BPM, an interrupt triggers every 2 milliseconds, giving a sampling rate of 500 Hz. This rate is sufficient to detect any pulse rate.

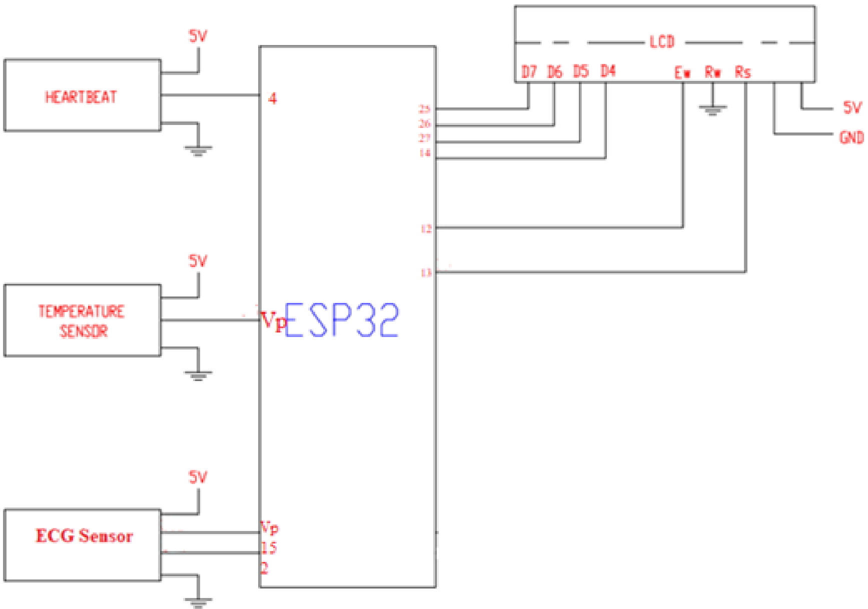


Fig.2: Circuit diagram of ECG monitoring system

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IV. FUNCTION OF EACH COMPONENT

- *ESP32: Wi-Fi and* Bluetooth *Connectivity*
- Pulse sensor: pulse sensor is a device that measures the pulse or heart rate of an individual.
- Temperature Sensor: To measure the room temperature
- ECG sensor: An ECG (Electrocardiogram) sensor is a device that measures theelectrical activity of the heart.
- LCD Display: Display the output.

V. RESULTS

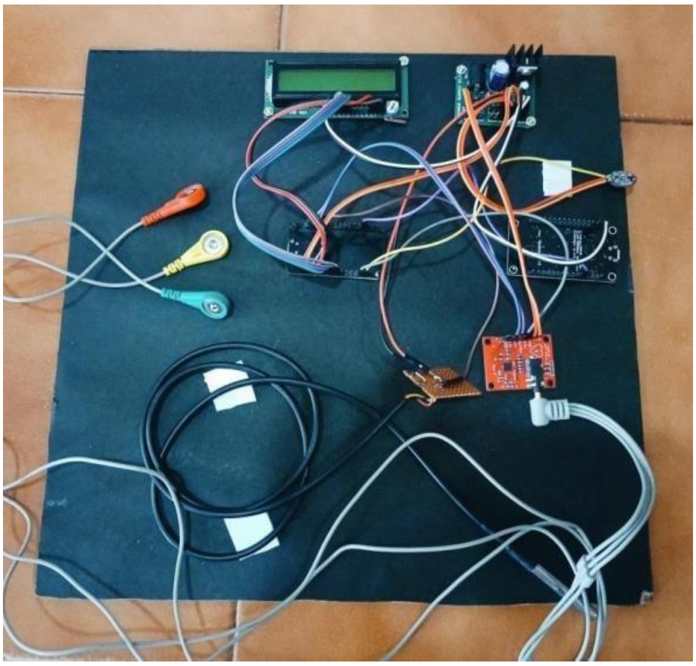

Fig.3: complete project module is shown in above fig

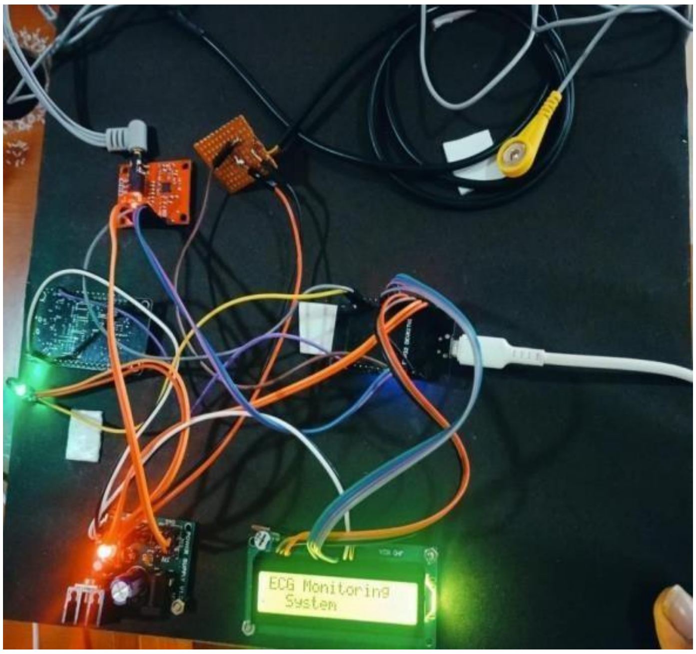

Fig.4**:** when switch on the supply the project module shown in above fig

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1. Temperature sensor output

2. pulse sensor output

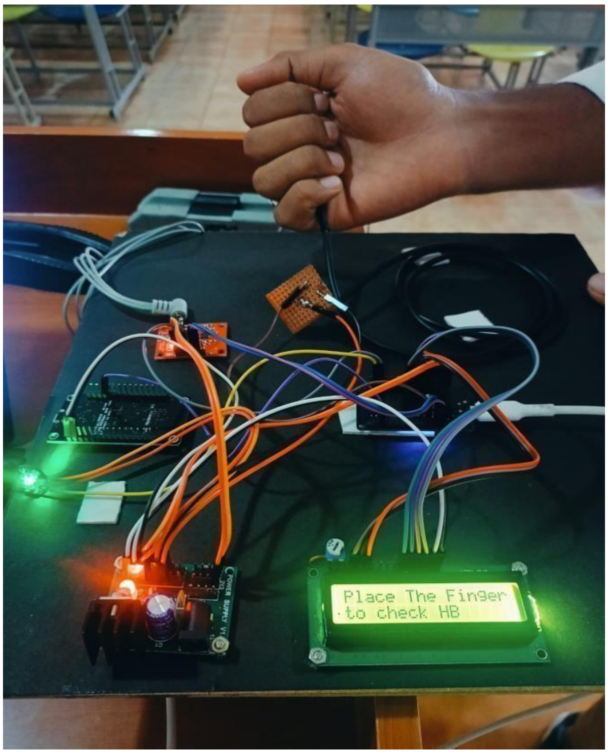

Fig.5: Hand will put the temperature sensor

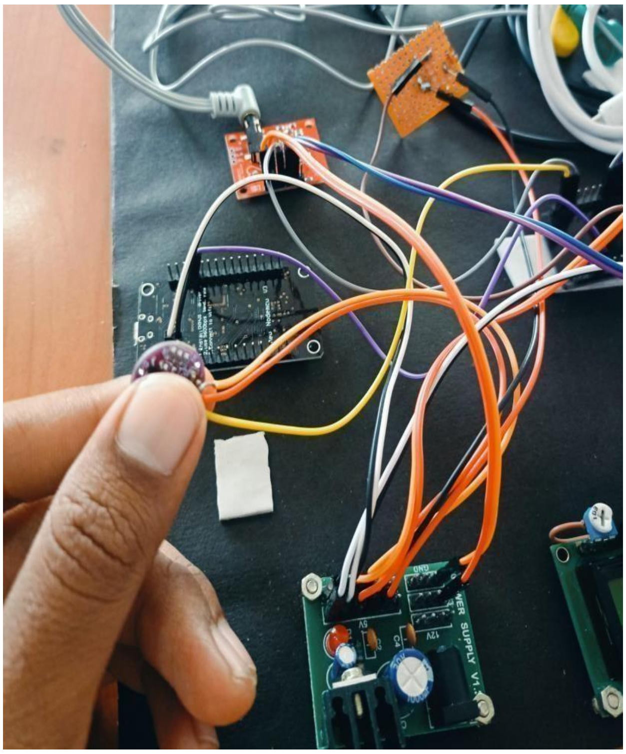

Fig7: Finger will place in the heartbeat sensor

Fig.6: The body temperature shown in LCD display

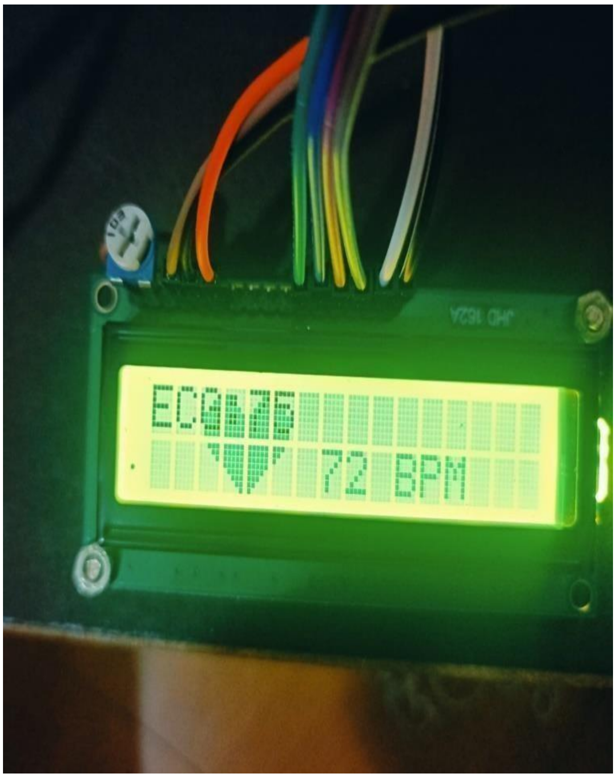

Fig8: The heartbeat pulse seen in LCD

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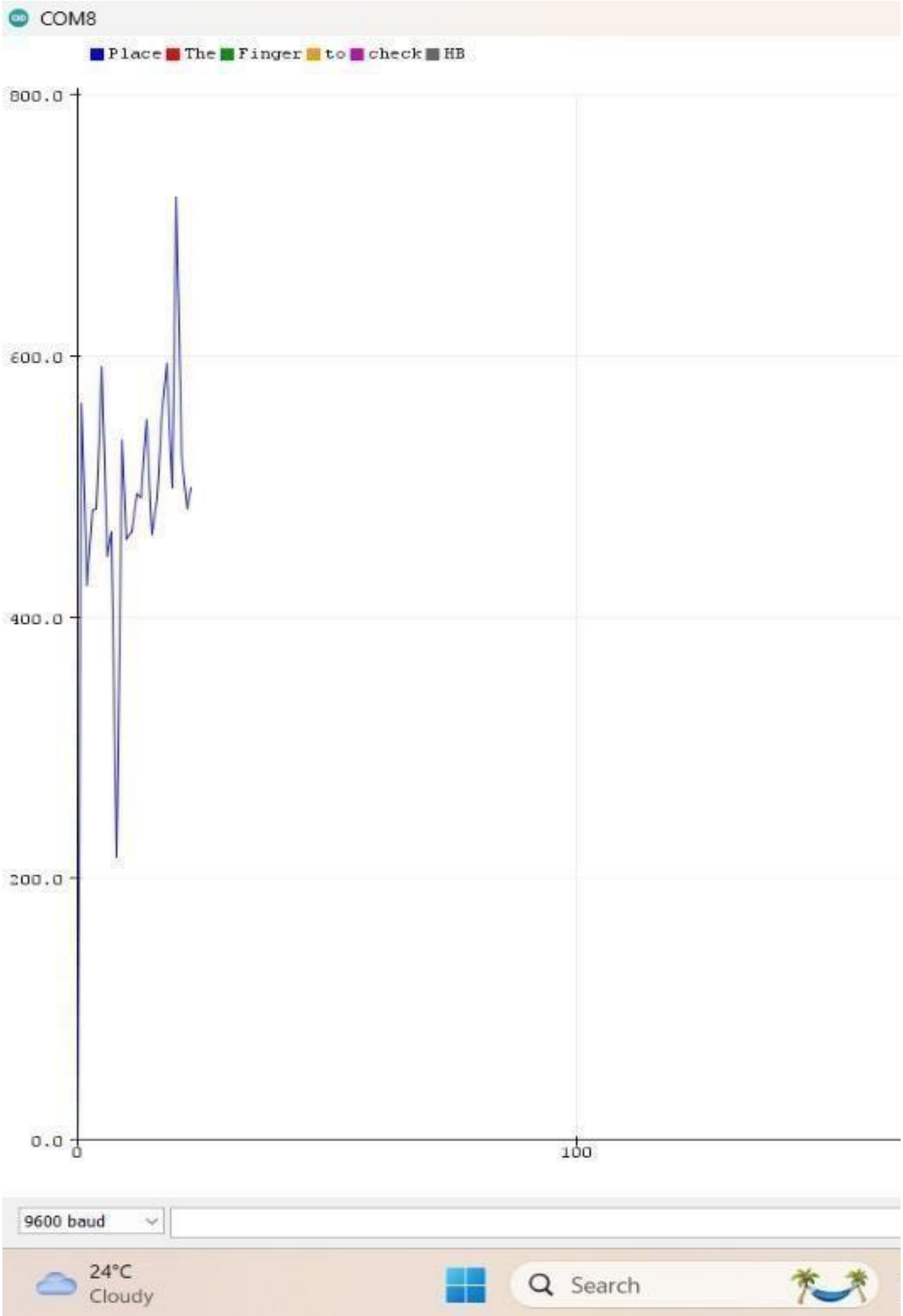
2. ECG SENSOR OUTPUT



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VI. CONCLUSION

That's a great summary of the key considerations for designing a new product, especially a medical device like a portable COVID-19 diagnostic system. By studying everything related to the idea, gathering customer feedback, and prioritizing quality, cost-effectiveness, accuracy, size, and user- friendliness, engineers can create innovative solutions that meet real-world needs. To develop a cutting-edge portable diagnostic system, engineers must conduct thorough research, solicit user input, and focus on key performance indicators such as quality, affordability, precision, compactness, and ease of use. This customer-centric approach enables the creation of innovative, effective solutions that address real-world challenges in healthcare. By prioritizing these factors, engineers can design a system that offers numerous benefits, including remote monitoring capabilities, real-time data transmission, and improved patient outcomes.

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