Wireless Sensor Network Application for IOT Based Healthcare System

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Abstract- **Medical care is given outrageous significance nowadays by every country with the approach of the novel Covid. The Internet of Things (IoT) is the new transformation of the web which is the developing exploration region, particularly in medical services. With the increment being used of wearable sensors and the PDAs, these distant medical services checking has developed at such a speed. IoT observing of well-being helps in forestalling the spread of illness just as to get an appropriate finding of the condition of well-being, regardless of whether the specialist is at a far distance. The gadget will associate with clinics, specialists, and family members to caution them of health-related crises and take preventive measures. This gadget will quantify the internal heat level, oxygen level, beat rate, and feeling of anxiety and alert the patients about their meds. Every one of these will be finished by utilizing the Android application and a clinical wristband. For cautioning patients about meds, the patient needs to set the timings on the Android application. Then, at that point, that notice will be gotten through the patient through the bell on the clinical armband. All information will be put away on a data set. Internal heat level, oxygen level, beat rate, and feeling of anxiety alongside the outcomes if every one of these is levelled out will be shown on the application given.**

I.INTRODUCTION

Advances in wireless sensor networking have opened up new opportunities in healthcare systems. Sensor-based technology has invaded medical devices to replace thousands of wires connected to these devices found in hospitals. This technology has the capability of providing reliability in addition to enhanced mobility. In the future, we will see the integration of a vast array of wireless networks into existing specialized medical technology. In the advanced technology-enabled world, changes are rapid and the status quo is constantly disrupted. The Internet of Things (IoT) is one such disruption happening right now, which has the potential to change the way healthcare is delivered. There are no standard definitions for the Internet of Things, As per the definition, "Internet of Things (IoT) is the network of physical objects that contain electronic embedded technology to communicate and sense or interact with their internal states or the external environment". The IERC definition states that IoT is "A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network." The IoT allows people and things to be connected anytime, anyplace, with anything and anyone, ideally using any path/network and any service

II.LITERATURE REVIEW

Mrinai M. Dhanvijay and Shailaja C. Patil, "Optimized mobility management protocol for the IoT-based WBAN with an enhanced security", *Wireless Networks***, vol. 27, no. 1, pp. 537-555, 2021.**

Dhanvijay et. al [1] suggested the IoT healthcare communication systems for the improvement of secure communication using a secure aware mobility management protocol. This approach generates a pairwise key generation algorithm based on an advanced encryption standard scheme. The overall transmission delay and handover delay were examined in the results section. When compared to the existing approach, the proposed system improves secure communication and reduces delay. Sen et. al [2] proposed the WBAN-based geographical routing algorithm for IoT-based surveillance systems for healthcare applications. It helps to prevent the spreading of coronavirus. In the results section, the delivery rate and drop rate were compared and assessed using the AODV routing technique. Izza et. al [3] discussed the IoT-based RFID authentication scheme to avoid security and privacy issues in wireless body area networks. Here, the ECG encryption scheme is utilized for secure communication. Kaschel et al. [4] described how a healthcare IoT monitoring system receives data from patients. The collected information is transmitted remotely and securely using the H-IoT system. Yoo et. al [5] presented an IoT-based health big data processing approach for the medical system. This approach helps to store more medical data and transmit the data securely.

Seda Savaşcı Sen, Murtaza Cicioglu and Ali Çalhan, "IoT-based GPS assisted surveillance system with inter-WEAN geographic routing for pandemic situations", Journal of Biomedical Informatics, vol. 116, pp. 103731, 2021.

Majeed et.al [6] proposed remote monitoring systems for the continuous tracking of patient information. Here, the cloud computing technique was developed to store and access the patient's data. This helps to increase the storage level with more users. Jiang et.al [7] introduced an enhanced authentication scheme for wireless body area networks to transmit data securely. Here, the proposed approach uses the biometric technique with the assistance of a hand gesture password. A high-density surface electromyogram helps to encode the password to access the data. Kiani et.al [8] explained the Benz logo antenna with metal-plated for efficient communication in healthcare applications. Dey et.al [9] discussed the super wideband antenna for wireless healthcare applications

and it is also applied in the Internet of Things domain. This antenna helps to improve the reflection coefficient and antenna gain. Aitzaouiat et.al [10] implemented involuntary medical seizures for secure communication.

Sarah Izza, Mustapha Benssalah, and Karim Drouiche, "An enhanced scalable and secure RFID authentication protocol for WBAN within an IoT environment", Journal of Information Security and Applications 58, pp. 102705, 2021.
Cardiovascular diseases (CVD) are the major cause of mortality globally, as well as in India. Most of the deaths caused by CVD are sudden and without giving any chance provide any medical help. To avoid such impulsive accidental deaths precautions are always required. Due to this heart patients require continuous monitoring of certain vital body parameters such as heart rate, pulse rate, and electrocardiogram (ECG) to show current health status clearly. In this paper, we are presenting 3 - a tiered architecture of our prototype healthcare monitoring system using a wireless sensor network (WSN) which is developed to continuously monitor certain body parameters of patients. Different biosensors available to measure heart rate, body oxygen level, and temperature are attached to the Arduino Nano board and recorded signals are sent to the server using Node MCU ESP8266 wireless communication. Data is made available on remote servers for doctors and caregivers using ThingSpeak, the Internet of Things (IoT) application. In case of an emergency, caregivers can be notified using smartphone alerts. The system is useful for cardiac patients and can be used for infant or baby care and elderly care in homes and hospitals. The accuracy of the system is found 95% with a response time of 10 seconds.

The current scenario of the world needs enhanced medical technology along with reduced expenses to fulfill the good health of patients that are suffering from chronic diseases. Because of the increase in the demand for healthcare infrastructure, it is getting complex to build and provide world-class facilities to maintain the health of everyone. The parameters which can be sensed by sensors can be temperature, light, or vibrations. Wireless sensor networks are under rapid research all over the globe, and researchers are working on it meticulously. This technology can replace thousands of wires in the medical field which can increase reliability and portability. This paper will investigate the current applications of WSNs utilized globally in the healthcare system, the limitations removed after the development of WSNs, what are scientists still working on to remove the barriers the healthcare industry is facing currently, and what led to the development and utilization of WSNs in healthcare, the current state of the art and need to integrate this technology following current medical scenario to enhance the healthcare system with limited medical expenses.

III.PROPOSED METHOD

Devices in the form of wearable like bracelets and other wirelessly connected devices like oxygen level, pulse rate, and body temperature give patients access to personalized attention. Especially for elderly patients, by enabling constant tracking of health conditions. This has a major impact on people living alone and their families. On any disturbance or changes in the routine activities of a person, the alert mechanism sends signals to family members and concerned health providers.

The medical bracelet contains sensors like LM35(temperature sensor) which measure body temperature and Max30100 which measures oxygen level and heart rate. All the sensed data will be transmitted wirelessly through the wi-fi module ESP8266 to google firebase and this data will be fetched on the web application. the web application has a feature of alerting patients about their medication through a buzzer, the medication details and alarm are set through Android application. 1000mah rechargeable Lithium-polymer battery is used to support the proposed system which allows the system to work for 2-3 days.TP4056 charging module is used to charge the battery.

IV.BLOCK DIAGRAM
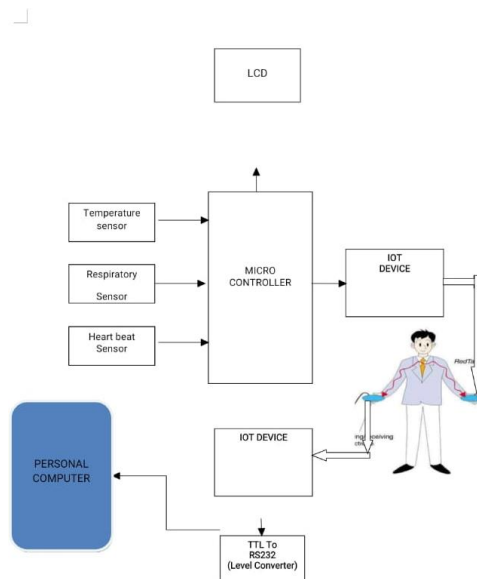
V.**OUTPUT AND RESULTS**:
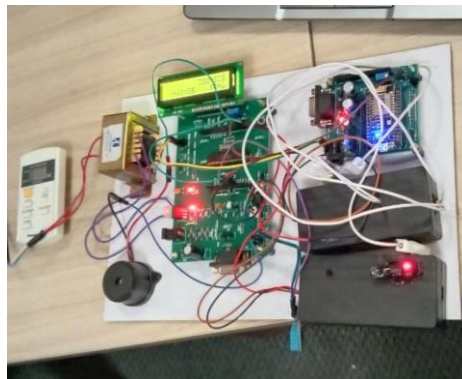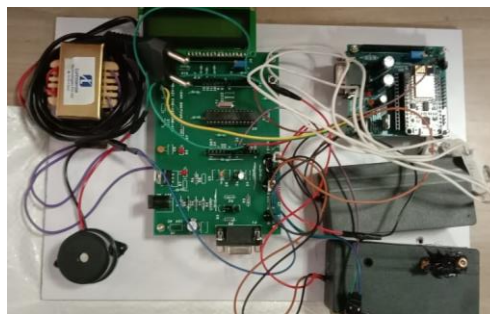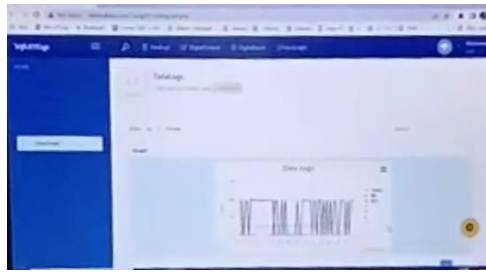
VI.**CONCLUSION AND FUTUREWORK**

Consequently, it works on personal satisfaction by observing them as well as reminding them about their medicine. It likewise works with that the individual thriving boundary information is gotten inside the cloud, stays in the clinic are diminished for routine assessments, and most significant that the wellbeing can be checked and infection analyzed by any specialist at any distance

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