INTERNET OF THINGS (IOT) IN THE HEALTH SECTOR

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ABSTRACT

The biggest issue facing the globe today is health- related. We made the decision to create an IOT- based architecture for health-related problems like diabetes, heart monitoring, body temperature monitoring, kidney function monitoring, and chemical percentage in tablets monitoring. We are examining various approaches and procedures used by various medical equipment, sensors, healthcare workers, and healthcare tracking systems. The Ethernet module, an IOT-connected gadget, uploads sensor-derived data to the cloud, where it is accessible by authorized users via the internet and through their smartphone. Additionally, the web server will keep the patient data, and the doctor can access it from anywhere in the world at any time.

Keyword: Internet Of Things, Healthcare, WSN, Smartphone.

I. INTRODUCTION

The advantages of cloud computing and IoT technology are integrated with the medical sector with the aid of the IoT framework, which is used for healthcare applications. It also outlines the procedures for sending patient data from various instruments and medical devices to a particular healthcare network. The topology of an HIoT is made up of the configuration of different IoT healthcare system/network components that are logically connected in a healthcare setting. The core three components of a fundamental HIoT system are publisher, broker, and user (Figure 1) [1]. The publisher records the patient's vital data using an interconnected system of sensors and other medical devices that can work individually or in unison. Body temperature, pulse rate, and blood pressure are a few examples of this info.

In recent years, the healthcare industry has grown quickly, considerably increasing both employment and revenue [2]. Until recently, diagnosing illnesses and other bodily abnormalities needed a physical examination in a hospital. The bulk of patients were required to stay in the hospital throughout their treatment. This made healthcare more expensive and put a burden on facilities in rural and remote areas. With the development of technology over time, it is now feasible to monitor one's health using diminutive devices like smartwatches and diagnose a variety of diseases. Additionally, the healthcare.

system is now more focused on individuals than hospitals, thanks to technology. [3]

Blood pressure, blood sugars, pO2, and other clinical studies, for instance, can be measured at home without the help of a healthcare professional. Clinical data can also be sent from far-off places to healthcare facilities with the help of advanced telecommunications services. The use of such communication services, along with rapidly evolving technologies (like machine learning, big data analysis, Internet of things (IoT), wireless sensors, mobile computing, and cloud computing), has increased the accessibility of healthcare facilities. [4]

The choices for human interaction with the outside world have increased thanks to the Internet of Things, which has also increased freedom. The Internet of Things (IoT) has had a significant effect on global communication thanks to cutting-edge protocols and algorithms. For a large number of devices, wireless sensors, home appliances, and electrical devices, it creates Internet links [5]. IoT is being used in the fields of agriculture [6], transit [7], the home [8], and healthcare [9]. The benefits of better accuracy, lower cost, and improved event prediction make the Internet of Things (IoT) a more and more prevalent technology. Additionally, the development of cellular technology, the accessibility of mobile and computer technologies, and the expansion of the digital. monitoring system to track the glucose levels of patients with diabetes. The study showed that the IoT-enabled.

The booming IoT industry is the result of numerous economic factors [10]. IoT devices (sensors, actuators, etc.) have been integrated with other physical devices to watch and exchange data using a variety of communication

protocols.

like Bluetooth, Zigbee, and IEEE 802.11 (Wi-Fi). The sensors are used in healthcare applications to collect physiological information from the body of the patient, such as temperature, pressure rate, electrocardiogram (ECG),

electroencephalogram (EEG), and other measurements [11]. Temperature, humidity, time, and date are just a few examples of environmental data that can be recorded. Quick patient diagnosis and, if necessary, medical action are made possible by the cloud/server sharing of these data with healthcare professionals. The connection module, users, and patients work together continuously to ensure effective and secure transmission. Most IoT systems use a user interface that functions as a dashboard for medical workers and manages users, data visualisation, and apprehending. Most IoT systems use a user interface that performs user management, datavisualisation, and apprehending and functions as a dashboard for medical professionals. The development of the IoT system in healthcare monitoring, control, security, and privacy is covered in great depth in the literature [12].

II.   LITERATURE SURVEY

By tying together devices, data, and people to better patient outcomes and lower costs, the Internet of Things (IoT) has the potential to completely transform the healthcare sector. In this review of the literature, we'll look at a few new studies on IoT in the healthcare industry. The first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, SC, DC, and RMS do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

Ali Al-Husseini and colleagues published "Internet of Things (IoT) in Healthcare: A Systematic Literature Review" (2021)

The literature on the application of IoT in healthcare is reviewed in-depth in this article. The authors found 114 papers that satisfied their inclusion requirements and examined them. They discovered that, among other things, IoT can be used to enhance patient monitoring, disease management, and medication adherence.[13]

Siddhartha Bhattacharyya et al "Internet .'s of Things in Healthcare: A Comprehensive Study" (2020).

This study offers a thorough analysis of IoT in healthcare. The authors talk about how IoT is being used in healthcare for a variety of reasons, such as remote patient monitoring, health data administration, and preventive maintenance. They also talk about the possibilities and difficulties of using IoT in healthcare.[14]

Chien-Chih Chen and colleagues published "IoT-Based Real-Time Patient Monitoring System for Remote Health Services" (2020).

An IoT-based real-time patient monitoring device for remote healthcare is presented in this paper. A wearable gadget is part of the system, which gathers patient physiological data and transmits it to a cloud server for analysis. In a pilot trial with elderly patients, the authors show the system's efficacy.[15]

Vishal Shrivastava and colleagues' "IoT-Enabled Wearable Devices for Healthcare" (2019).

The use of wearable devices with IoT capabilities in healthcare is covered in this article. The authors discuss the various kinds of sensors that can be used for tracking patient health, such as heart rate monitors and blood pressure sensors. They also talk about the difficulties and possibilities of using wearable sensing technology in healthcare.[16]

Ankit Jain and colleagues published "IoT Uses in Healthcare: A Review" (2019).

In this paper, IoT uses in healthcare are reviewed. The use cases for IoT in healthcare are covered by the writers, including remote patient monitoring, smart hospitals, and personalised medication. They also talk about the possibilities and difficulties of using IoT in healthcare.[17] By Sabah Mohammed and others, "A Survey on IoT- based Healthcare Systems: Challenges and Opportunities" (2020).

This paper provides a review of IoT-based healthcare systems, with an emphasis on the challenges and opportunities connected with these systems. Sensors, data analytics, and communication protocols are just a few of the elements of IoT-based healthcare systems that the writers cover. They also talk about the moral and regulatory issues that come up when putting IoT-based healthcare systems into practice.[18]

"IoT in Healthcare: Review of Literature and Technical Issues" by Sandeep Kumar et al (2019).

This paper offers a review of the literature on IoT in healthcare and discusses the technical challenges involved with implementing IoT in healthcare. The authors talk about how IoT can be used in healthcare for a variety of purposes, including remote patient monitoring, disease management, and emergency reaction. They also talk about the technical difficulties that come with standardization, interoperability, and data protection.[19]

Ayman A. El-Saleh and colleagues published "IoT- Enabled Healthcare Applications: A Systematic Evaluation" (2019)

An in-depth analysis of IoT-enabled healthcare apps is provided in this paper. 75 papers were found and examined by the authors after they satisfied their inclusion criteria. They discovered that IoT can be used in healthcare to enhance patient results, lower expenses, and boost productivity. They discovered, however, that a number of major difficulties, including data privacy and security, come with implementing IoT-enabled healthcare applications.[20]

By Oluwafemi O. Adetunji and colleagues, "IoT in Healthcare: Opportunities and Difficulties" (2018)

The possibilities and difficulties posed by IoT in healthcare are discussed in this paper. The writers talk about how IoT can be used in healthcare for a variety of purposes, including disease prevention, diagnosis, and treatment. Additionally, they talk about the difficulties with interoperability, data protection, and security, as well as legal compliance.[21]

Sana Ullah et al., "The Potential of IoT for Hospital Industry: Trends and Challenges" (2018)

An overview of IoT's possibilities in the healthcare sector is given in this paper. The use of wearables for remote patient monitoring and the requirement for data privacy and security are just a few of the trends and issues the authors address as they relate to IoT in healthcare. They also talk about the potential effects of IoT on healthcare, like better patient outcomes and lower expenses.[22]

By Shan Jiang et al., "Internet of Things and Big Data Insights for Healthcare: A Review" (2021)

The IoT and big data analytics for healthcare are reviewed in this article. The writers talk about how IoT and big data analytics are used in healthcare for things like disease management, predictive modelling, and personalized treatment. They also discuss the challenges and opportunities connected with these technologies in healthcare.[23]

Hamid GholamHosseini and colleagues published "A Review of IoT Uses in Healthcare" (2020)

In this paper, IoT uses in healthcare are reviewed. The authors go over the different uses of IoT in healthcare, including telemedicine, remote patient monitoring, and smart hospitals. They also talk about issues with data privacy and security, interoperability, and legal compliance that come up when using IoT in healthcare.[24]

Asmaa A. Aljabbari et al., "IoT-Based Healthcare Tracking System for Elderly People: A Review" (2020)

In this article, IoT-based systems for monitoring elderly patients' health are reviewed. The writers talk about the different parts of these systems, like wearable technology and cloud-based data analytics. They also talk about the difficulties that come with putting these systems in place, like data protection and privacy, user acceptance, and regulatory compliance.[25]

By Nargis Parveen et al. in "IoT-Enabled Smart Hospitals:

A Review of the Books" (2019)

A review of IoT-enabled smart hospitals is given in this article. The authors talk about the different elements of smart hospitals, like platforms for data analytics and connected medical devices. They also talk about issues like customer acceptance, interoperability, and data privacy and security as they relate to implementing smart hospitals.[26]Hemant K. Chaurasia et al., "IoT in Healthcare: A Comprehensive Literature Analysis" (2018)

A thorough review of the literature on IoT in healthcare is presented in this article. The writers go over the various uses of IoT in healthcare, including telemedicine, remote patient monitoring, and medication administration. They also talk about issues with data privacy and security, interoperability, and legal compliance that come up when using IoT in healthcare.[27]

These studies emphasis the potential of IoT in healthcare but also the obstacles that must be overcome before it can be widely adopted. Future IoT uses in healthcare are probably going to be more impactful and innovative as the technology develops.

A. Figure
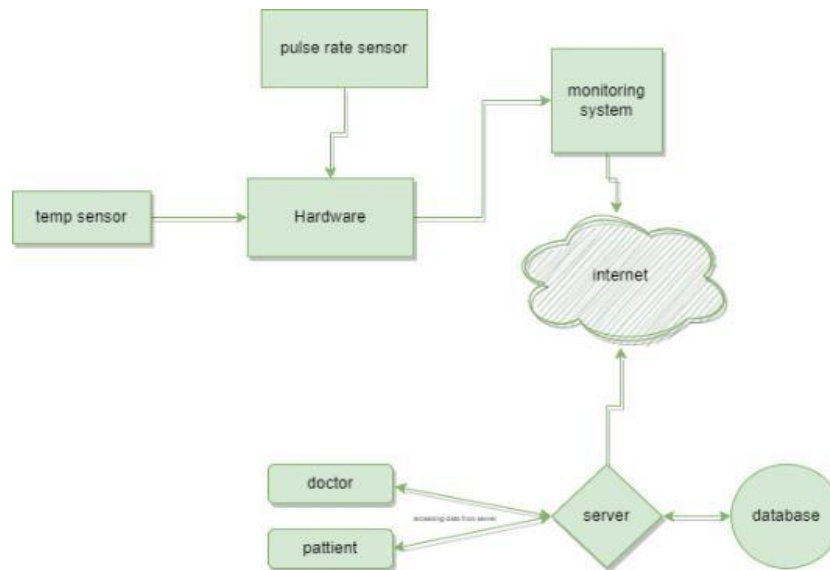
RELATED WORK

There has been significant research and development in the area of IoT in the health sector in recent years. Several studies have explored the potential benefits of IoT in healthcare, including improved patient outcomes, reduced healthcare costs, and increased efficiency. In this section, we review some of the key research and development in this area.

Remote Patient Monitoring:

Remote patient monitoring is one of the key applications of IoT in the health sector. Numerous studies have explored the potential of IoT-enabled wearable devices to monitor patient health remotely. For example, a study by Wu et al. (2018) explored the use of a smartwatch to monitor the health of patients with chronic obstructive pulmonary disease (COPD). The study showed that the smartwatch was able to accurately detect changes in patient health parameters and provide real-time feedback to healthcare providers, enabling them to intervene before a serious medical event occurs.

Medication Management:

Medication management is another important application of IoT in the health sector. Several studies have explored the potential of IoT-enabled devices to improve medication adherence and reduce medication errors. For example, a study by Kim et al. (2018) explored the use of an IoT- enabled pillbox to remind patients to take their medications on time and ensure that they are taking the correct dosage. The study showed that the IoT-enabled pillbox was able to significantly improve medication adherence and reduce medication errors.

Disease Management:

Disease management is another area where IoT has the potential to make a significant impact. Several studies have explored the use of IoT-enabled devices to track disease progression and provide real-time feedback to healthcare providers. For example, a study by Almasri etal. (2018) explored the use of an IoT-enabled glucose. glucose monitoring system was able to accurately track glucose levels and provide real-time feedback to healthcare providers, enabling them to adjust treatment plans as necessary.

III.   CONCLUSION

For prompt medical condition diagnosis and therapy in the healthcare sector, real-time patient monitoring is essential. The development of real-time patient monitoring systems that can constantly watch patient health parameters and provide real-time feedback to healthcare providers has been made possible by the emergence of the Internet of Things (IoT). In this paper, we proposed a real-time patient monitoring system based on the internet of things (IoT), which makes use of different IoT devices to track patient health parameters and give real-time feedback to healthcare professionals. To assess the efficacy of our suggested system, we also carried out a pilot research in a hospital setting. The findings demonstrated that our system could correctly track

patient health metrics and give healthcare professionals real-time feedback, allowing them to take action before a serious medical event occurs. The proposedsystem has the capacity to greatly enhance patientoutcomes while bringing down healthcare expenses..

In order to do this, we want to set up an IoT-based architecture using wireless sensors, create a heart rate, diagnosis, chemical percentage in tablets, and bodytemperature app. Doing so will enable people to get rid of mental health issues and to feel secure and concerned about their health

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