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A IOT BASED WEB APPLICATION PATIENT MONITORING SYSTEM USING RFID READER

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ABSTRACT

The system includes an RFID reader that collects data from RFID tags on patients' wristbands or ID cards and transmits it to a web application. The web application analyzes the data and provides healthcare professionals with real-time information on the patients' health. The system's use of RFID technology and web-based communication streamlines the patient monitoring process, reduces the risk of human error, and saves time for healthcare professionals. The web application component provides a secure and accessible platform for healthcare professionals to access patient data remotely. The system's benefits include improved patient outcomes, enhanced healthcare efficiency, and reduced costs. This innovative healthcare solution can help healthcare facilities improve their patient monitoring processes and provide better care for their patients.

INTRODUCTION

1.1 SYSTEM OF HEALTHCARE

Due to substantial advancements in healthcare and medicine, as well as greater public awareness of the need of personal and environmental cleanliness, life expectancy has been rising around the world. Family planning has become more popular in recent decades and has helped reduce birth rates worldwide.According to the World Health Organization (WHO). Regarding social welfare and health, requirements, this massive ageing population would have a tremendous influence on the socioeconomic structure of society. In addition, the cost of hospital treatment, prescription medications, and medical equipment is rising, which drives up the cost of health care services. It is critical to developing and put into practice to provide the aging population or those living in places with restricted access to healthcare with better healthcare services at an affordable price, new approaches, and technology are needed to ensure the population's maximum comfort, independence, and participation.

1.2 IOT (INTERNET OF THING)

A developing area with important economic, social, and technological consequences is the Internet of Things (IoT).When objects are connected to the internet and have powerful data analytics capabilities, our way of working and living is going to alter.The Internet of Things does, however, also come with several significant challenges that could prevent its potential benefits from being realized. Because so many diverse technologies must cooperate in an IOT system, standardisation is one of them. Any IOT device, regardless of manufacturer or technology, would be able to connect to any other device in a fully interoperable ecosystem.

1.3 Using the Cloud in Healthcare

Cloud computing, utilizing acronyms like IaaS, PaaS, and SaaS, allows users to access computing resources on-demand and from anywhere.The long-held dream of computers as a utility has come realized with the development of cloud computing.Similar to how electricity and gas are produced and billed, cloud services charge consumers only for the resources and services they use.Everything is included in a User's can only pay for the services they actually utilize thanks to our dependable monthly subscription plan. Regarding the m-health sector, numerous earlier research predicted the rise of cloud computing and provided several frameworks to improve healthcare delivery.

EXISTING SYSTEM

1.Mobile Healthcare System with Secure Lightweight IoT Integrated RFID -Safety is currently an issue for public health around the world, particularly for elderly individuals who require physiological health monitoring systems connected with technology to watch and manage medical requirements.A mobile healthcare (M-health) system allows doctors to enter patient health information from their location and provide medical advice as needed. Its goal is to save patient health records for all time.This arrangement increases availability and efficacy because cases and doctors do not need to meet. As a result, patients can directly receive medical advice from physicians through their Hearthstone.RFID technology is essential to this process for access to medical records and identification of patient-specific information.

2.Implementation and Assessment of a Centralized Patient Monitoring and Tracking System Based on RFID (RPMST)- It makes sense that keeping track of all the treatments and medical information would be burdensome for a patient. The concept of a centralized information system that shares and manages patient data using RFID technology is undoubtedly beneficial. Each patient is given a distinct ID number using RFID, making it simpler to locate and retrieve their records when necessary.Trackingpatients is another crucial component of patient care, particularly in an emergency. The patient's vital signs, including temperature and heartbeat, are routinely checked through patient tracking. A message with the patient's location and the urgency of the issue is sent to the closest hospital and a relative if the readings are outside the usual range. This enables prompt and effective support to be provided.

3 Design and Evaluation of a Web and Mobile Application-Based, Low-Cost RF Patient Monitoring System- It is undoubtedly a worthy objective to use web and embedded systems to enhance healthcare in underdeveloped nations. One of the primary components of the study is

the utilization of wireless sensor networks for real-time remote identification and monitoring of healthcare data. This enables medical professionals to keep an eye on their patients' health and decide on the best course of action even when they are far away. Affordability is a crucial factor in underdeveloped nations, and the suggested system is built using RF-based infrastructure to be inexpensive. This can make it available to a large population, including individuals who live in distant locations and have little access to medical services. Additionally, the system uses multi-physiological signal processing and data capture, which enables a morecompleteand picture of the health of the patients

4.Development and Use of an RFID-Based COVID-19 Patient Health Monitoring System in Government Hospitals - The use of wireless communication devices has substantially increased in recent years, increasing the flexibility of digital system communications. The development of LAN, WAN, and SWAN technologies has made the entire planet into a "Global village," enabling hierarchical global internet communication. This technology has been utilized by business sectors for a variety of purposes, including human resource management. RFID tagging is frequently used to protect data processing and sharing with data privacy among hierarchical departments in sensitive areas like server farms, scientific research labs, and nuclear power plants. The RFID technology's cryptographic integration increases the security and confidentiality of patient and hospital databases.

5 Internet of Things RFID Technology Development for a Health Care Monitoring System (IoT) -

The healthcare industry is a leader in using information and communication technology (ICT) to improve healthcare administration and delivery. There are now more opportunities for study and discovery across all industries, including the medical and healthcare sector, thanks to recent advancements in the development of the Internet of Things in ICT (loT). Hospitals have started using cell phones for communication, and to enable this, they have also started employing Internet of Things (IoT) devices such as RFID and NFC tags, as well as small sensor nodes. Due to its mobility, using a mobile agent in healthcare procedures in a Wi-Fi community setting allows for the exploration of better services for patients and staff members like doctors and nurses. This study presents new ways to use the Internet of Things in the realm of inventive and scientific health care. Most surveys focus on the many healthcare methods employed in the Internet of Things, including wireless health monitoring, U-healthcare, E-healthcare, and age-friendly healthcare methods. In this study, a comprehensive monitoring existence cycle and efficient healthcare monitoring system developed with the use of loT and RFID tags are described and proposed. The experimental findings in this research demonstrate reliable performance in the face of various medical emergencies. In this system, a combination of microcontroller and sensors is offered to obtain accurate evaluation findings, monitor and weigh the patient's health status, and boost the power of loT.

6 Creation of an Internet of Things-Based Smart Health Monitoring System for Assisted Living of Elderly and Physically Challenged People - Currently, traditional medical examinations and other health services may move from hospitals to home settings as part of a prospective transition in healthcare. As a result, patients receive medical attention more rapidly, especially

in cases of emergency. In addition, hospitals might lighten their workload by sending doable and simple chores home. The decrease in expenses is a huge benefit. The hospital's expenses for each visit to the doctor could be avoided by patients. As a result, it is critical that the health sector quickly implement a trending technology to increase modern medical procedures and technologies allow for easy patient monitoring from any location. In this application, the kit consists of a microcontroller node MCU, a glucose temperature sensor, and a heartbeat sensor. The sensors are responsible for detecting and transmitting data to the web application. This data is then processed and analyzed, providing users with valuable insights and alerts. With real-time monitoring of critical health parameters, the sensors enable prompt action in the event of any abnormalities. A user-friendly version of this application can be created using PHP software. The patients can use this application to get the doctor's counsel even when he is not present physically; they can use this website to communicate their problems with the doctor. The doctor reads the patient's message and then sends a prescription to the patient's cell phone through text message. To prevent the onset of the patient's critical requirements and to regularly maintain the patient's health conditions, patient monitoring comprises examining the patient's physical condition and pharmaceutical information. Mobile medical applications and wearables that let people record their health data are a few instances of how the Internet of Things is used in healthcare.

7.Design and Implementation of IoT-Based Cloud-Based Patient Monitoring Systems -The study recommends developing a mobile data acquisition (DAQ) system based on Android that can collect the specific health information of the user, store it for further analysis, and display it on Smart devices that have the option of sending it to the data center for additional processing. In addition to its internal sensors, which provide additional vital status data such as user location, magnetic or noise level, acceleration, and temperature, the mobile device can collect data from several wired (USB) and wireless (Bluetooth, Wi-Fi, cloud, and GPRS) sensors. The software solution has diary capabilities to save information regarding sleep issues, food logs, or pain diaries. It also includes a user-friendly interface that is ideal for users of various skill levels and is highly adjustable. The software solution's primary functionalities, which have been successfully tested inside a Living Lab facility, are described in the article along with its internal architecture. Overall, the suggested approach has the potential to enhance healthcare outcomes through the facilitation of more individualised and efficient health monitoring, resulting in better health condition prevention and management.

8.System for Wireless Patient Health Monitoring: Design and Implementation In order to identify health issues and ensure prompt medical care, continuous monitoring of essential health metrics like heart rate and temperature can be extremely important. The system's cost-effectiveness and ease of implementation are excellent features since they may increase its applicability to a larger range of healthcare facilities and patients. Another useful feature that could enhance the effectiveness of healthcare delivery is the ability to send alert messages to the concerned clinician in the event of deviation from nominal values.

9.Remote Wireless Health Monitoring Systems -The microcontroller's data is analyzed at the data processing stage, and any necessary calculations and data formatting for transmission are also carried out. The data is received and put into a format that can be sent by SMS by the Visual Basic TM software. With a GSM modem, the SMS message is sent to the intended recipient during the communication stage. Healthcare delivery could be revolutionized by the prototype wireless health monitoring system, especially in rural and poor areas. The device might be used to remotely check on patients' health and send crucial health information to doctors for evaluation and treatment. The device might also be used to notify medical staff of emergencies and give them up-to-date information on the patient's condition in real-time. A notable development in the realm of medical technology is the application of SMS technology in healthcare. The system is affordable, simple to use, and adaptable to existing healthcare systems. The wireless health monitoring system has the potential to be a key component in the delivery of healthcare services globally with future development and enhancement.

METHODOLOGY

Real-time object monitoring is getting harder and harder to do as a result of population increase and the expansion of IT products that offer services via the Internet to people all over the world. The Internet of Things cloud can deliver services in real time to several locations and circumstances. is a concept that combines technology connected via the Internet. The Cloud of the Internet of Things refers to an arrangement that cloud computing, real-time data networking, and industrial process data sensor technologies. It offers sensor technology as a service over the Internet. It provides real-time access to data. The services offered include border and drug control, healthcare, transportation, agriculture, public spaces, and monitoring systems. The system relies on practical and affordable solutions to handle the data produced by the Internet of Things.Databases can be created using the cloud of the Internet of Things and the Smart Hospital Information System, which will use real-time sensor technologies to gather data from numerous sensor devices connected to the hospital system in various locations and business process areas via Internet services to provide a healthcare service available in real-time. Authorized people can access patient data and offer customized services thanks to the electronic storage of medical records via a cloud or Internet of Things technology.

1.Hardware System

RFID Technology Infrastructure

A typical RFID system consists of tags containing transponders to store data and readers that retrieve the stored data from the tags. The data is written to the RFID tag, enabling the identification of objects associated with a specific application. When RFID tags are placed within the range of a magnetic attraction field and are performing a user-defined activity, an RFID reader scans and recognizes the data from the tags.

RFID Tags

RFID tags are versatile and can be used for various purposes, such as tracking the movement of patients and medical equipment within a hospital, monitoring individuals in care facilities, and triggering automatic tollbooths for vehicles. Following each delivery of tag information, the tag always anticipates a reader's acknowledgment. It is frequently intended to continue

providing information until the reader acknowledges it. The WID tag integrated chip is prepared to live temperature during this examination and sends this information to an international RFID reader.

The following characteristics are included in the RFID tags used in the analysis:
1. Active, Mastercard-sized tag type.
2. Memory capacity is 48 bytes with an 8k bytes option.
3. Field Generator's 433 Hz comes to life frequency.
4. The range of the field-initiated wake-up is 3 to 33 meters.
5. Depending on the reader's sensitivity level, the range of tag browsing can vary from 3 to 85 meters.

Reader for RFID

The reader is made to integrate into systems quickly and easily without sacrificing security, usability, or speed. The RFID reader is a small, standalone module that may be quickly put in any appropriate location. It includes a time processor, packaging, virtual transportable memory, and transmitter-receiver unit.

The purpose of this device is to collect data from an RFID tag that is used to track particular objects. The process of transmitting data from a tag to a reader typically involves the use of radio waves. In theory, RFID might be a technology similar to bar codes. The RFID tag does not, however, have to be physically scanned or in line of sight with a reader. To be read, an RFID tag must be close to one of the three to three-hundred-foot range RFID readers. With the use of RFID technology, a variety of objects may be instantly scanned, and even when they are surrounded by numerous other objects, a single product can still be readily identified. Due to the cost of bar codes and the requirement to uniquely identify each item, they haven't completely replaced them.

The following options are available on the RFID reader used in this analysis: Memory:
1. 10 Megabits of memory.
2. The possibility to browse multiple tags is included.
3. The tag's working frequency is 916.5MHz.
4. Tag: 433 rates of coming to life.
5. Regular RS 232 and RS 485 communication.
6. Depending on reader sensitivity settings, the tag browsing range is 3 to 45 meters.

7. Genuine collision avoidance abilities.
8. Resistance to interference and noise.

Block Diagram

2.Software System

1.RFID Tag to RFID Reader

When the RFID reader is close to the RFID tag, a radio signal is sent by the reader.The radio signal is picked up by the RFID tag, which then uses to power its antenna. The tag sends back a radio signal that contains its unique identification number (ID) to the reader. To get the ID, the RFID reader receives the signal from the tag and decodes the data. The ID is subsequently transmitted by the reader to a computer system for processing and archiving. The computer system uses the ID to access the relevant information associated with the RFID tag, such as product information, inventory data, or security access permissions.

2.Web Application

After the RFID reader has collected the ID information from the RFID tag, it needs to be transmitted to a web application for further processing and analysis.RFID reader can be directly connected to a computer or server using an USB port. The information the reader has gathered can then be processed and stored locally or transmitted to a web application using an API or other communication protocol. Once the data is transmitted to the web application, it can be stored in a database, analyzed using data analytics tools, or displayed in a dashboard for real-time monitoring and insights. The web application can also generate alerts or trigger automated

actions based on predefined rules or events, such as notifying staff when inventory levels are low or denying access to unauthorized individuals.

3.Databases

Data can be stored in a database for document purposes. Patient details need to be updated regularly to ensure that the medical professionals have access to the most up-to-date information. The process of updating patient details involves the following steps:

1.Collecting Patient Details: The first step is to collect the patient details such as demographic information, medical history, medication history, allergies, and other relevant information.

2.Updating the Database: The updated patient details can then be entered into the database. This can be done through a variety of methods such as manually entering the information into the system or using electronic forms that can be filled out by the patient or medical professional.

3.Verification: The accuracy and completeness of the information must be confirmed after it has been entered into the database. One way to achieve this is by cross-referencing the data with other sources, such as the patient's medical records, or by contacting the patient directly.

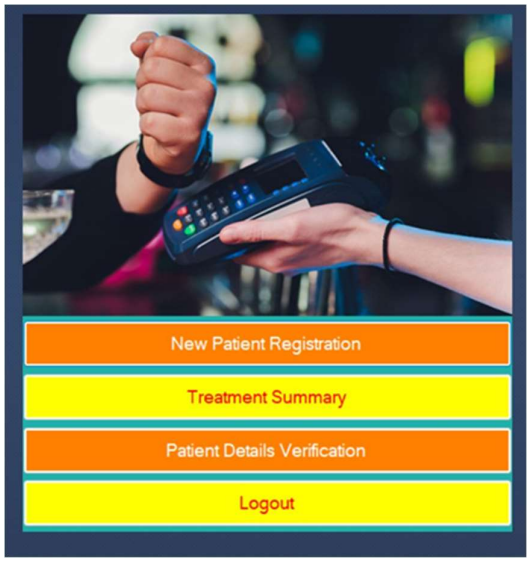
4.User Login

Login: To validate their identity, the user inputs their login ID and password into the web-based application.

Authorization: After verifying the user's identity, the system examines their access rights to make sure they have the necessary permissions to view the requested information.

Accessingthe Data: Upon your authorization, the data must be seen from any location.

RESULTS:



Conclusion

The adoption of a web-based IoT-based patient monitoring system that uses RFID reader technology can have a big positive impact on the healthcare sector. With the ability to remotely monitor and manage patients' health, healthcare providers can make informed decisions, leading to better patient outcomes. The system's use of RFID technology and web-based communication streamlines the patient monitoring process, reducing the risk of errors and saving time for healthcare professionals. The web application component provides a secure and accessible platform for healthcare professionals to access real-time patient data from anywhere with an internet connection. Overall, this innovative healthcare solution can enhance patient care, improve healthcare efficiency, and reduce costs, making it a valuable investment for healthcare facilities looking to improve their patient monitoring processes.

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