Radio Frequency Identification (RFID) based ubiquitous health care data handling

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Abstract. The Health care data is a most important and essential data compare with other types of data in the world. So the Health care Industry need to increase the data handling ability with a help of modern techniques. The Health care data handling must be improve with modern techniques like Cloud Computing and Radio Frequency Identification (RFID). The proposed framework merge the features of Cloud computing and RFID. The proposed framework provide the unique features to achieve the efficient data handling. RFID establish the data collection process from varies medical devices or centers. The cloud computing provide storage facility for Healthcare. The security feature is provided by the RFID for Healthcare data. Here Ubiquitous health care data accessibility represents the health care data can be access at anywhere, anytime, and from anything in Cloud computing. The proposed framework provide security in the form of the RFID tag to the patients and medical devices /centers. The RFID provides the security for the following data’s like patient records, doctors and nurse details caring the patient and hospital bed details. The proposed data handling produces the higher data accuracy, richer security and less energy consumption with help of Quality of Service factors.

Keywords: Radio Frequency Identification (RFID), Ubiquitous, Health care, data handling, Cloud computing, Quality of service factors.

1. Introduction

Today world data is an assets of every organization. So every organizations are keep trying to collect, store and access more numbers of data for their development purpose. The Healthcare data must be secure with Radio Frequency Identification (RFID) technique. An Android application to allow doctors to scan the chips from the bed and review all details about patient. The RFID chips can act as a calling card for patient’s data, which are stored on secure servers and updated regularly and in Real time via the patients’ health care providers. At present most of the nations are proposed and implement Regional Collaborative Healthcare (RCH). The RCH permits hospitals to synchronous the patients’ data between them, alongside pharmacies and medicinal services units to reduce the pressure. The
patients experiencing when purchasing physician recommended prescription, moving starting with one clinic then onto the next or regular medical check-up at the nearest health care unit [11].

The ideas of time and refreshed information are extremely significant with regards to medical care, just as nearness and importance; with the framework proposing a doctor or allotted nurses would have the option to get to an information base containing the entirety of the patient's basic and delicate information essentially through the sweep of a RFID tag by means of Near-field communication (NFC) innovation. This will effectively enable time efficiency provided that a patient can be treated instantly with no more paperwork but simply through the reliable world of technology. The proposed work is implemented by RFID tag and receiver to provide the secure data collecting, cloud data storing, data access, Monitoring, and Controlling.

The RFID host system manages the flood of data between the reader and tags [4]. A RFID have system can similarly have a muddled structure, where distinctive reader are arranged across over different areas and data streams to the host PC through LANs or the web. The RFID reader initiates the tag and recuperates the information put away in its inner circuit. A RFID reader imparts and get signs with the help of the receiving wire. A RFID reader, in any case called an examiner, is essentially a scaffold between the strikes have system and the reader reception apparatus. Near Field Communication (NFC) is a procedure plan of short range remote programming.

2. Review of Literatures

In existing health care data handling works facing more challenges to achieve the data access. As indicated by Healthcare Industry Standard, a gathering representative should average 4 to 6 minutes while checking in a patient; which means 12 patients for every hour per worker. Meeting rooms, particularly in huge clinical buildings, are understaffed contrasted with the everyday convergence of patients, which must be that the business standard isn't even distantly accomplished [5]. This issue emerges because of patients having to physically round out structures, and the staff having to physically check for ID and Insurance status (on the off chance that relevant) and afterward physically book the facility for the patient and add them to the Queue. Gathering staff are additionally entrusted with noting calls and booking arrangements for the patients that bring in or check the status of accessible medical services suppliers and answer the guest's request [1].

The Patients can book an arrangement on the web, yet that scarcely spares time; a patient is needed to introduce the important records and the gathering staff need to check the subtleties before adding the patient to their center's Queue. This problem is even present in the Emergency Rooms (ER), where a relative or a friend or family member needs to remain behind and check in the patient who is in basic condition and must be dealt with right away [12]. In the ER, a progression of tests and revelations must be made on an unregistered patient before overseeing any prescription or playing out any tasks to maintain a strategic distance from any unsavoury astonishments during therapy, while the patient's clinical records are as of now accessible, complete, and refreshed in another office [6].

The remote innovation has been continuously progressing in the realm of medication administrations applications where the clinical gadget, information innovation and correspondences have started to join and can change. The innovation of Radio Frequency Identification (RFID) has shown overpowering assurance in helping clinical administrations upgrades patient's prosperity and achieving gifted activity. Due to the increase of human missteps and patients similarly the decrement of restorative staff, investigators found that the RFID development is been a sensible plan.

In any case, the current RFID tag clearly has a couple of challenges in getting a profitable and definite data trade in like manner to help steady data transmission. So as to direct the most ideal consideration, medical care experts ought to have the option to have simple admittance to the patient's data in a hurry instead of heft folds of desk work around, additionally they ought to have the option to follow their in-
patients around the office and ensure they are accepting the correct therapies at their booked occasions, just as discover who are their going to doctors, attendants, and screens. Gear task, feast plans, meds, details, and so on are altogether basic during the time spent treating a patient, and representing everything is a significant factor. The Hospitals, Clinics, Health Care Units, and Major Pharmacies need the capacity to convey, and share significant patient information essential for encouraging the patient's admittance to quality consideration, right doctor prescribed prescription, and their entitlement to their own data [2].

RFID framework shows critical potential for changing therapeutic administrations, yet barely any examinations assess this potential. Our examination assessed the viability of utilizing RFID as a bed tag: an instrument to stimulate conspicuous proof of void beds [3]. We affected a little change in the releasing to technique to relate RFID tag with patients and made a RFID-based system that subsequently chosen discharge time [13]. For each patient, we assess the distinction in the releasing occasions recorded physically by the current methodology and the RFID-based system. The investigation was led on 43 patients over 2 months in 2 genuinely separate multi-guarantee to units. Contrasted and the earlier technique, the RFID-based system recognized release beds >15 minutes sooner 61% of the time with a typical of 27 minutes and middle of 10 minutes sooner. Medical clinics activity portrayed a difference in a short time as critical. With insignificant speculation, our little scope considers lead clinic position to begin masterminding RFID organization [8].

3. Proposed RFID based Ubiquitous Health Care Data Handling

The primary target of the proposed work to help Healthcare framework into a more complex and appropriately created substance that gives most extreme consideration and quality support of its patients. The feasibility of a proposed work is measure with following Quality of Service (QoS) factors, Cost refers to the value of each individual component like Cloud Storage Cost and Internet cost [10]. RFID techniques are very notable to be cost productive, so despite the fact that it is to be executed on a major scale it would at present be considered as a spending well-disposed venture. Availability refers to a complete time span for the gadget to arrive at the defender area. Being a RFID based framework the data is consistently accessible and prepared to recover just by examining a patient's tag. Reliability refers to the disappointment rate in which segments working under determined conditions will perform inadmissibly for a given timeframe. The proposed framework doesn't have a ton of provisos, likewise the foundation wherein the proposed framework will be executed should guarantee the framework's security by taking the proper measures.

The making of Tags and additionally Labels that can store a remarkable Retrieval ID that will be allotted to every patient; every Retrieval ID is utilized to get patient information from the cloud server [9]. RFID label readers to be utilized at the front counter for recovery of patient's information from the information cloud storage space. RFID readers at centers, division gatherings and attendant stations just as diagnostic rooms for confirmation of patient data, recovery of documents, and constant updates or progress, drugs, activity booking, and remedies. The software will be installed on all the computers used by the medical staff, as well as mobile phones/assigned tablets for attending Physicians and Nurses for faster data input/retrieval and configuration [7]. A secure server that stores all the data related to this system. The server should be synced with a main server that connects all the hospitals and healthcare facilities for the globalization of patient data, which will support the Regional Collaborative Healthcare (RCH) theory.
The figure 1 shows an Entity-Relationship diagram to represent the connection between entities with relations. The figure 2 shows the Data Flow Diagram the proposed framework, where the information will originate from and go to, and where the information will be put away.

![Entity-Relationship Diagram](image)

**Figure 1.** Entity-Relationship Diagram of proposed framework

The proposed framework is implemented as an Android application Android Studio (Java), PHP and MySQL database to store all the scanned information from the patient, doctors and bed. All the registered users their data will be stored in the database and the password will be decrypted. The Patients records can be viewed through RFID. The proposed system Performance produce a quick response time. It will be used by the health section of the hospitals. Since this application is subject to process patient documentation matters, this should be reliable to the users of this application. A substance relationship Entity-Relationship (ER) chart is utilized to imagine the framework and speak to the client's prerequisites. The ER outline is utilized to speak to elements and how they identify with

![Data Flow Diagram](image)

**Figure 2.** Data Flow Diagram of the proposed framework
each other. The ER chart additionally demonstrates the connections between the elements, their event (multiplicities) and characteristics. The figure 3 and figure 4 display the Table description of entire healthcare database and Patient Bed.

**Figure 3.** Table description of entire healthcare database

**Figure 4.** Patient Bed Table description of healthcare database

The result of the proposed work provides the following activities

Action 1: Shows the main page for the user to sign in by entering the email address and password to the account to gain access to the patient’s information.

Action 2: The user will scan the tag that is placed next to the patient bed using the mobile to get the patient information.

Action 3: After scanning the tag the information about the patient will appear in the application, the doctor/nurse can update the report and details saved in the tag.

Action 4: the doctor or nurse will update and save the patient information.

The proposed Health care data handling work consists of data collection, data storage and data access with high security.
4. Conclusion and Future direction

The proposed Health care data handling work efficiently covered the data collection, data storage and data access with high security. The innovation creates every day, this has made a gigantic impact, analysts can discover huge amounts of data’s in regards to a particular illness, and patients can discover heaps of arrangements or prescriptions with respect to a particular malady. Shockingly, for patients to go starting with one medical clinic then onto the next the Doctor. Needs to conclusion them again to affirm the Patients record could get lost. The structured task bring extraordinary achievement on ubiquitous Health Care Data Handling. Since it can support numerous emergency clinics, hospitals and so forth. Aiding in putting away records, overseeing them, seeing them and refreshing them all simultaneously. In future implement as a real time system for any healthcare centers with help of Cloud of Medical Things [CoMT].

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