

# Smart Card Based Patient Health Record Monitoring and Food Habitat Recommendation System

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## ABSTRACT

In this project, we tend to develop NFC based applications in tending systems. Currently, today's technology of sensible cards is essentially employed in nearly every facet and these days they're easy to keep and access. Considering this big use of practical systems, it will be beneficial to apply it in tending machines to shape the clinical records, make them accessible, manageable, and to boost the potency. The patient's health information is embedded into the smart cards. The information like patient personal data, medical, insurance details are added to the smart cards. This eliminates patients carrying all their hospital identification cards, health information and reduces the risk of loss of data. The doctor can retrieve the patient information by reading the smart cards using the NFC reader during consultation and emergency. This patient information is obtained in Netbeans using Javascript and collected in the database. Using patient ID as the primary, the previous patient's medical data and drugs would be viewed by the doctor to inspect the patient and recommend the medication. To secure the patient information, the PHI is encrypted and stored in the public cloud named CloudMe for global access. In the web application, we integrate food diet recommendation system automation for patients with specific diseases to reduce the mortality rate. Also to automate the file carrying system and reduce human errors, all the medicine, doctor details are stored in the database. Next time when the patient places the card, automatically the previous medical consultation history can be viewed by the physician. To secure the patient health information (PHI) we convert it into hash values using the SHA algorithm and store it in the server.

**Keyword:** - This system will profit each patient and also the medical doctors via imparting a strong and secure flow of health. It can even offer portability of devices, can be used for managing health in an emergency situation, densely populated hospitals, and far-off locations.

## I. INTRODUCTION

Patients go to hospitals with different illnesses and different symptoms. When doctors operate on patients there are chances of confusion between patient's disease and treatment which can turn to a fatal misled in treatment of a patient and also lead to death. Also maintaining records of patients on paper is difficult. Hence for a robust healthcare system, NFC is used. NFC stands for near field communication which is a standard based, short range technology and is a simple two-way interaction between electronic devices that allows performing contactless transactions. [1]

For smart cards we can use RFID, NFC tags. Both are widely used in automation, smart city concept implementation. RFID and NFC tag features are compared and listed in table 1.[2]

The main feature in NFC is we can store the data in the card and can be read by any reader whereas in RFID the data would be read only by the respective reader. Security and gaining data owner confidentiality is the main challenge now. For gaining data owner confidentiality, encryption methods can be integrated to provide security against external intrusions, data corruptions, data tampering, data insertions [3]

NFC communicates by making magnetic induction where two loop antennas are located close to each other forming an air-core transformer. NFC tags are integrated circuits which store data that can be read by an NFC enabled device. If a patient visits the hospital, they will be given a unique identification-based NFC tag. Using this tag, the doctor can verify a patient's disease condition, past medical histories in a short time without going through the paper-based health

records. Doctor uses this tag to tap in his reader device using which the details will be displayed in the system.[4]

## II. RELATED WORKS

Many researchers have been carried out on automating the current healthcare sector to reduce expense, complexity and provide simplified operation rendering global access. Researches are carried out in implementing wireless communication with short range like Bluetooth, iBeacon, IrDA for health monitoring. In this the proposed methodology can be carried out only for data transmission and data cannot be stored. This architecture methodology is costlier adding to the current expense.

This paper explains the current healthcare sector and defines the improvisation ways for automating and bringing innovativeness. This paper explains even now, the physicians recommend medicines for the patients manually. This invokes human errors and patient record maintenance is an important factor for both patients and respective hospitals to provide diagnosis during emergency. Still now the patient's medical records are maintained in the form of paper which is subjected to data loss and untrustable. Developing country like our India still they adopt paper based medical record maintenance system and there is no centralized management for patient health record storage. This paper provides the improvisation technique such as smartcard based medical record storage and access.

This research article explains about health card system. In bigger hospitals, they issue health cards which doesn't

invoke patient data storage. It consists of unique patient identification number to identify the patients. The admin types this patient identification number to view the medical history, validate doctor appointments. Even in this system only the patients appointments, master prescription are embed in the system, the sensitive information's like allergy, previous medications, other diseases are been carried manually in the form of paper only.

In this paper, the author proposed retrieval of important part of patient health record from mobile devices using inbuilt NFC module. In this security and privacy plays an important role as mobile phones would be used for different functionality. This provides a greater advantage of retrieval of patient data during emergency situations but this cannot apply to mass audience as NFC tag based smart phone users are limited. Hence smartcard providing global audience usage is important. Thus simplified process which can provide access to mass audience resulting in faster and reducing doctor, patient communication barrier is essential and more demandful. Finally they concluded that a novel approach for the problem statement would be Near Field Communication (NFC) technology.

This paper explains about NFC technology. Near Field Communication based wireless communication was identified by sony, philips and established NFC forum. Starting of 2006, 50 members have joined in the NFC forum. NFC technology aims in providing efficient solution in health monitoring applications because of less complexity and cost. This also provides certain advantages such as less power consumption and act as an efficient alternative solution for RFID based applications. NFC provides 424 kbit/s based data transmission rate rendering support short range ranging between 5 to 20 cms. This short range cannot be seen as a disadvantage because NFC enables fast and easy way of communication between the device and human having the card. NFC is emerged into various client applications and widely used across global applications, hotels and organizations with embedded and mobile devices. This author defines integration of wireless sensors in healthcare sector. The implementation of wireless sensors have a greater impact in healthcare sector. Monitoring patient health data is an area which invokes innovation. The innovative device should be simple producing promising results. In current process, the physicians are provided with Sphygmomanometer Electrocardiograph devices to obtain the health data of patients on a regular basis which is time consuming and invokes manual note down of record. This process sometime invokes human error causing wring prescription and sometime to death.

This research paper survey the alternate solutions for NFC and describes NFC based health monitoring. They proposed NFC based some health monitoring and explains the benefits. This paper also compares NFC with other short range communication technologies such as Bluetooth, RFID, IrDA. This paper also details the improvisation of health monitoring with NFC technology. They also paved a way for improvisation in the proposed methodology by creating a platform for new research ideas on smartcard based patient health monitoring system.

This paper explains how information technology can improvise the current healthcare sector. Improvising healthcare sector would help in providing good treatment

for the patients rendering smooth services. As we know in hospitals, the health workers work in a heavy pressurized situation with minimum count of man power. Thus innovativeness and adoption of information technology would be able to achieve efficient and quality services to patients with minimal resources. In existing approach, if the health workers works in a pressurized situation with minimal man power will sometimes lead to human error and which might create an adverse impact in the patient's medication process.

This research article propose NFC based indoor navigation system. In this system, NFC is used to provide centralized authorization access for users for respective rooms in buildings and commercial complex. This provides many benefits and flexibility among the users creating usability of the system.

RFID	NFC
Frequency range 13.56 MHz (High freq) and 902-928 MHz ultra-high frequency.	Operates at frequency 13.56 MHz.
One way communication.	Two way communication.
Can be used for communication between devices at a distance upto 1m.	Limited to close proximity communication (10 cm).
Tags can be scanned simultaneously	Tags cannot be scanned simultaneously.
Are not available in mobile phones	These are available in mobile phones.

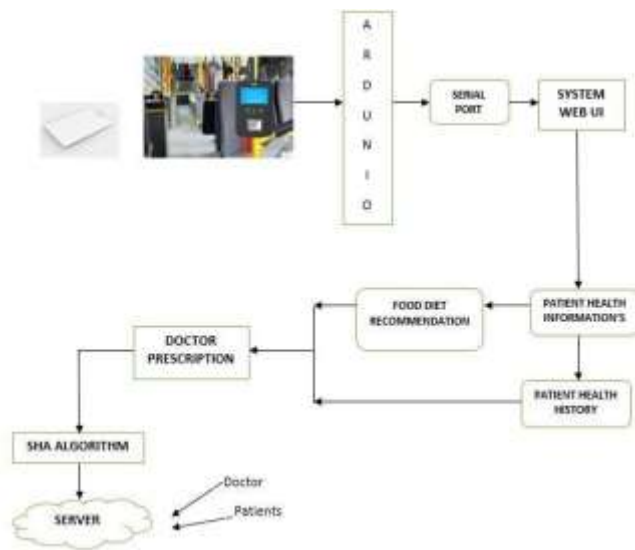
TABLE I RFID VS NFC

### III. PROPOSED WORK

In our proposed work the information's like patient personal data, medical, insurance details are added into the smart cards. This eliminates patients carrying all their hospital identification cards, health information's and reduce the risk of loss of data. The doctor can able retrieve the patient information by reading the smart cards using the **NFC reader** during consultation and emergency. These patient information are obtained in **Netbeans** using Java script and collected in the database. Using patient ID as the primary the previous patient medical data and drugs would be viewed by the doctor to inspect the patient and recommend the medication. To secure the patient information, the PHI are encrypted and stored in the **public cloud** named CloudMe for global access.

In the web application, we integrate **food diet recommendation** system automation for the patients with specific disease to reduce the mortality rate. Also to automate the file carrying system and reduce human errors, all the medicine, doctor details are stored in the database. For mining the exact patient data and identify the relationship we used **collaborative filtering algorithm**. Next time when the patient places the card, automatically the previous medical, consultation history can be viewed by the physician. To secure the patient health information's

(PHI) we convert into hash values using **SHA algorithm** and store in the server. This system can benefit both the patient and the doctors by providing a robust and secure health flow. It can also provide portability of devices and usability for health



#### IV. CONCLUSIONS

Thus our literature survey provides NFC based healthcare system has more advantages over traditional healthcare system and providing two way communication when compared with RFID based wireless short range communication system. Thus implementation of NFC based healthcare system would eliminate the risk of patients carrying the health records in the form of papers and provide advantages over patient health data loss, tampering and damages. Also NFC based healthcare system would be very useful during emergency situations, retrieval of patient data, food recommendation system, thus creating more benefits for doctors, patients and healthcare service providers. management in emergency situation, overpopulated hospitals and remote locations.

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