Single Chip NFC Based Secure Emergency Medical System

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Abstract- *The project entails facilitating better healthcare services for casualty patients, through NFC enabled devices. The NFC enabled devices offer an easy and secure way for self reporting of health status information[2]. The project involves use of NFC to collect important information about the patient such as the blood sugar count, pulse rate, ECG etc. Thus the doctor can access the patient's previous medical data history through just a tap and take immediate measures to save patient from danger and harm. Medical data is confidential information that must not openly be available to anyone with physical access to the storage media. We make a technology to provide secure and quick access to medical information. It is very important for the doctor to properly document the patient under his care.*

Medical records form an important part of a patient. It is important for the doctors and medical establishments to properly maintain the records of patient. It will help them in the scientific evaluation of their patient profile, helping in analyzing the treatment results, and to plan treatment protocols. Medical records include a variety of documentation of patient's history, clinical findings, diagnostic test results, preoperative care, operation notes, and post operative care.

Keywords- NFC chip, smart phone, NFC reader, Medical record, Criminal Record, Personal record .

I. INTRODUCTION

Nowadays, life is too fast. Each and everyone is having some documents related to us that includes Aadhar Card, PAN Card, Ration Card, Vehicle License, Medical Reports and many more. It is very difficult to carry all these documents at everyplace which causes a lot of inconvenience. So we have proposed a system with NFC chip which if will be mounted in a human body which will uniquely identify that person. There would be a centralized system where all the documents are scanned and are uploaded on to the cloud after verification by the respected authority. Now when the reader scans for the particular chip it will get unique value for which it will give us the documents of that particular person in our android application.

Considering this large functionality of mobile phones, it will be helpful to use it in healthcare system to make the medical data easy to carry, efficient, accessible, and manageable. So that the patients can use mobile phones for self-help or communication with a doctors. Or doctors can use it to monitor the health of the patient with the use of portability of health records. For this NFC (Near Field Communication), which is an upcoming technology that has proven to be reliable and secure can be used for storing health credentials and securing the data [1]. This can be achieved using the system which includes) Secure Health card for storing patient id and ii) Server which stores Electronic Health Record. This system will profit each the patient and therefore the doctors by providing a sturdy and secure health flow. It can also provide portability to devices and provide usability for health management in emergency situation, to overpopulated hospitals and remote locations.

In this project there will be a cards which consists of a unique id. By using the NFC reader the doctor will be able to find the previous record of the patient which is stored in the cloud. Again if there is any new patient then the doctor will insert the data in that chip only and that data will be store in the cloud. So it will make easy for doctor to search any patients record. Patient will be equipped with NFC cards[2]. The medical application (In-built NFC reader/writer) writes the link of the patient into the NFC tag from smart phone. To create patient application we are using ANDROID studio. Although substantial progress was created in rising the sharing of patient medical info among care suppliers, professionals still need to address the issue of efficient electronic medical records. In emergency situations, particularly with unconscious, incoherent and unaccompanied patients, providing emergency physicians with a patients accurate medical history could be the difference between life and death

Objectives:

- To maintain digitized information of every person.

- Provide easy as well as secure access to database of Documents.
- Provide database for person's medical background and criminal activities which we be helpful for the doctors/police.

If we want documents urgently and if we are not caring the original documents, then we have face different problems. In proposed system this card we will be very useful whenever we need the documents only scan the card the verified documents will be scan and needs will be fulfil.

It presents a system using NFC-enable mob phone for facilitating the patient in a low-source environment. The patient can use them for self-help. Doctor can use this for monitoring patient health[4]. With the recent emerging technologies in mobile devices involving secure credential storage, larger storage capability, wireless communication interfaces they can be used in the healthcare for gathering health parameters and also for healthcare. The very important aspect of health care is Privacy and security. We propose that the patient should retain only primary part of the record in EHR electronically. A Health-card maintained on a mobile device will retain the whole EHR together with reports and tests. An authorized medical provider can access securely the permitted portion by a simple tap of mobile device.

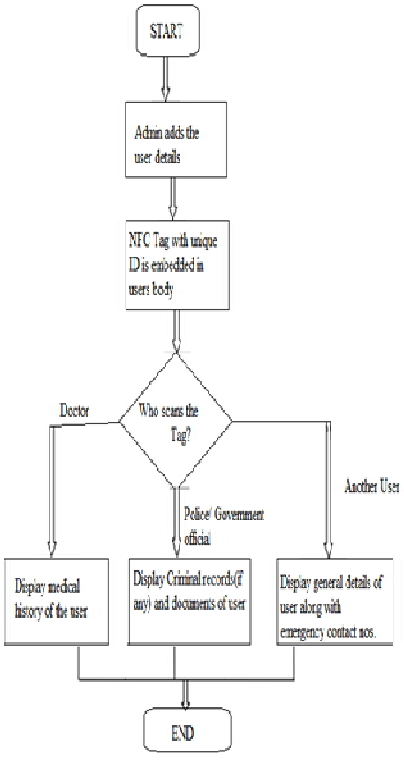

Fig : proposed system architecture

II. LITERATURE SURVEY

Paper	Description
Defining the Functional Requirements for the NFC-Based Medication Administration and Clinical Communication System **2018**	In this paper they used theoretical and practical sources to form a clear picture of the BMA procedure .Identified the essential methods used in nursing practice to ensure safe BMA, and their limitation .Accordingly, they drew an initial technical concept of the system functions that will help design the system .this only use the medication administration communication. this system not provide security to user.
Bedside Patient Monitoring by NFC **2016**	The health monitoring sensors are installed near the mattress on patient bed. By utilizing this application on Android smart phone and selecting the NFC mode from the setting menu, all information from sensors can be collected easily from the bedside by patients themselves or doctors. This paper is in this paper only show the information of bedside patient with the help of NFC.
NFC Based Healthcare System **2015**	In this paper it describes how an android application is used as our own NFC tag writer to write patient unique id in NFC tag. Doctors using NFC enabled smart phone to retrieve patient information when placed near NFC tag .this project is designed for patient medical information display. NFC based health care system provide limited application. it is use only doctor and patient.
NFC based profiling of smart home lighting system **2015**	This paper demonstrate simple version of lighting control that can be used in home.
NFC Based Secure Mobile Healthcare System **2014**	NFC enabled Android mobile devices for improving healthcare process for secure medical object identification and patient Health card on an external tag or mobile device itself.

III. SCOPE OF WORK

The scope of the project is:

- The system will provide complete security to the user's data.
- The data will be authenticated and validated by the admin.
- The admin will add the user and other authorities such as doctors and police officials.
- The unnecessary exposure of data is avoided to all and only the data required by the person will be provided.

- NFC provides high level of security to data. The admin will add the user and other authorities such as doctors and police officials.
- The unnecessary exposure of data is avoided to all and only the data required by the person will be provided.
- NFC provides high level of security to data.
- Initially we are implementing it for small scale platform but it can be scaled up for a larger platform also.
- In future, it will be used in all big or small company.
- it used in hospital, police station and RTO

Proposed System:

The objective of the project is to make a system which will provide the details of any user at any time. The NFC tag will be implanted in the body of the user. This tag will contain the unique id of the user which is linked to the Adhar no. of user. The id when scanned with our mobile application will provide the data about the user according to the user scanning it. Thus, the data security and confidentiality will be provided to user's data. NFC provides high level of security to data. The data will be authenticated and validated by the admin.

Advantages

1. NFC provides high level of security to data.
2. The unnecessary exposure of data is avoided to all and only the data required by the person will be provided.

Modules:-

A. Special User Module:

Special user such as Doctors, Traffic Police, Government officials etc will be able to :Scan user NFC tag to get the info about user. User such as Doctors can even upload new medical records of the individual after verification from Admin.

B . Security:

NFC id will be linked with our Aadhar number NFC id is unique per tag so if someone tries to clone the tag the it would not be possible due to Aadhar number linked with the NFC tag assigned to the person. Data at the server will be encrypted. Data communication between the user app and the database will be encrypted, which will avoid the cloning of data. The AES Algorithm will be used for data security purpose.

C. Admin Module:

Admin will be able to: Verify and add the new user's record. Add the user's with special privilege. e.g Doctors, Police officials etc. Validate the data provided and update the data of users as per demand.

D. User Module:

User will be able to: Scan the NFC tag of any person to get the basic info of his/her. Request for registration to Admin if new to system. Will be provided unique ID and NFC tag embedded into the body.

E. Server & Database:

Database : My SQL Programming language : Android

Type : 3 Tier Architecture
Data: Medical History
Important Documents
Police Record

Feasibility Study:
Software Feasibility :

1. Android Studio IDE.
2.JDK 1.8
3.PHP
Hardware Feasibility :
1. Android mobile.
2.NFC Cards.
3.NFC Reader.
4.Server storage.

IV. CONCLUSION

The system is aimed to collect the medical data of patients automatically, from the wireless sensors to base station, then to the center database. This system is intends to produce a trouble free and sleek medical information access just in case of emergency and for daily routine basis. It bridges the gap between patients and doctors in terms of communication and provides a novel and secure platform to act, thus providing to better healthcare services. A paperless system which will make the Identification of a person more easy and authentic. Use of NFC tags increase authenticity of data as they cannot be overwritten.

In future NFC devices can be made independent of any other equipment, like mobile phone in our case. It can be in the form of a small chip consists of passive NFC tags attached to patient body and there can be active NFC receiver attached in the patients environment. This active NFC receiver also can be placed in many places in hospital. In this way, it is also possible to find the patient location.

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