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SECURE MEDICAL TAGS FOR REDUCING MEDICAL ERRORS AND DRUG INTERACTION WITH EHR SYSTEM

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Abstract**—***In present days cell phones are utilized for various applications such as smart guide, to learn different programming software, web based learning classes, medical applications and so on. In this endeavor, we have proposed design for upgrading social protection system with the assistance of NFC containing Android-based mobile phones and Bluetooth interfaces, smartcard development based on safe secure segment (SE) taking care of qulifications and secure data, and comfort secure administration on a crossbreed cloud for security and welfare record administration.*

Keywords **– Mobile tags, Near Field Communication (NFC), secure data.**

1. INTRODUCTION

The main aim of this paper is to propose the utilization of medical tags diminishing restorative bungles, and Secure Health card for keeping away of Electronic Health Record (EHR) considering Secure NFC Tags, by utilizing Card Emulation Mode or NFC P2P Mode. We present a propelled cell phone application planned to help patients keep away from these mistakes.

Secure Healthcare organizations is a requirement for making nations, where the expense of human organizations is high and security and protection are basic issues and making nations like India, where there is a mass population to take care and solid human organizations methodologies are required. A proficient, reliable, liberal and secure success stream is basic to manage patients, their thriving records adequately and for the correct consideration to reach to the patient at the ideal time.

Perceiving check of things for secure supportive system is especially head for a guaranteed work process. For instance, secure identifiers on the prescriptions can push human administrations skilled to guide review medicine to a patient to lessen blunders. Near to this issue, the Patient Health Record association is central both for patients and moreover recovering center association. In making nations like India, there is no unified association of thriving records and records are commonly held by patients in a paper plan OPD (Out Patient Department) card, which is both lopsided to keep very close by the paper-based reports furthermore dangerous. With the current developments in cell phones including secure accreditation saving, larger capacity limit, remote correspondence interfaces, and computational force, they can be utilized as a bit of corrective organizations for not just assembling essential thriving parameters, as in the Body Area Networks, yet what's more for restorative organizations association. Confirmation and security is an especially central bit of social insurance [5]. We recommend that the patient should hold all or certified patient's EHR electronically, on a Healthcard that is either on an outside Smartcard open by a PDA or on the PDA held by a patient.

The whole EHR including reports and tests can be held tight in a cell phone can hold. The allowed bit can be stored safely by a supported accommodating supplier by just a tap from of the phone. Due to the computational limits the records can be sifted through for a peedy move to be made. We have additionally quickly said a basic security structure fundamental for the applications. Since NFC NDEF form is inclined to security strikes, we have used low-level APIs on Android-based telephones, to safely get to NFC marks, for example, MIF ARE Classic names with NFC-An (ISO I443).

2. LITERATURE SURVEY

The literature survey is a progressive step to understand the work focused by number of researchers. The work is shown in the following as:

The present system is to see the pulse rate of patient body. The system stores parameter of pluse rate into cloud. In this sensor is connected to microcontroller which acts as source of data. The data will be measured from sensor through microcontroller. In data pro-processing, data model obtained are identified as a label and used to send the information to cloud database for further purpose of utilised in data anlysis. Data which is stored is collected for further observation [1].

Other system proposes a patient health monitoring system using IoT and android. It consists of temperature sensor ECG sensor, Heartbeat sensor and accelerometer. These sensors are attached to Arduino board. The readings from microcontroller are given to web with the help of Ethernet shield. The parameters can beseen by android app which will be installed in doctor's smartphone. The health parameter value are saved and uploaded online [2].

And another system show called "Secured Smart Healthcare Monitoring System based on IOT". And here Microcontroller PIC16F877A is used, to collect sensor data. Then it is sent through Internet of Thing. The data is protected. It can be accessed by the doctors at any time in any browser at Laptop, Tablet, Mobile phone. Then it is possible to check the health status of the patient. LCD is connected to PIC16F877A. It displays the healthcare data. HTML webpage is automatically refreshed in each 15 seconds, hence the status of health can be regularly sent to the caretaker [3].

3. PROPOSED WORK

We have proposed architecture for NFC based secure health care as illustrated in Fig. 1 for

- secure medical identifiers as in flow steps 1.1 to 1.5 and
- Health card retaining EHR using Android mobile devices as in flow steps 2.1 to 2.5.

We have proposed a secure healthcare service like Health Secure on a hybrid cloud to which all hospitals can subscribe. The Health Secure hybrid cloud provides service for maintaining Cryptographic servers for secure framework and Storage server to provide backup as well as space for extended EHR. Mobile ADMIN is a mobile device of an authorized medical admin.

Android applications the patient's mobile device with the Health card and Mobile Doc is the doctor's mobile device. Since larger screen would be better suited to view and update the health records, Mobile Doc could either be an NFC enabled tablet, for portability, or a laptop with external smartcard reader. For NFC P2P based and card emulation based Healthcares, we use patient's and doctor's set of public and private keys. Asymmetrical shared key is used for encrypting data.

Hospital administration has an application for securely reading/writing with a mobile device, Mobile ADMIN; to manage smartcard based tags and patient Healthcares. MobileADMIN can register with the proposed Health Secure cloud service on hybrid cloud, which can issue security keys for our architecture. The mobiles use simple interfaces of NFCand Bluetooth for credential storage and communication. With the help of android application and with patient related data stored in database using in local server it helps to understand the patients better.

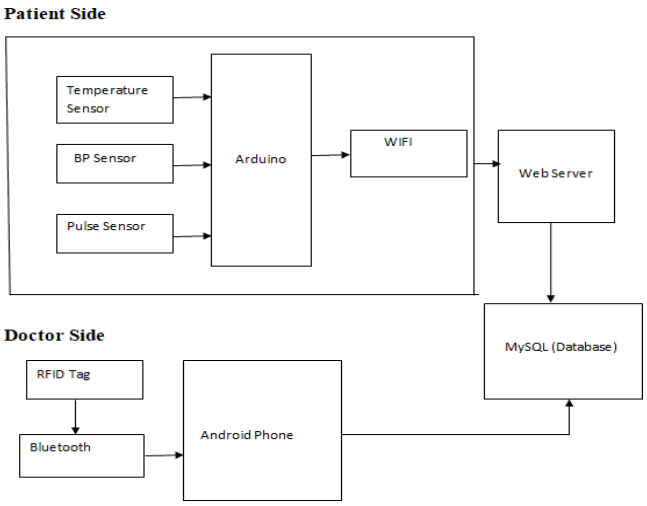

Figure1: Architecture

4. TECHNOLOGY USED

NFC is a top tier remote headway which gives fundamental interfaces to the gadget to contraption correspondence and in like manner access to NFC, RFID and smartcard labels. NFC drew in cell phone can work in three modes:

- Reader mode: in which contraption can peruse and stay in contact with NFC based dormant marks.
- Peer to Peer (P2P) mode: in which NFC contraptions can partner and exchange information with one another.
- Card duplicating mode: in which NFC device can fill in as a contactless card.

NFC names are of various sorts and use NDEF (NFC Data Exchange Format) for making sure about and sending information. NFC marks must have a guaranteed inspected and make access for essential applications, for example, those identified with social insurance.

NDEF gives no protection against data control, overwrite protections and automated mark records can't keep up a vital good ways from malignant modification of names. NFC empowered telephones have a guaranteed part (SE)which is a protected microchip (a sharp card chip) that merges a cryptographic processor to support trade with affirmation and security and gives secure memory to making sure about applications and accreditations. It comes in various edge factors, for example, installed, miniaturized scale SD card or a UICC (SIM) card.

Because of simplicity of openness, we have utilized SWP engaged littler scope SD card (by GO-Trust) as a SE to direct cryptographic keys and what's more lenient helpful records. SWP is an agreement based show between Contactless frontend (CLF) and UICC. It is Java Card 2.2.2 steady.

Java Card is an advancement which enables Java to develop applets to continue running considering sharp cards with astoundingly limited memory and dealing with limits and gives data encapsulation, firewall, and cryptography. The sharp card assurance models, ISO/IEC 7816 for contact and ISO/IEC 14443for contactless, demonstrate that correspondence between a host application and a smart card is done through Application Protocol Data Units (APDUs).

4.1 Applications

- Useful in crisis and turbulent conditions like mass populated recuperating focuses.
- NFC can give basic control of giving solitary records to any endorsed pro by the essential tap of versatile gadgets..
- Bluetooth can be utilized close by NFC to give speedier access to mass information from the cell phone.

4.2 Advantages

- An productive, solid, incredible and secure prosperity stream is basic to supervise patients.
- Health card on a wireless can be valuable for a patient who can bestow to master or clinical orderly by sitting at home.

5. CONCLUSION

We have proposed NFC empowered Android mobile phones for improving Healthcare process for safe medical object ID and patient Health card on an outside tag in this system. Otherwise Health Cards Secure association can support Health cards on a half and half cloud, to give administration to again design security and widended stockpiling to safe records.

We expect to manage the designing of the Well being secure organization later. The applications are simple to utilize because of simple touch of NFC for secure correspondence. This will overhaul the thriving stream in swarmed facilities of making countries like India.

The strategy will benefit the patients and furthermore restorative master since they can use the normally held mobile phones beneficially. The expense of the building can be diminished by using short scope SD cards or UICC cards with inbuilt NFC radio wire. These kinds of SEs can be given also being cards on a mass scale to reduce the expense and to be operational on non-NFC mobile phones.

6. FUTURE ENHANCEMENT

- The mobile devices and Healthcares can be authorized by a Health Secure service on a hybrid cloud, to provide services for enhanced security and extended storage for health records. We plan to work on the architecture of the Health secure service in the future.
- The proposed architecture can be used for applications other than healthcare with secure identifiers and secure transfer of large data between devices.
- Although MIFARE Classic security algorithm Cryptal has been broken], any other secure smartcard based tags like MIF ARE DESIRE could be used in future based on the availability of the APIs. We have suggested a basic security framework requirement.
- The current security framework is based on Public Key Infrastructure. Identity based Encryption and Attribute Based Encryption techniques can also be compared in future
- We need to work on the security issues of NFC and Bluetooth for accessing secure Health card in future for security threats of theft, cloning, man in the middle and relay attacks and loss of a mobile device. We plan to design architecture of the Health Secure service on a hybrid cloud in the future with replicated Kerberos cryptographic servers and a Hospital Information System for backup of EHR.
- We also need to compare NFC and BTLE for card emulation. NFC has higher energy requirement, compared to BTLE, when it is in a reader mode to activate the passive tag. But NFC has an advantage of smoother interfaces and getting initiated by a simple tap, while BTLE requires pairing.

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