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## DIGITAL SMART CARD FOR HEALTH APPLICATION

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### ABSTRACT

This paper aims at providing quick access to patient's medical data during trauma. Electronic health record benefits the people by giving better health care system. Physicians can exchange the medical history of a patient with every clinic. This helps the physician to have the current and accurate information of the patient and provide quality treatment. Patients suffering with a specific health ailment are expected to test various medications. Maintaining a proper health record digitally helps us to save both time and money. Also, it would improve Patient's Safety by updating the basic medical information. The analysis and differentiating the state of patients make this proposed study more effective and economical. It is ease to access patient data at any difficult health condition of a patient.

### INTRODUCTION

Paper records, like traditional vaccine cards, are easily lost, damaged, and can be difficult to transport. Because organizations store immunization records in disconnected information systems, physical cards can be hard to access or replace. Paper records can also be difficult and costly to authenticate, creating additional concern about forgeries during the COVID-19 pandemic.

Additionally, paper records have posed challenges during natural disasters, with survivors often struggling to access their records under extreme conditions. Quan Le, Immunization Program Data Unit Manager at the Louisiana Department of Health, witnessed these challenges as residents evacuated the state during Hurricane Katrina in 2005.

“People whose lives had already been turned upside down by Katrina were unable to access their immunization records so that they could enroll their children in school in another state,” says Le. “The

State Department was inundated with requests for immunization records. The challenge was trying to get these records into the hands of parents as quickly as possible so that their children could get back to learning and have some semblance of normalcy. Those efforts would have been so much easier if we had SMART Health Cards then. Luckily, LA Wallet gives Louisiana residents a SMART Health Card-enabled solution today.”

Using SMART Health Cards, individuals are given control of their personal health information. With digital records like those from Washington, Louisiana, and many other states and countries, people can access and download their immunization records anytime, anywhere, and store their health records as a verifiable QR code. Individuals can share their SMART Health Cards with employers, schools, events, and at border crossings to authenticate their vaccination status. The Washington State DOH played a fundamental role in ensuring this technology is equitable and accessible. “We were really motivated to make sure that no one would be denied access to their vaccination records,” says Dr. Bryant Thomas Karras, Chief Medical Informatics Officer at the Washington State DOH and VCI steering committee member. “When we launched WA Verify, we made SMART Health Cards available in 42 languages.”

By using Azure for infrastructure, the VCI was able to give adopters the tools they needed to quickly launch SMART Health Cards. “In Washington State, we completed a two-year project in only two to three months,” says Karras. “I am so appreciative of the collaboration with Microsoft and other state agencies. We could not have done it alone.”

Smart cards are utilized in medical field because it is less expensive, easy to carry, processing the data, and managing the data without any disturbance of previous data[5]. Many paper focuses on utilizing smart card either for data storage or immediate access of data[6]. A PDA based e-health smart card system is liable to improve healthcare globally. PDA is said to be a transportable

minicomputer. It visualizes the effect of information and communication technology particularly in the field of healthcare[7]. The smart card stores data of a patient and rejects the bribery of medical field. A smart card health monitoring system with cloud storage approach supports hospitals, doctor and pharmacists and allows them to store data in electrical format[8]. There is no chance for data intrusion and data theft in this approach. Bluetooth technique to transmit live monitoring data of a patient is utilized.

## RELATED WORK

Smart cards are very versatile and portable devices which can be used for a variety of application. They also have a considerable amount of security.[9](smart card apps) They are very reliable telecommunication devices that are used to store data. Smart cards are tiny computer-like devices that hold an inbuilt memory. Though the hardware and software capabilities of a smart card are less significant compared to desktop computers or laptops, they are very widely used for location-sensitive application.[8]. Smart cards have now become more identifiable with the help of RFID tags (Radio Frequency Identification) which enhances them [10].

One of the most important fields of usage of smart cards is the health care. When a smart card user comes and swipes the card his health related records are displayed. These health details are secured using keys. It uses the concept of public key cryptography like RSA, AES, and LSF [4]. Smart cards are used in healthcare to have a portable system with data storage and easy processing. Smart cards in healthcare have an increased capacity and high performance. Cards can be used by both patients and doctors. Patient health detail and personal information are stored in the card [9]. User health details such as heartbeat and pressure is stored in the card. These details are stored dynamically into the card so that it can be used in emergency [10].

Smart cards are also used in the field of transit. On using this smart card in the transit system, it offers various advantages to the people. As the population is increasing in our day-to-day life, the demand for transport is also increasing. Evolution of smart cards in transit system has decreased the confusions in tendering the exact ticket fare. In public transit, the smart card is said to be secured so that it can store all the transactions of the financial process. Once the card is made secure and is validated, the card contains some information about the card ID, ticket fare amount, route ID, bus ID etc. [11]. The smart card is not only used for paying the ticket fare, but also for determining the behavioral attributes of a trip by observing the continuous long term changes in the trips. The behavioral attributes in the smart card data is found out by two processes. One is by using the data fusion methodology, which means the process of integration of multiple data and knowledge representing the same real-world object into a consistent, accurate, and useful representation. And the other method is by using Bayes probabilistic model. [12].

The existing system uses the above two processes to find out the attributes of the trips, but in the proposed system we can determine these attributes by using the manual method i.e. we can access the required attributes or data from the database which consists of the history of transactions as well as the information about the route which a person has preferred to travel. To avoid using the complex methods to find these attributes, in the proposed system, we have set a count variable in the transit database which tells us the number of times a person has chosen that particular route to travel. To mitigate the congestion caused by the ever increasing number of privately owned automobiles, public transit is highly promoted by transportation agencies worldwide. A better understanding of travel patterns and regularity at the magnitude level will enable transit authorities to evaluate the services they offer, adjust marketing strategies, retain loyal customers and improve overall transit performance. This travel pattern is identifying by using various data mining algorithms. [13].

## METHODS

This implementation guide provides a framework for "Health Cards". The frameworks supports documentation of any health-related details that can be modeled with HL7 FHIR. This work grew out of our initial focus on enabling a consumer to receive COVID-19 Vaccination or Lab results and present these results to another party in a verifiable manner. Key use cases included conveying point-in-time infection status for return-to-workplace and travel.

Because we must ensure end-user privacy and because Health Cards must work across organizational and jurisdictional boundaries, we build on international open standards and decentralized infrastructure. Data holders should have full control over the data they choose to share for a particular use-case. Since Health Cards are signed by the issuer and cannot be altered later, it is important to ensure that Health Cards are created with granular sharing in mind. Therefore, issuers SHOULD only combine distinct data elements into a Health Card when a Health Card FHIR profile requires it.

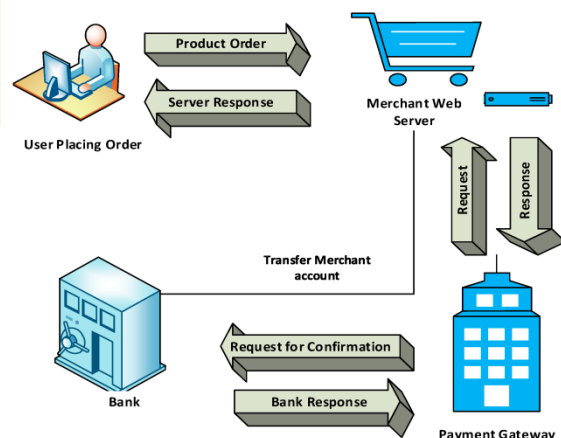


Fig 1: Work Flow

Commonly, Health Cards will be created to convey information about a specific disease. In such cases, Health Card FHIR Profiles SHOULD only include data that need to be conveyed together. (e.g., immunizations for different diseases should be kept separate. Immunizations and lab results should be kept separate. Immunizations and immunization exemption status should be kept separate.) In other

cases, Health Cards may be created to convey a broader set of clinical information, such as a patient summary document that can be shared in a clinical setting. In these cases, standard FHIR profiles such as International Patient Summary should guide the decision about which data to include.

The growth of information and communication technology is an indispensable part of growing nations as it increases the economy of a country; also making it competitive with other developing and developed nations in the field of healthcare [1]. The welfare of a nation entirely depends upon medical field. The requirement of e-health system is essential in developing countries like India[2]. Automation in the field of medicine is needed to improve efficiency in working environment for professionals. The health condition and details of them are collected from the patient, test report, diagnosis of doctor, equipment will be available to check and know the condition of a patient, and from pre-existing data [3]. Paper record of patient data is likely used in many areas of healthcare unit. In general, the reviewing and storage of patient data for further reference is in the form of

## RESULT ANALYSIS

A smart card is accessed by a portable reader. The contactless RFID card is chosen because RFID card enables easy updating of data. This card has two level authentication and can be accessed only in the hospitals. When the RFID card of the patient is scanned, it is redirected to the Hospital server. Once it is redirected, hospital code must be entered as a first level authentication. After entering the hospital code, the physician needs to know whether the patient is in conscious or unconscious state. Homepage for Authentication When a patient uses a smart healthcare card in a conscious stage, the patient must enter the A adhar number as a second level authentication and the medical history of the patient could be accessed for further treatment.

Authentication is the primary security to protect the data from unauthorized users who tries to access it.

During authentication, the user should provide the credentials which is compared to the files stored in the database. If the credentials given match the files in the database, then the authenticated entity is authorized to use the resource. Once the authentication is done, authorization process will start. Authorization is the safety mechanism which determines the access levels or user privileges related to the resources includes files, services etc. This is the process of permitting or refusing the access to a network resource which admits the user access to different resources based on the identity of the user. For this purpose, the process of authentication and authorization is carried out by the healthcare system.

## CONCLUSION

There is a very large scope for future work in our system. In case of the healthcare system more dynamic health data recording devices like weighing machines, BMI calculator etc. can be added in addition to pulse and pressure sensors. Also the card can be connected to mobile phones of the user and his nearest family in order to remind them of any appointments at clinics and of any insurance related activities provided that the card is directly connected to the insurance agency. In the transport part the facility of recharging the card using currency with the help of automated machines enabled with currency sensors which helps the user when the bank account runs out of money may be provided. Also tracking the card in the journey to find its destination dynamically instead of picking the destination beforehand, can be done. The smart card system for healthcare and transport system can be used to improve the efficiency in the transport system by reducing the cumbersome efforts spent in rendering exact fares for transportation and improves security by using a Personal Identification Number (PIN) and also increases the integrity of data in healthcare systems by recording dynamic data.

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