Smart Card Security

J.Jelsteen[1], M.Mithra[2], M.Reefath Sulthana[3]
[1]assistant professor, Dept of MCA
[2, 3]Dept of BCA
[1, 2, 3] Sri Krishna arts and science college, Coimbatore,india

Abstract- *Smart cards are safe portable storage devices used for many applications especially security related ones involving access to system's database either online or offline. For the great reaches of smart card, it is necessary to look into several aspects and factors mainly those resulted due to the quicker advancement in information and converse technology. This paper looks into the current trends in smart card security and its working, two types of smart card, two types of smart card based on their functionalities and configuration, four steps of constructing a smart card, advantages and disadvantages of smart card, 5 areas of smart card applications, more importance is given to the four key characteristics of smart card : portability , security , open platform and memory management, as they are trusted to be the heart of many smart card applications.*

Keywords: Smartcard, Security, Memory, Contact, Contactless

I. INTRODUCTION

Smart card is one of the extensive achievement in the world of information technology. Similar in size to today's plastic payment card, the smart card has a microprocessor or memory chip fixed in it that, when combined with a reader, obtains the processing power to serve many different applications. As an access-control device, smart card can be used to access server remotely over the internet and they can make personal and business data available only to the specific users. Smart card provides data portability, security and convenience.
Smart cards can be categorized into the following:

Memory and Microprocessor:

Memory card keeps data and can be spotted as a small floppy disk. A microprocessor card, can also add, delete and manipulate information in its memory.

Contact and Contactless:

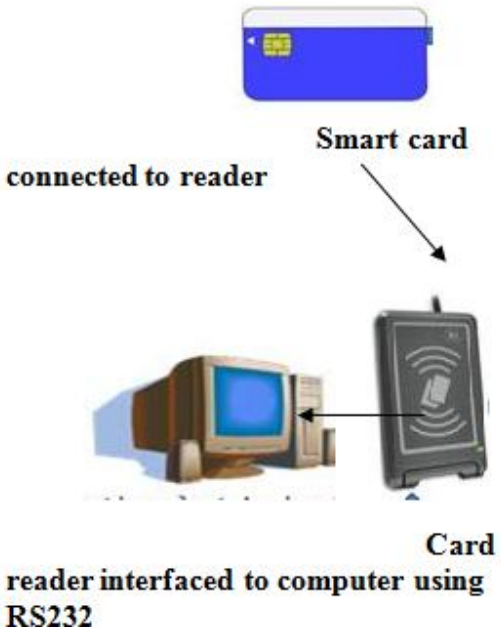
Contact smart cards are indulgedinto a smart card reader that enhances a direct contact with the reader. Whereas, contactless smart cards comprises of antennas that are implanted inside the card that makes communication with the reader without physical contact. A combi card combines the two features with a high level of security.

What is A Smart Card?

Smart card, chip card or integrated circuit card (ICC) is a direct electronic device that is used to control any resource. A smart card is a type of Plastic card like device which contains an IC chip fixed on to it. The IC chip can be a microprocessor with memory.Most of the smart cards include an order of metal contacts to electrically get attached to the internal chip. Others are contactless, and some are both.Smart cards can provide personal identification, authentication, data storage, and application processing.

How does the Smart Card Works?

Through a card reader a smart card is connected from which it gets information from the smart card and correspondingly passes the information to the host computer.



Smart Card Reader:

Smart card reader reads the data stored in the card for access control, authentication, online banking, digital signatures, financial transactions and other applications. A smart card is connected directly or indirectly, the smart card reader is the device to which the smart card is being connected.
Smart card readers are accessible in either contact, contactless, or a combination of contact and contactless models.

Three Types of Smart Card based on Connection to the Smart Card Reader:

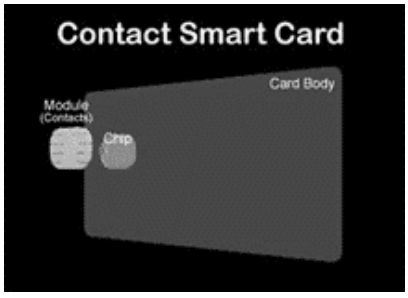
There are three types in it they are:

- Contact Smart Card
- Contactless Smart Card
- Dual Interface (both contact and contactless card)

Contact Smart Card:

In a Contact smart card, the readers require the card to be inserted by the user into the card reader. This type of smart card consists of electrical contacts which are used to combine the card reader where the card is being inserted or indulged. The electrical contacts are located on to a conductive gold plated coating on the card surface.

These cards are most commonly used for applications that require more security, like government IDs, e-commerce transactions, campus IDs, network security, vending, meal plans, loyalty, electronic cash, and health care cards, to name just a few.

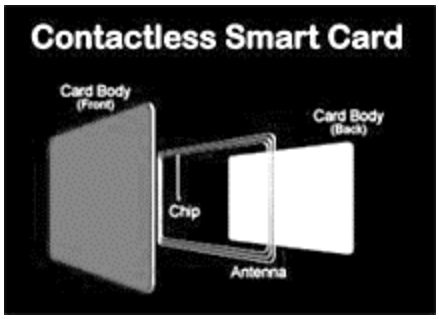


Contactless Smart Card

Contactless smart card readers operate with radio frequency that converses when the card comes nearer to the reader. The card need not be directly put onto the real reader. Contactless card readers gives the satisfaction of not having to indulge the card into the reader.

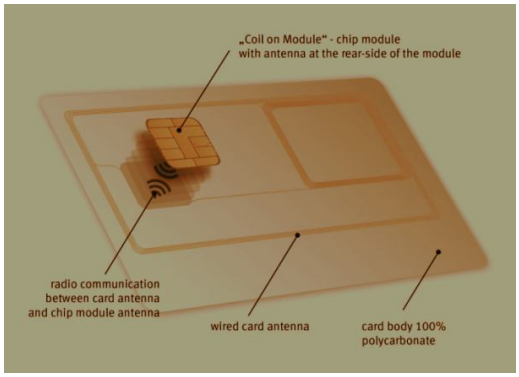
The most similar applications for contactless card readers include door and facility access, electronic passports, parking and vending.

It consists of an antenna with which it is used to converse using Radio Frequency. It usually gets potentiality from the reader via the electromagnetic signal.



Dual Interface Smart Card:

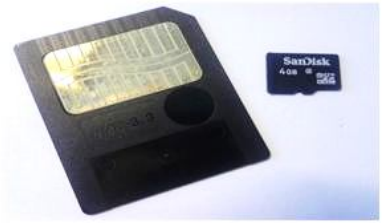
Contact cards enhances direct contact with the reader in order to be powered and ready for conversing. Contactless cards can be conversed with using 13.56-MHz Radio Waves from a maximum distance of 10 cm (4 in). They contain an antenna that validate this type of conversion:Every phone has at least one Contact Smart Card Reader, which is used to read the SIM card. Most of the Android phones have a Contactless Smart Card Reader.



TwoTypes of Smart Cards based on their Functionalities and Configuration

Memory Cards:

These are cards consist of memory circuits. It can only store, read and write data to a specific location. The data cannot be processed or manipulated. It can be a directmemory card which is only used to store data. It can also be a restorable or a replaceable card which includes memory units which can be used only once.



Memory cards are of three types:

- Stored Value Memory Cards
- Protected / Segmented Memory Cards
- Straight Memory Cards

Microprocessor Based Cards:

These cards consist of microprocessor embedded onto the chip in addition to the memory blocks. It also consists of specific sections of files in which each file associated with a particular function. The data in files and the memory allocation is managed through an operating system which can be a fixed operating system or dynamic operating system. It allows for data processing and manipulations and can be used for multifunctioning.

This microprocessor card has the ability to:

- Store information
- Carry out local processing
- Perform complex calculations.

Four Steps to Construct a Smart Card:

- The primary step involves **designing**. The designing involves particularizing the chip for the memory size, clock speed, uneasy memory types, type of operating system and specifying the application software, specifying the card type, size and functioning and additional features.
- The second step involves **chip fabrication.** This involves building the silicon chip on an epoxy glass substrate with gold plated connectors. The silicon chip is fixed to the connectors using connecting wires. The card substrate can be PVC based plastic card or Polyester based card.
- The third step involves **loading the code** to the memory using special instructs.
- The fourth step involves **data loading** into the PROM memory such that the data prevails to a single person.

Areas of Smart Card Applications:

- **Mobile Communications**

For digital mobile phones, smart cards can also be used as identification devices. These cards are known as Subscriber Identity Molecules (SIM) cards. Each SIM card has a solitary identifier that manages the rights and privileges of each subscriber and makes it easy to properly identify and bill them.

- **Government Applications**

Smart cards are being used by Government to issue identity cards to individual, which contains all the details of the individual. An example is the recently started Aadhar card scheme in India.

- **Banking & Retail**

Some of the most common uses for smart cards are ATM cards, credit cards and debit cards. Many of these cards are “chip and PIN” cards that require the customer to supply a four- to six-digit PIN number, while others are known as “chip and signature” cards, needing only a signature for verification. Other financial and retail uses for smart cards include fuel cards and public transit/public phone payment cards. They can also be used as “electronic wallets” or “purses” when the chip is loaded with finance to pay for small purchases such as groceries, laundry services, cafeteria food and taxi rides. Cryptographic protocols protect the exchange of money between the smart card and the machine, so no connection to a bank is needed.

- **Healthcare**

With health care data rapidly increasing, smart cards assist with maintaining the efficiency of patient care and privacy safeguards. The cards allow medical facilities to safely store information for a patient’s medical history, instantly access the information and update it if needed and reduce health care fraud. Instant patient verification provides for immediate insurance processing. In addition, smart cards

enable compliance with government initiatives, such as organ donation programs.

- **Domestic:**

The most frequently used smart card in domestic field is the DTH smart card. This card provides authorized access to the information coming from the satellites. In simple words the card with which we can get access to the Direct Home TV services is nothing but a smart card. The information is encrypted and decrypted within a smart card.

II. CONCLUSION

This paper describes the working and need for smart cards and its present activities in the field of technologies. Now a days all the identification cards is encrypted within it a smartcard or chip that enhances for the easy retrieval of information. Smart card includes contact and contactless, as contact smart cards must be handled by the user with the direct access to the card whereas contactless dose not direct accesses for its working. Thus in the present smart cards plays a very major role in the development of smart technologies. Currently it has been working on all the sectors such as health care, government application, mobile communication, domestic and banking and retail. The future enhancement of this smart cards will be enormous than we use now. We hope the future development of smart cards will be more useful to save time. Smart cards are among the most secure embedded devices in the field today. Smart card is an evolutionary product. Trend of use is irreversible.

REFERENCE

[1] ISO/IEC 7816-2:2007. Identification cards – Integrated circuit cards – Part 2: Cards with contacts – Dimensions and location of the contacts.http://www.smartcardbasics.com/smart-card-types.html
[2] "ISO/IEC 7816-2:1999/Amd 1:2004 – Assignment of contacts C4 and C8". *www.iso.org*. Retrieved 2015-08-20.
[3] Anderson R and M.Kulun, (1997) The working of smart cards.
[4] Martin, Christophe (30 June 2010)https://www.elprocus.com/working-of-smart-card/
[5] Greenpeace August 6, 2017.https://www.elprocus.com/working-of-smart-card/
[6] Varghese, Sam (2004-12-06)http://evergreenid.com/blog/top-5-uses-for-smart-cards/