



## Smart Card and Its Application

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**Abstract**—Smart card is capable of accessing, storing, and calculating data, as well as providing an immediate exchange of necessary information and provides convenience, accuracy, customization to facilitate data security, identification, and authentication. Smart card is called 'smart' because it contains a computer chip and is often referred to as 'chip card' or 'integrated circuit card'. Smart card are secure devices that enable positive user identification and are multi-functional, cost effective devices that can be easily adapted for both physical and logical access and is widely applied within our daily lives, from electronic payments, transportation, and tele-communication to healthcare, entertainment, and education. This paper discuss some uses of smart card in different areas. Smart card is mostly used in security applications, which offers much higher security compared to basic printed card, and even magnetic stripe card and is often used to prove identity, control access to protected areas, or guarantee payments.

**Keywords**—smart card, smart card reader, memory card, gsm card, biometric card.

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### I. INTRODUCTION

Smart Card is micro-processor equipped tokens, able to store and process a diverse range of data and applications. It is a small electronic device about the size of a credit card that contains electronic memory, and possibly an embedded integrated circuit. Smart card containing an IC are sometimes called integrated circuit card. Smart card is used for a variety of purposes like storing a patient's medical records, banking, mobile communications, driver license, mass transit fare collection system, electronic toll collection system, payphones, digital cash and generating network IDs. To use a smart card, and to access information from it or to add information, smart card reader is used. Smart card can be plugged into a reader commonly referred to as a card terminal, or it can operate with radio frequencies. When the smart card and the card reader come in contact, each identifies itself to the other by sending and receiving information. The reader provides a path for an application to send and receive commands from the card. There are many types of reader available, such as PC card, and standard keyboard model. Each manufacturer provides a different protocol for communication with the reader. Basically user has to communicate with the reader. Next, the reader communicates with the card, acting as the intermediary before sending the data to the card. Communication with a smart card is based on the APDU format. The card will process the data and return it to the reader, which will then return the data to its originating source.

### II. APPLICATIONS

A smart card contains more information than a magnetic stripe card and it can be programmed for different applications. Smart card can be designed to be inserted into a slot and read by a special reader or to be read at a distance, such as at a toll booth. The term "smart card" is mainly used to describe any card that is capable of relating information to a particular application such as magnetic stripe card, optical card, memory card, and microprocessor card. Where large numbers of people need to be managed, smart card improves speed of processing payments and the ability to allocate revenues and subsidies between various operators. Because smart card can carry specific information, and can be used to deliver this information or instructions to a terminal, an access barrier, a machine, an environment control system, and many other devices. A magnetic stripe card has a strip of magnetic tape material attached to its surface and is used for bank card. Optical card use some form of laser to read and write to the card. Memory card can store a variety of data, like financial, personal, and specialized information. Microprocessor card are the smart card with an embedded integrated circuit chip which can store information, performs processing on stored data. A smart card is a portable computational device with data storage ability and reliable form of personal identification and a tamper-proof, secure information repository. Smart card is used as identification device for GSM digital mobile phones. The card stores all the necessary information in order to properly identify and bill the user. Smart banking card can be used as credit, direct debit or stored value card, offering a counterfeit- and tamper-proof device. The microchip on the card and the card reader use mutual authentication procedures that protect user, merchants and banks from fraudulent use. Other services enabled by smart card are advanced loyalty programs and electronic coupons. A smart card can be used to store a monetary value for purchases like groceries, transportation tickets, parking, laundromats, cafeterias, taxis etc. Smart card allows the information for a patient's history to be reliably and safely stored. Health care professionals can access such information when needed, and update the content which allows immediate processing. The smart card performs mutual authentication

and public-key encryption software in order to reliably identify the user of the card. For security purpose, a smart card is a tamper-proof device to store such information as a user's picture and fingerprints. The advantage of smart card is their flexibility and security. It can act as an ID, a credit card, a stored-value cash card, and a repository of personal information such as telephone number or medical history. The user can encrypt and decrypt information without relying on unknown, and therefore potentially untrustworthy, appliances such as ATMs. Smart card is very flexible in providing authentication at different level of processing. Smart card is turning out to be a fundamental piece of the transformation of retailing into electronic commerce because of increased data storage capacity. Securing payment across the internet as part of electronic commerce using credit/debit bank card. The secure initiation of calls and identification of caller for billing purposes on any Global System for mobile communications phone is performed by smart card.

Agricultural producer use smart marketing card to track quotas. Employee access card with secured passwords and the potential to employ biometrics to protect access to computer systems and office facilities. Consumer health card containing insurance eligibility and emergency medical data. All-purpose student ID card containing a variety of applications such as electronic purse for vending machines, laundry machines, library card, and meal card. Smart card provide a secure, portable platform for "any time, anywhere" computing that can carry and manipulate substantial amounts of data, especially an individual's personal digital identity. Financial institutions can use smart card to deliver higher value-added services to businesses and consumers at a lower cost per transaction. These services include money on a card, corporate card programs, and targeted marketing programs based on analysis of consumers' buying patterns and offers a mechanism to secure cellular phones against fraudulent use. Smart card can carry an individual's digital signature which provides a mechanism to secure access to computer networks within a corporation, which help ensure that only individuals with the proper authority can get access to specific network resources. A smart card, typically a type of chip card, is a plastic card that contains an embedded computer chip—either a memory or microprocessor type—that stores and transacts data. The data is associated with either value, information, or both and is stored and processed within the card's chip. The card data is transacted with the help of a reader that is part of a computing system. The card can carry personal account, credit and buying preference information that can be accessed with a mouse click instead of filling out forms and can manage and control expenditures with automatic limits and reporting. Internet loyalty programs can be deployed across multiple vendors with disparate POS systems and the card acts as a secure central depository for points or rewards. Micro Payments - paying nominal costs without transaction fees associated with credit card, or for amounts too small for cash, like reprint charges.

Memory card is designed primarily for storing information or values and is commonly used for applications such as disposable prepaid telephone card for public telephones. Their integrated security logic makes it possible to protect stored data against manipulation and are suitable for use as prepaid cards or identification card in systems where low cost is a primary consideration.

A memory card is a small storage medium used to store data such as text, pictures, audio, and video, for use on small, portable or remote computing devices. Different types of memory card are secure digital card, compact flash card, smart media card, memory stick, and multimedia card. These cards are of varying sizes, and each is available in a range of storage capacities. Most available card have constantly powered non-volatile memory, in which data is stable on the card, not threatened by a loss of power source, and does not need to be periodically refreshed. Because memory card are solid state media, which have no moving parts, and therefore are less prone to mechanical damage. Earlier removable storage media, such as the PC card, the smart card, and similar card used for game system can also be considered to be memory card. However, the newer card is smaller, require less power, have higher storage capacity, and are portable among a greater number of devices. Because of these features, memory card are influencing the production of an increasing number of small, lightweight, portable low-power devices for more immediate access.

GSM Card, better known as SIM card are used for initial authentication and providing various utility based service facilities such as call counters, billing & payment data transaction management, phone number, memory storage etc. Contactless card have the ability to communicate data without physical contact of card with the reader and can be used up to a meter away from the terminal. It uses radio frequency technology to interact with a reader and has an antenna embedded inside the card which enables communication with the reader without physical contact and performs faster and more convenient transaction. It is used for mass transit, public transport for fare payment, access control, cashless vending, parking, loyalty, electronic purse, road toll, student, employee IDs in government and corporate environments, e-passports and other secure travel documents, and card for cashless payment toll ways and other high-throughput environments.

Bio-Metric Card stores information about a specific person's body and is trusted credential for authenticating an individual's identity. Bio-metric information like hair colour, height, DNA sequences, fingerprint, the handprint, and the retina / iris scan, in which the hand or eye is electronically scanned and the output is stored for identification.

### **III. CONCLUSION**

The growing need for smart card in almost every field increases the applications and functionalities are expanding in scope and dimension. This paper highlights some uses of smart card in different areas .Such as to support access, identity, banking, payphones, mobile communication, student id card, bio-metric card, memory card, gsm card etc. The advantage of using smart card is its flexibility, security, portability, increasing data storage capacity with minimal processing speed. The number and use of smart card-based applications has increased around the world acts as a fundamental building block in wide range of applications. The amount of information carried and security concerns should be managed for its larger benefits.

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