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## Validation of smart card for securing digital documents

Pragati Subhash Bendale

[bendalepragati@gmail.com](mailto:bendalepragati@gmail.com)

Shram Sadhana Bombay Trust's College of Engineering  
and Technology, Jalgaon, Maharashtra

Prachi Arun Barkale

[prachibarkale@gmail.com](mailto:prachibarkale@gmail.com)

Shram Sadhana Bombay Trust's College of Engineering  
and Technology, Jalgaon, Maharashtra

Aniket Sanjay Patil

[aniketpatil0315@gmail.com](mailto:aniketpatil0315@gmail.com)

Shram Sadhana Bombay Trust's College of Engineering  
and Technology, Jalgaon, Maharashtra

Kapil Surendra Pandey

[pandekapil55@gmail.com](mailto:pandekapil55@gmail.com)

Shram Sadhana Bombay Trust's College of Engineering  
and Technology, Jalgaon, Maharashtra

### ABSTRACT

*In the current scenario, most of the organizations go with the theme of digitalization to encourage paperless culture. All the organizations are reforming their systems to perform all the transactions using smart card technology. Considering the Educational institutions in the category of digitalization we recommend to use this smart card technology in the place of maintaining the certificates in files in the form of hard copies. It is easy to carry pocket-sized cards which will have a certified verification number, which makes each card unique. For the process of validation of card, we use LUHN algorithms. This card will help us to handle our certificated in an easy manner.*

**Keywords**— Digitalization, LUHN Algorithms, Authentication, Authorization

### 1. INTRODUCTION

In daily life, we deal with many professional and personal documents, but handling these types of documents is an enormous job for every organization. Smart card technology is becoming the most commonplace getting used. In today's world every task is becoming much simpler for the people so why don't we reduce the human effort in handling these enormous documents? Handling the certificates of the students in schools and colleges and protecting those certificates by the students and also fraud detection is a huge task. So, the idea of a Smart Card came into the picture. Every student will be given a Smart Card which has a unique number as soon as the student completes his SSC. Whenever a student is given a Smart Card, all the certificates that belong to him are stored in that card and saved in his account. Whenever an organization needs a certificate of the student, it can be easily accessed by the organization with the help of the smart card.

#### 1.1 Background

Smart Card Technology got invented in the year 1968 and 1969 by Helmet Grotrup and Jurgen dethloff, and they are the first to invent an automated card. After that till the year 2000 the industry of French group of bankcards CB that is Carte Bancaire had shifted more than 1.5 Billion smart cards worldwide and continue so on till now by different companies but, these cards are developed only for Economic sector not in Educational sector.

#### 1.2 Motivation

Smart cards are used in many ways. In countries, they are used for different purposes like banking and pay phone access. The main usage of this smart card is of some sort of authentication process. They are used in the processes like verifying the bank accounts, phone cards, or satellite is indeed authorized to access this service. Security is the main issue considered in every technology. Smart card technology provides a way for safely storing the data on the card. Every group consists of a panel of registration authorities who take care of the registration function so that any random user cannot log in to the system. People having the proper access rights can only operate the data which is inside the card. For securing the data we use the process of encryption. In the encryption process, we have different steps like generating keys, secure key storage, hashing and digital scanning.

#### 1.3 Problem statement

Develop a Smart Card Technology to solve accessing and security problems. This Technology overcomes the problems faced with Judicial and Educational documents and provides a solution. Smart Card Technology helps to secure the documents in a single card

in the form of soft copies which requires anywhere anytime. The system will consist of two portal. The first portal will be for the user for login and registration. The Second portal will be for Firm. Firstly, the user must have to register, after registration user will be able to log in and will get authority. People having the proper access authority can only operate the data which is inside the card like upload, delete, download and view documents. Then for the firm, it has the Second portal where the firm will be permitted only for downloading that Documents and will have access for a limited duration.

## 2. SYSTEM OBJECTIVE

The Primary objectives of the project are to simplify the process of accessing government to citizen services and make it hassle free.

- A step towards the paperless world.
- Ensure Authenticity of the e-documents and thereby eliminating the usage of fake documents.
- Secure access to issued documents through a web portal.
- Reduce the administrative overhead of government departments and agencies and make it easy for the residents to receive services anytime, anywhere access to the documents.

## 3. LITERATURE SURVEY

In 1968 German inventor Jurgen Dethloff along with Helmet Grotrupp filed a patent for using plastic as a carrier for microchips. Then, in 1970 Dr Kunitaka Arimura of Japan filed the first and only patent on the smart card concept after that in 1974 Roland Moreno of France files the original patent for the IC card, later dubbed the smart card. In 1977 three commercial manufacturers, Bull CP8, SGS Thomson, and Schlumberger began developing the IC card product. Then 1979 Motorola developed first single chip Microcontroller for French Banking. In 1982 World's first major IC card testing then, in 1992 nationwide prepaid card project started in Denmark. Finally in 1999 Federal Government began a Federal employee smart card identification According to the paper of L. A Mohammed, Abdul Rahman Ramli, V. Prakash, and Mohamed B. Daud smart card was developed at the end the seventies by Michel Ugon (Guillou, 1992). After that, till the year 2000 the industry of French group of bankcards CB i.e. Carte Bancaire had shifted more than 1.5 Billion smart cards worldwide and continue so on till now by different companies. Different Researchers studied the use of this smart card for better enhancement in daily life. Then, In 2017 as per the Study of G. Sai Asritha, T. Sai Raaga Sowmya, N. Vaishnava Dhaatri, L. Jagajeevan Rao from Department Of Computer Science and Engineering described the usage of smart cards in different sectors like Admission Process, Campus Interviews etc. for making paperless offices.

## 4. PROPOSED SYSTEM

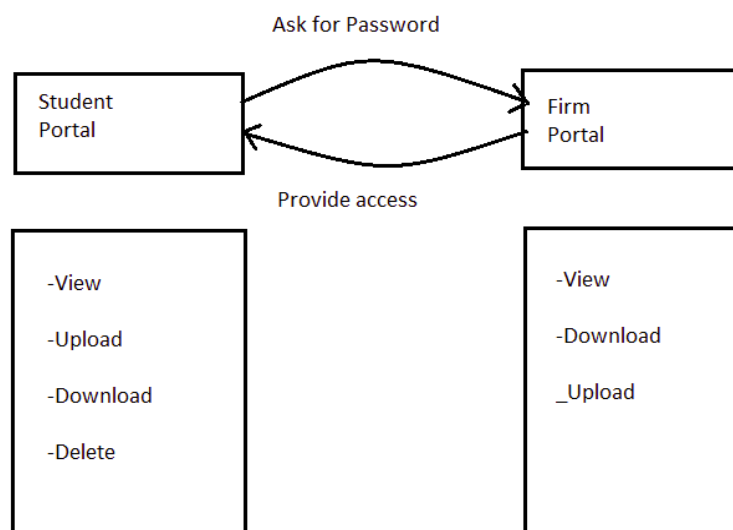
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## 5. SYSTEM DESIGN

The process of using this smart card goes like in the start with the registration of card holder and firm agent. Then certificates are requested by an authorized enrollment agent from the firm side. Firstly scan the QR code present on the card for accessing the documents stored in the card. After scanning it will ask to install the App to decode the QR code, then again scan the QR code after installation of required App. It will provide an option for decode and it will ask for a password. Once you enter the password it will log in and provide options (like view, update, download, delete) for the card holder and (view and download) for an agent. The system architecture provides details of how the modules are integrated and described with the help of unified modelling diagrams.

## 6. FIGURES

### 6.1 Architecture of the system



**Fig. 1: Architecture of the system**

### 6.2 Data flow diagram

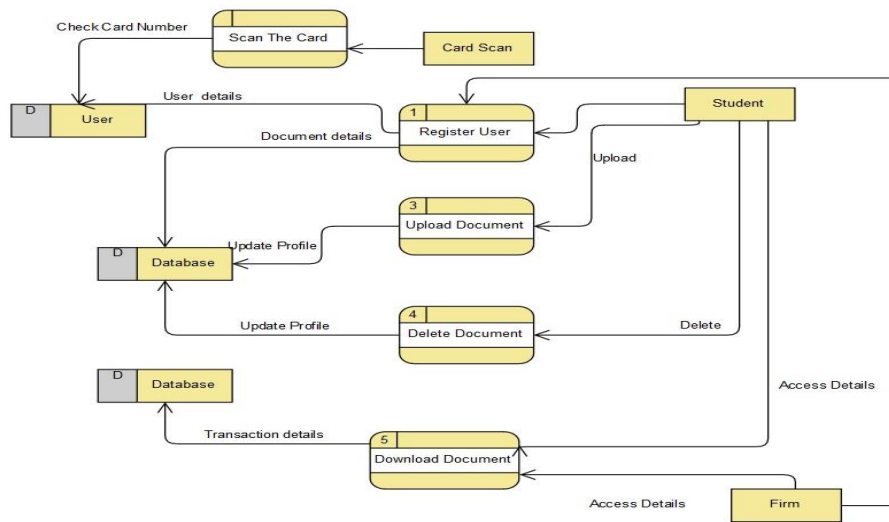


Fig. 2: Data flow diagram

### 7. USED ALGORITHMS

The Algorithms that are used to validate the card numbers for finding whether the given card number is valid or not and also for encryption and decryption some algorithms are used. These are:

- LUHN Algorithm
- AES Algorithm

#### 7.1 LUHN Algorithm

The LUHN algorithm uses a simple checksum formula to validate the given card that is validating the identification number of the given card. This algorithm are also used to validate a card number such as credit card numbers, debit card numbers, IMEI numbers etc. It was designed to protect against unexpected errors, not malicious errors. Most of the master card and many government organizational cards use this algorithm for validating the identification number. LUHN algorithms mainly focus on mistype or incorrect card number.

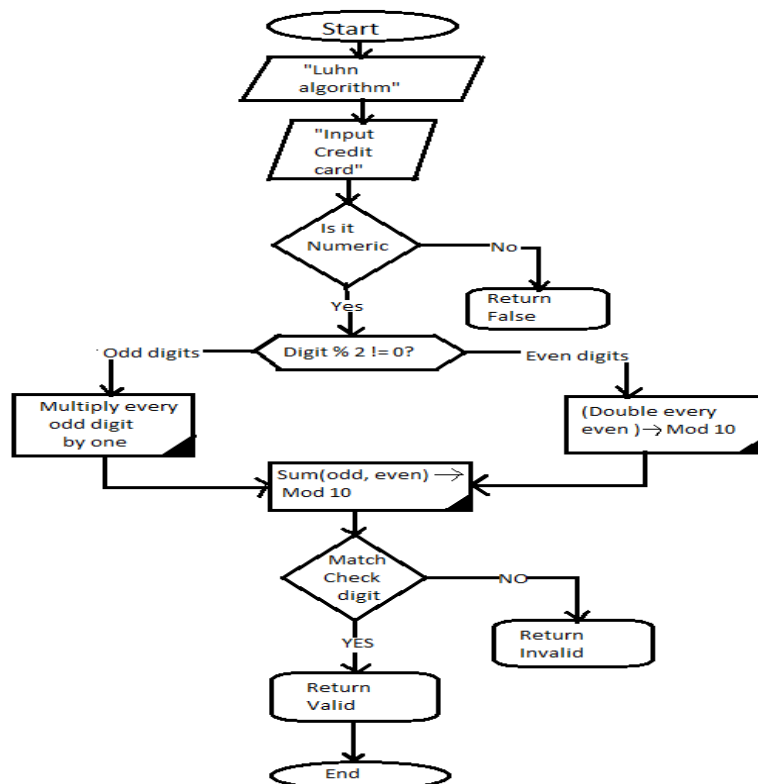


Fig. 2: Process of LUHN algorithm

#### 7.2 AES Algorithm

AES is an iterative instead of Feistel cipher. It is based on two common techniques to encrypt and decrypt data known as substitution and permutation network (SPN). SPN is a number of mathematical operations that are carried out in block cipher algorithms. AES has the ability to deal with 128 bits (16 bytes) as a fixed plaintext block size. These 16 bytes are represented in a 4x4 matrix and AES operates on a matrix of bytes. In addition, another crucial feature in AES is a number of rounds. The number of rounds relies on the hand, they found that DES has high performance compared to the 3DES algorithm.

Algorithm Start(FileName, SecretKey)  
Browse files  
Enter 16 byte SecretKey  
Algorithm Encrypt()  
Convert to State Array  
AddRoundKey()  
SubBytes()  
ShiftRows()  
MixColumns()  
Key Expansion

**Algorithm Decrypt:**

Convert to State Array  
AddRoundKey()  
InvSubBytes()  
InvShiftRows()  
InvMixColumns()  
Key Expansion

**8. CONCLUSION AND FUTURE WORK**

The smart card technology exists in the banking sector for payment. The main intention of this paper is to bring smart card technology into existence in the educational field. With the help of this smart card, we can store all educational and organizational certificates in digital format. Here we implemented the LUHN algorithm for validating the card. By implementing the smart card technology into existence in the field of educational system we can reduce not only the man power but we can achieve fraud-free environment. All the certificates of the students starting from SSC to the highest possible degree are maintained in these cards. Future scope of this work is: smart card should implement in educational as well as in the medical field. So that it becomes easier to the student for admission process and for the patient to take quick treatment.

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