

SMARTPAY – UNIFIED PAYMENT SYSTEM USING NFC

Mrs. I. Varalakshmi¹, Mr. D. Abishek², Mr. K. Anbu Suriya³, Mr. Harish B.T⁴

¹Mrs. I. Varalakshmi, Assistant Professor, Department of Computer Science and Engineering, Puducherry, India

²D. Abishek, Department of Computer Science and Engineering, Puducherry, India

³K. Anbu Suriya, Department of Computer Science and Engineering, Puducherry, India

⁴B. T. Harish, Department of Computer Science and Engineering, Puducherry, India

Abstract - NFC technology has been widely implemented all over the world and its impact on our daily life is very diverse and massive. Those diverse areas of NFC application include logistical tracking, monitoring and maintenance of products, product safety and information, and payment process etc. Today government facing so many challenges to implement this smart card system the major challenging areas are securing data, goods, records, transaction etc. Our system provides with a cost efficient and a secured multipurpose smart card. The security of the system is enhanced using the 3DES Cryptography technique ensuring the elimination of cyber-attacks. The advantage of our system is that all the features can be united in a single system and the transactions can be made seamlessly with a single Card. When the NFC tag gets detected by the NFC reader module, then the microcontroller recognized the person is valid user or not using fingerprint. It results that the user can access his/her account and get facility of ordering food one can collect it very easily. It contains an identification module, which has the NFC hardware to read tags as vehicles pass through the tollgate. The NFC module uses the information from the fingerprint module to determine the actual physical identity of the system using its fingerprint.

Key Words: NFC (Near Field Communication)

1. INTRODUCTION

In this century, people live a life which is solely dependent on technology. New innovations are made to make out life less demanding, calm and more agreeable. The primary goal of advancement has been to extend capability and diminishing effort. In the present scenario, the world is straightly moving towards automation. Automation is the use of various management systems for running instruments such as machinery processes in factories, boilers, and heat treating ovens, change on telephone networks, steering and stabilization of ships, craft and different applications and vehicles with possibly reduced human interventions and better accuracy.

2. RELATED WORKS

In present situation vehicle checking is huge trouble to the people with regard to license, insurance and RC book. It brings on traffic bother and also in toll gate system traffic jam occurs, time and fuel absorption is elongated. The automated toll accumulation system is very successful right now. This paper has to do with Automated Toll collection and Check-Post system using Radio Frequency Identification (RFID) and Global System for Mobile communications (GSM) module. The recognition is succeeded with the guidance of passive radio frequency. This project associate vehicle particulars like unique ID is saved in an RFID tag which is attached in the vehicle. After all the specifications are effectively observe through a computer, it can be saved on a data bank for cyclic gap as for time and date. Individual users clinch the unique ID for their vehicles. When the vehicle crosses the Toll-Plaza the reader reads the tag and the tax amount will be detected from their account balance by employing of RFID and GSM module. ATmega328 Arduino controller has to be associated with a GSM network which will capacitate a user to control the system by dispatching SMS or a forming a call and also avoid the stealing of vehicle. In this project we address the problems faced at toll plaza & also introduce identification system for vehicles against which stolen and accident cases are registered using RFID. The owner has to create an account through mobile application & register his RFID tag. When vehicle passes through Toll Collection Unit (TCU) it is classified as passenger or goods carrying vehicle based on its Unique Identification Number (UIN). A goods vehicle is weighed at TCU & if it is overloaded then charged with extra tax. UIN is passed to Central Server Unit (CSU) where the balance gets deducted from account. Once the balance is deducted at CSU it will indicate TCS to open the barricade and vehicle is allowed to pass. If vehicle is detected to be stolen at CSU it will indicate TSC not to open the barricade. Also to overcome the problem of hit & run cases collision detection mechanism is implemented using piezoelectric sensor in vehicle to identify RFID of collided vehicles. These details can be used for further action. In this existing method, RFID based Automated Toll Collection System is introduced as a solution of the traffic problems and also to maintain transparency in the toll collection system. The system aims to make a digital toll collection system which

can eliminate the delay on toll roads, toll bridges and toll tunnel without cash and without requiring cars to stop. This method focuses on an electronic toll collection system which uses radio frequency identification (RFID) technology to identify a vehicle specifically for collecting toll. The RFID system uses tags that are mounted on the digital number plate of the vehicles, through which information embedded on the tags are read by RFID readers. It is possible to reduce the need for vehicle owners and toll collection authorities to distribute tickets and collect tolls manually in this system Information on the toll payment can also be easily exchanged between the vehicle owners and toll authorities.

3. METHODOLOGY

The customer will his own NFC card with all his details installed in it, The NFC reader will read the data present in the card and for fingerprint for authentication purpose. The security of the system is further enhanced using the 3DES Cryptography technique ensuring the elimination of cyber- attacks. The fingerprint authentication is done by ATMEGA 328 module by using the data in NFC card. The encryption algorithm used here is 3DES encryption. After successful authentication the 64-bit encrypted data stored in the ATMEGA chip is decrypted at the POS side. The decrypted plain text contains the data set. The each field in the data set is mapped to the specific data such as the Transport wallet ID, Food Wallet ID, Toll gate ID and the ID proofs.

Encryption:

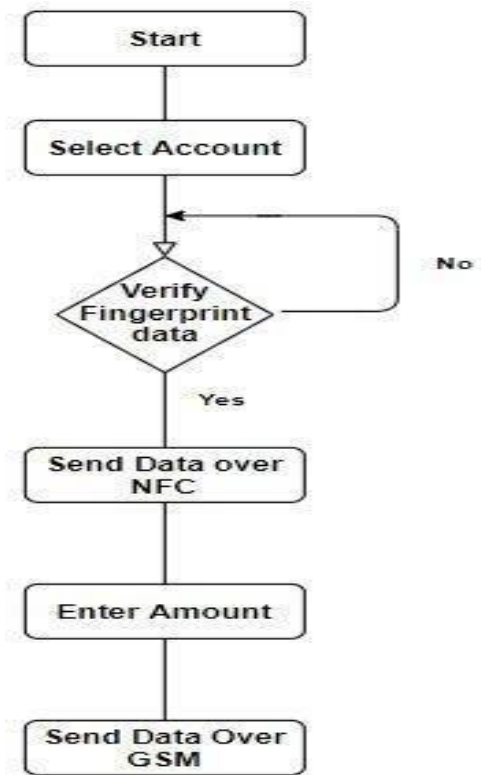
Input : 64 bits (Plaintext) Output : 64 bits (Cipher text) Key : 168 bits

Decryption:

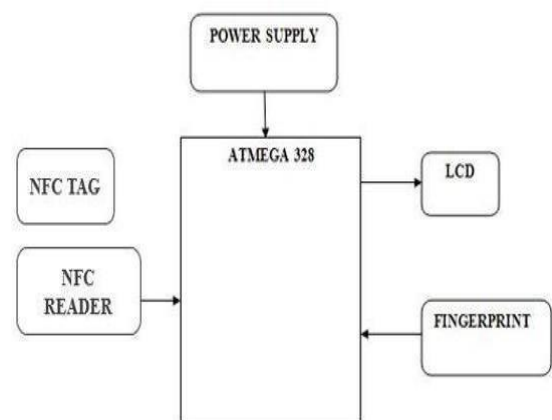
Input : 64 bits (Cipher text) Output : 64 bits (Plain text) Key : 168 bits

The system provides the employee in the food court and tollgate to recharge card, make purchases the food, add and remove order and generate bills. On the completion of transaction money is withdrawals from card and the balance is shown again on the LCD display.

BLOCK DIAGRAM



DATAFLOW DIAGRAM



3.1 NFC Tag

NFC tagging is an ID system that uses small radio frequency identification devices for identification and tracking purposes. An NFC tagging system includes the tag itself, a read/write device, and a host system application for data collection, processing, and transmission. NFC methods utilize radio waves to accomplish this.

3.2 NFC Reader

In order for an NFC system to function, it needs a reader, or scanning device, that is capable of reliably reading the tags and communicating the results to a database. A reader uses its own antenna to communicate with the tag. When a reader broadcasts radio waves, all tags designated to respond to that frequency and within range will respond. A reader also has the capability to communicate with the tag without a direct line of sight, depending on the radio frequency and the type of tag (active, passive, or semi passive) used.

3.3 Fingerprint Module

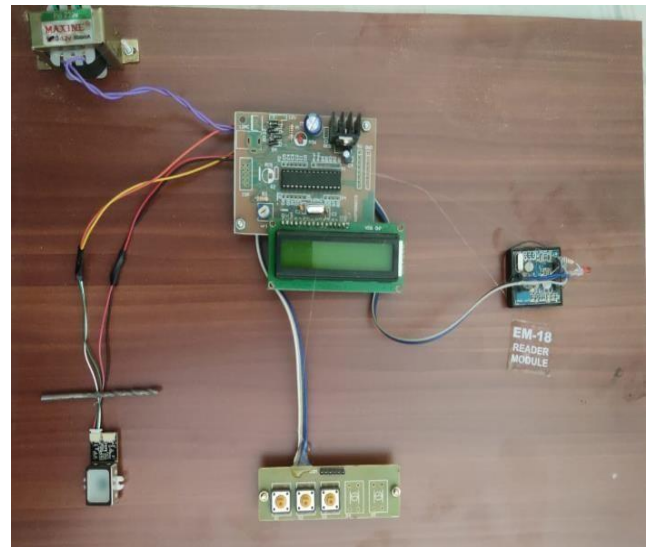
The multipurpose fingerprint sensor incorporating Principal component analysis (PCA) has the options to enroll and check different fingerprints. The enroll sketch is run to store the fingerprints into the device. Through the serial monitor each finger entered into the system for each voter is given an identification number.

3.4 LCD

The data from the environment will be measured by the sensor and the Data that are collected will be sending to the receiver. The data that has been read will be displayed on the LCD screen.

4. IMPLEMENTATION

NFC based smart access system (toll gate, food court, license number, Aadhaar number, PAN number) framework utilizes fingerprint and near field communication technology which can be used for quick, faster and efficient gathering of data. This will be easy for the vehicles which pass through toll gate and ordering food in food court but need not stop for paying the toll and the amount is automatically deducted from account. The same NFC is used view the license number, Aadhaar number, PAN number. All the process can be done after the fingerprint verification.



WORKING MODEL

5. SOFTWARE DESCRIPTION

ARDUINO SOFTWARE (IDE)

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

EMBEDDED C

Embedded C is the most well-known programming language in the product field for creating electronic devices. Every processor utilized in an electronic framework is related to embedded programming. It has cross advancement in nature. It was dependent on equipment design (microcontroller or different gadgets). It is utilized for restricted assets like RAM, ROM and I/O peripherals on an installed controller.

6. CONCLUSIONS

Security is ensured to users with the 3DES Encryption and NFC technology gives unique proof of identity to each user. Maintenance of this system is very easy. This implementation reduces the time and efforts that was wasted in conventional food court and tollgate.

The main goal of this project is to upgrade the security and portability of the smart system by enabling smart transaction. The software programming is done in Embedded C which is a user-friendly language to fulfill user's need

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