

# A Digital Innovation to Eliminate Coin Shortage in India Based On NFC-Card

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**Abstract—** Recently, people suffer from coin shortage problem and tend to bill the amount and round off to the nearest multiple of 10 in places such as hotel, restaurants, retail shops, public buses, and markets everywhere. this project proposes an innovation solution called byte-coin, to solve the coin shortage problem that we are facing in our country. The transaction involves the participation of the retailer and customer. Although there is no direct contact with the bank at the time of transaction a minimum participation of bank is necessary to successfully execute this. The usage of internet is neglected. Each transaction involves the participation of both retailer and customer.

**Index Terms—** NFC payment, ADC, DMA, SSI, SSP.

## I. INTRODUCTION

India has a problem with small change hotel, restaurants, auto-taxi drivers, retail shop, public buses, markets everywhere people suffer from coin shortage problem and tend to bill the amount rounded to the nearest multiple of 10. RBI supplies billions of coins every year in various denominations across India. But still the common man faces shortage of change and often being paid in eclairs, mints etc. This project proposes an innovative solution called byte-coin, to solve the coin shortage problem that we are facing in our country. the solution involved a secured digital payment system that has purpose built limits on the amount involved in the transaction. Each transaction involves the participation of the retailer and customer. Although there is no direct contact with the bank at the time of transaction a minimum participation of the bank is necessary to successfully execute this. There is no need of an internet connection thus making it accessible to every part of our country. There are two sides to this project. Byte coin card on the customer side and byte coin devices on the retailer or shopkeeper side. the customer has to have an approved byte coin card. each retailer or shopkeeper should own a byte coin devices. Byte coin transaction operates securely over NFC communication. Each transaction is called as coin transaction. It has a few vital purpose-built limitations. Each card can hold a maximum of 200rs only. each devices has a maximum daily limit of 20000rs. any single coin transaction can only transfer an amount between 1 to 9rs. the reader has a dual display

screen the retailer side one is a GUI based on touch screen TFT display type whereas the customer focused one is graphics display type. Both the display behaves smart in showing only the relevants information according to the viewer. Retailer side displays always show the current balance on the retailer device.

## II. LITERATURE SURVEY

W.Lumpkin & M.Joyce explained the exchanging of goods for a recognized symbol of value called currency has occurred on our planet for tens of thousands of years. The concept has stayed the same: an object represents a set value that is exchanged for goods and services. The object is then reused for other goods and services, with the Object's value set by the local or international level of a group of individuals, which sets the value through a complex set of value or trust factors. At one time, precious metals were used, like gold and silver, and then we progressed, first to paper money, specialized paper notes issued by a regulatory body; then checks, paper notes that reference a local bank; and credit cards, plastic cards with identifiers that represent banks or credit-issuing institutions as well as the individual borrower of the credit.

N.E.Madhou, F. Guenane, et al described NFC technology is used in contactless Payment applications by offering the NFC payment functionality In credit/debit cards, smart phones and payment terminals. Thus, An NFC payment transaction is executed in a simple and practical Way. EMV is the security protocol for both contact and contactless Payment systems. However, during an EMV payment transaction, This standard does not ensure two main security constraints Between a customer payment device and a payment terminal: (1) Mutual authentication, (2) confidentiality of sensitive banking Data exchanged. These weaknesses represent a major risk in the case of NFC payment because the transaction is performed using NFC radio waves in an open environment. The risk is reduced in the case of contact payment because the transaction Is executed in a closed environment by inserting the card into the terminal. In this paper, we propose a new security protocol .For NFC payment transactions based on a Cloud infrastructure.

A. Mandalapu explained the flexible use of credit and debit card transactions has become increasingly ubiquitous and so have the associated vulnerabilities that make them a common target for cybercriminals. Furthermore, a prevalent

complication associated with blocking of ATM cards involves tedious interactive processes and even possibly long waiting times during interaction with customer care services. Using a three factor authentication scheme employing NFC (Near Field Communication: an emerging technology evolved from a combination of contact-less identification and interconnection providing data exchange), Dash Matrix Algorithm and One-time password, we describe and quantify the potential to overcome common transaction liabilities (brute force attack, shoulder surfing, skimming of ATM cards, etc.). The auxiliary feature of blocking ATM cards is implemented using a QR code authentication scheme and NFC technology, implemented both in NFC enabled phones and non-NFC phones.

**III. EXISTING PROBLEM**

1) Rise of the illegal markets. Notable example is exporting in Indian coin to Bangladesh for marketing blades. other misuses like accumulating it and selling at a premium price later.2) Shortage of production and problems with the distribution systems.3) Physical form of coins. Still using metals for coin production.4) Slower adoption rate of card based payment and mobile payments system. The reasons include lack of high speed internet connectivity security concerns services charges and long transaction times.5) Coin saving habits of people in their home.

**IV. PROPOSED METHOD**

This project proposes an innovative solution called BYTE-COIN, to solve the coin shortage problem that we are facing in our country. The solution involved a secured digital payment system that has purpose built limits on the amount involved in the transaction. Each transaction involves the participation of the retailer and the customer. Although there is no direct contact with the bank at the time of transaction a minimum participation of banks is necessary to successfully execute this. There is no need of an internet connection thus making it accessible to every part of the country.

**V. NEAR FIELD COMMUNICATION (NFC)**

Fuzzy logic is the way the human brain works and we can mimic this in machines so they will perform somewhat like humans (not to be confused with artificial intelligence, where the goal is for machines to perform EXACTLY like humans).Fuzzy logic control and analysis system may be electro-mechanical in nature or concerned only with data for example economic data in all cases guided by 'if then rules'` stated in human language.

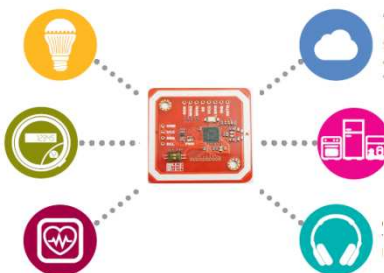


Figure 1.Fuzzy Logic

Fuzzy logic can control non linear system that would be difficult or impossible to model as case-based.fuzzy controllers are far simpler than knowledge-based system.

**VI. GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)**



Figure 2. GSM Kit Features

- \*SIM900D from SIMCOM
- \*Quad-band GSM module in SMT type.
- \*SMS cell broadband
- \*Embedded SIM
- \*Inbuilt antenna



Figure 3. Application of GSM

**VII. THIN-FILM TRANSISTOR (TFT) PIXEL**

A TFT substrate is composed of a matrix of pixels and ITO region (a transparent electric conducting film) each with a TFT device and is so called array. Thousands or millions of these pixels together create an image on the display. The diagram below shows the simple structure of a pixel schematic diagram of TFT-LCD array with controllers, power supply, and driver circuits.

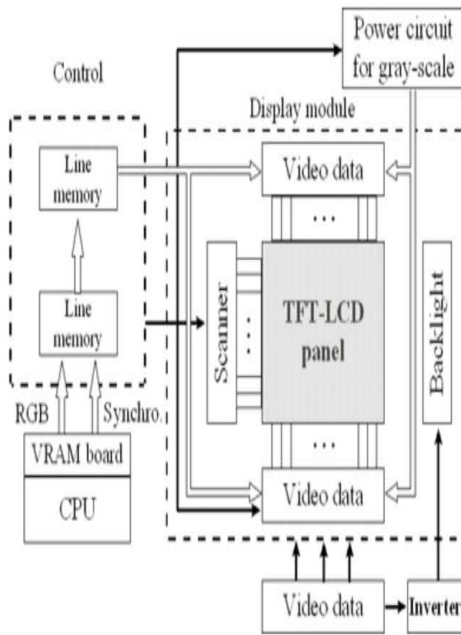


Figure 4. Block diagram of TFT-LCD panel

### VIII. ARM CORTEX-M3

The ARM cortex-M3 processor is the industry 32-bit processor for highly deterministic real time application and has been specifically developed to enable partners to develop high performances low cost platforms for a broad range of devices which includes microcontrollers, automotive body sytems, industrial control sytem and wireless networking and sensors. The processor is highly configurable enabling a wide range of implementations from those requiring memory protection and powerful trace technology through to extremely cost sensitive devices requiring minimal area.

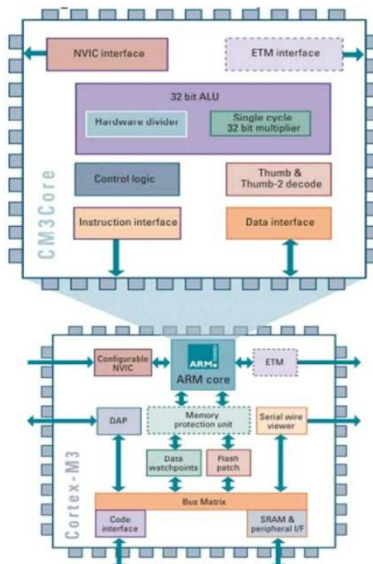


Figure 5 ARM Cortex™-M3 processor  
 ARM Cortex-M processors offer superior code density to 8-bit and 16-bit architectures. This has significant advantages in terms of reduced memory requirements and maximizing the usage of precious on-chip Flash memory.

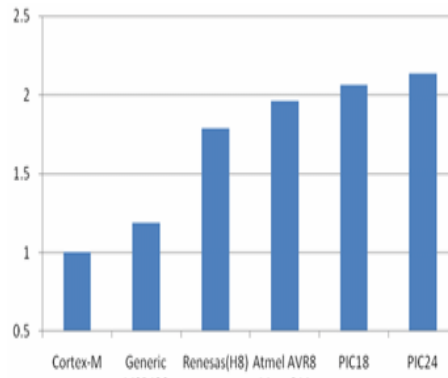


Figure 6 Code size comparisons using relative EEMBC Core mark test size

### IX. POWER SUPPLY

A power supply provides a constant output regardless of voltage variation “fixed” three-terminal linear regulator are commonly available to generate fixed voltage of plus 3v, and plus or minus 5v,9v,12v,or 15v when the load is less than about 7 amperes.

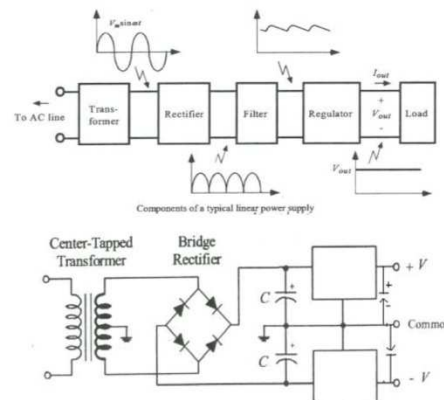


Figure 7. Schematic diagram of basic power supply  
 \*Output current up to 1A  
 \*Short circuit protection  
 \*Thermal overload protection  
 \*Output voltages of 5, 6,8,9,10,12,15,18,24

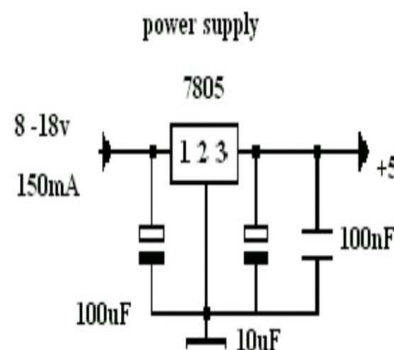


Figure 8. Circuit diagram of the power supply  
 This circuit is a small +5V power supply, which is useful when experimenting with digital electronics. Small inexpensive wall transformers with variable output voltage are available from any electronics shop and supermarket. Those transformers are easily available, but usually their voltage regulation is very poor, which makes them not very usable for digital circuit experimenter unless a better regulation can be

achieved in some way. The following circuit is the answer to the problem. This circuit can give +5V output at about 150 mA current, but it can be increased to 1 A when good cooling is added to 7805 regulator chip. The circuit has overload and thermal protection. The pin diagram and hardware implementation

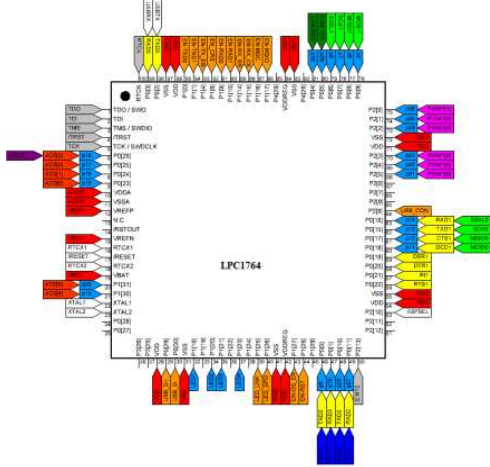


Figure 9. Pin Diagram Of LPC1764



Figure 10. Hardware Implementation of Byte Coin

### X. CONCLUSION

Although this project can be implemented even without the support of a bank, it will be good when considering the broad acceptance and the long term viability of the project. The card and the device should be issued by the bank authorities after testing and approval, a bank can maintain the user database both the device owner and card owner .this will make the maintenance process an easier one. Since there is a central database to store the card and the device there is a way to service it for example a lot card or a stolen device.

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