Effective Identification of Black Money, Fake Currency & Expiry Using NFC, IOT & Android

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ABSTRACT: The purpose of the project is to effectively detect fake currency and curb black money by using cutting edge technologies like NFC(Near field communication), IOT(Internet of things) and Android. Though the main aim is to protect the Indian economy our other objective is to promote cashless transaction. This is why our project also involves smart cards and QR codes

KEYWORDS:Key words: NFC, IOT and QR codes

I.INTRODUCTION

Counterfeiting money has become an enormous problem around the world mainly India. Traditional security features on currency notes are easy targets for counterfeiters, and they can easily imitate the original currency notes with fake ones. We introduce a NFC chip to the currency note. NFC chips have had a significant impact on security, especially in the detection of counterfeit currency. This chip includes serial number, currency amount and expired date. This system includes a specified machine. In first case once the people are given a currency note to the machine. This machine is connected to the server. We use IOT technology for the dumping of data in the server. Then the machine is to check the serial number, amount and expired date. Finally it is intimate the original note or fake note. In second case the people use smart cards, and this system is to store the transaction between people and amount details by using server. In third case the people use a QR codes, this system also stores the transaction between people and amount details by using server. In this we also create an application which can be accessed through the android phone. This entire system is used to control the circulation of counterfeit currency (black money) notes as the money which are "expired" has to be brought back to the bank and so the money is always in circulation and not accumulated to a single person. Through the server we can even trace the path of how the money is moved. The proposed scheme also allows domestic consumers to identify fake currency notes.

II. PROPOSED ARCHITECTURE

As we can see from the above block diagram, the system consist of a machine to read the currency which is made by PIC18F458 and the machine also contains LCD display and the machine is given supply as necessary.

Fig 1: Block diagram

NFC chip which costs less than one rupee if produced in bulk is placed between the sheets of currency note.

QR (Quick response) code which contains the necessary information of the vendor or merchant using, so when a customer uses a QR code to buy something it is added\subtracted depending on the transaction. QR code is scanned using mobile phones. The next part of construction is the designing of smart cards (Credit and debit cards) uniquely and dumping data regarding the cards into the server. The final part of construction is to design and implement the server where all data can be dumped and retrieved using IOT technology.

III. HARDWARE ENVIRONMENT
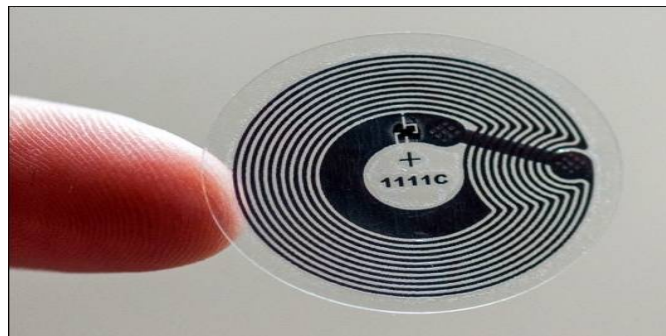
A) NFC- NEAR FIELD COMMUNICATION
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Fig 2: NFC chip.

It is a set of communication protocols that enable two electronic devices, one which is usually a portable device such as a smart phone, to produce communication by bringing them within a range of 4 cm (1.6 in) with each other.

NFC-enabled devices- smart phone and a printer operates at a radio frequency ISM band of 13.56 MHz on ISO/IEC 18000-3 air interface at rates ranging from 106 to 424 k bit/s.

NFC device can work in three modes:
1. NFC card emulation—facilitates NFC-enabled devices like smart phones acts like smart cards, allowing transactions.
2. NFC reader/writer—allows NFC-enabled devices to read information stored on reasonably priced NFC tags surrounded in labels or tidy posters.
3. NFC peer-to-peer—allows two NFC-enabled devices to commune with each other to swap information in an ad hoc fashion

FEATURES:
1. Data stored   : 96 to 8,192 bytes
2. Frequency   : 13.56 MHz
3. ISO/IEC 18000   :3 air interface

4. Rates   :106 k bit/s to 424 k bit/s
5. Theoretical working distance: up to 20 cm
6. Practical working distance   : about 10 cm.

Supported data rates: 106, 212 or 424 k bit/s (the bit rate 848 k bit/s is not compliant with the standard ISO/IEC 18092). The dual modes are:

1. Passive—the initiator apparatus provides a carrier field and the target apparatus answers by modulating the existing field. In this mode, the target apparatus draws its operating power from the initiator-provided electromagnetic field, thus making the target device a transponder.
2. Active—Both initiator and target apparatus converse by alternately producing their own fields. A apparatus deactivates its RF field while it is coming up for data. In this mode, both devices typically have power supplies.
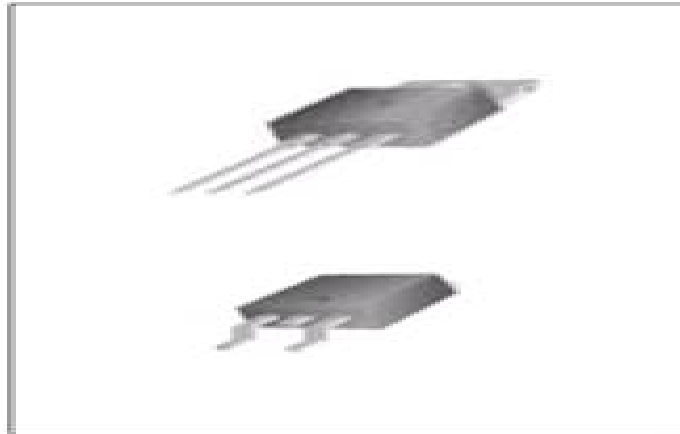
B) POWER SUPPLY

Fig 3: KA78XX

FEATURES:
1. Output Current up to 1A
2. Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
3. Thermal Overload Protection
4. Short Circuit Protection
5. Output Transistor Safe Operating Area Protection

CIRCUIT DIAGRAM:

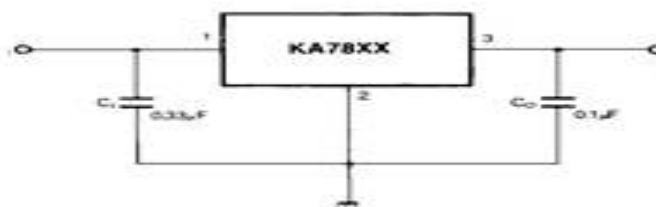Fig 4: Circuit diagram- KA78XX

a)   78 regulators - positive r voltages from 5 to 24 volts

b)   79 regulators - negative voltages from 5 to 24 volts.
c)   For ICs, microcontroller, LCD - 5 volt
d)   For alarm circuit, op-amp, relay circuit - 12 volts

C) LCD:

A 16x2 LCD means it can exhibit 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, which are, Command and Data.

SPECIFICATION:
1. Display: 16 characters x 2 lines
2. Backlight: Yellow
3. Operating temperature: 0°C to 50°C
4. Operating voltage: 4.5V - 5.5V
5. Backlight voltage: 5.0V (100mA)

DIMENSION:
1. Module size: 80mm x 36mm x 13.5mm
2. Viewing area: 64.5mm x 14.5mm
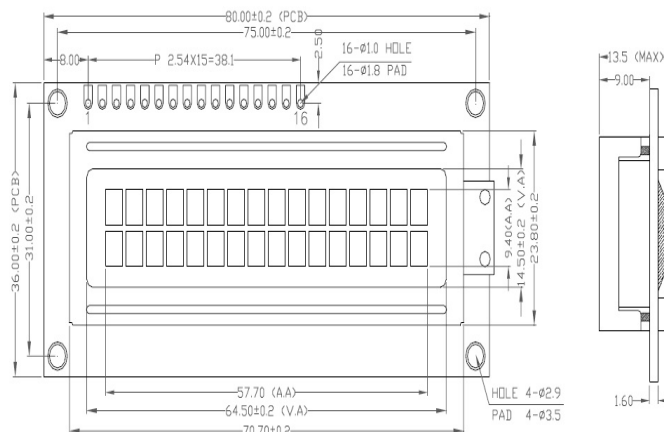3. Mounting hole (Diameter): 2.9mm

Fig 5: LCD design.

D) PIC18F458 MICROCONTROLLER

A microcontroller is an evolved form of micro processor. It contains microprocessor memory, I/O interfacing circuit and peripheral devices like A/D converter, serial I/O timer etc.It has bit handling instructions.More multifunctional pins.But it is less flexible in design point of view.

FEATURES:
1. program memory 2 Mbytes
2. data memory   4 Kbytes
3. Timer1: 16-bit timer/counter
4. Timer2: 8-bit timer/counter
5. Timer3: 16-bit timer/counter
6. Programmable Brown-out Reset (BOR)

FLASH TECHNOLOGY:
1. Low-power but with high-speed improved Flash technology
2. Completely static design
3. Broad operating voltage choice (2.0V to 5.5V)
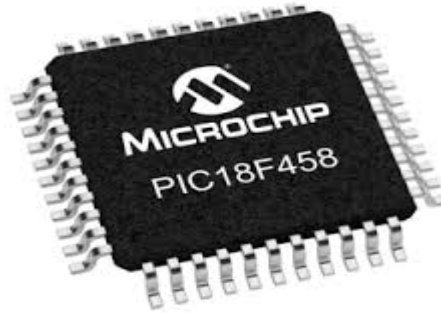4. Industry and comprehensive temperature ranges

Fig 5: Microchip

PIC is also referred to as programmable interface controller. It is used for a wide array of puposes in almost all electrical and electronic devices.

IV. SOFTWARE ENVIRONMENT

1. Operating system   : Windows XP
2. Languages   : Java
3. Data Base   : Mysql

OVERVIEW OF THE MYSQL DATABASE MANAGEMENT SYSTEM

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation.

A. MySQL OVERVIEW

1. MySQL is a database management system.
2. MySQL is a relational database management system.
3. MySQL software is Open Source.
4. MySQL Server works in client/server or embedded systems.
5. A large amount of contributed MySQL software is available.
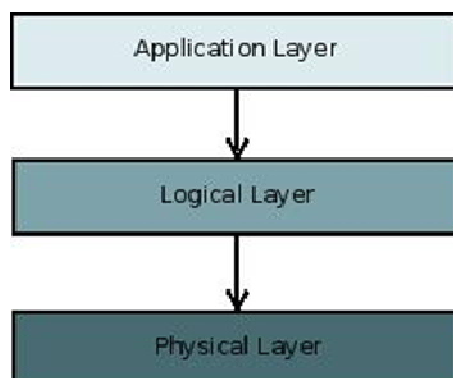
A.1)MYSQL ARCHITECTURE

Three layer model:

Fig 7:MYSQL three layer model.

1. The application layer has network services for connection handling, authentication and security. Different clients interact with MySQL wherein the clients can written in different API's like:.NET, Java, C, C++, PHP, Python, Ruby, Tcl, Eiffel, etc...
2. The Logical Layer has the MySQL intelligence , it comprises query parsing, analysis, caching and all built-in functions (math, date...). This layer is also used to provide functionality which is common across the storage engines.
3. The Physical Layer is needed for storing and retrieving complete data stored in "MySQL". Accompanied with this layer are storage engines, with which MySQL interacts with simple API's.

Fig 8: N-tier model.

B. JAVA PROGRAMMING LANGUAGE

Java can be charaterised as
1. Simple
2. Architecture neutral
3. Object oriented
4. Portal
5. Distributed
6. High performance

In the Java computer programming language, all the base or the source codes are first composed in plain text files with the `.java` extension. Then those source files are compiled as `.class` files using `javac` compiler. A `.class` file do not comprise codes that are native to our processor; but it contains *byte codes* — the pure machine language of Java Virtual Machine (Java VM). The `java` launcher then runs our app with instance of the Java Virtual Machine.

The Java platform has two components:
- The *Java Virtual Machine*
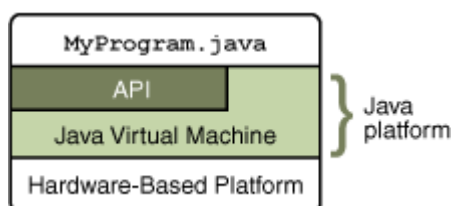- The *Java Application Programming Interface* (API)

JAVA API

Fig 9 :API and JVM

B.1) JAVA PLATFORM, STANDARD EDITION

Some of the general purpose packages in J2SE are as follows

1. Java.lang
2. Java.io
3. Java.math
4. Java.net
5. Java.util

B.2) SWING APPLICATION

Swing can be defined as a graphical user interface library for the Java SE platform. It is in the realm of reality to demand a different look and perception through the pluggable look and feel system of Swing. Clones of Windows, GTK+ and Motif are provided by Sun.

B.3) THE TOMCAT MANAGER WEB APPLICATION

THE SERVER

The first container element referenced in this snippet is the <Server> element. It represents the entire Catalina servlet engine and is used as a top-level element for a single Tomcat instance. The <Server> element may contain one or more <Service> containers.

THE SERVICE

The next container element is the <Service> element, which holds a collection of one or more <Connector> elements that share a single <Engine> element. N-number of <Service> elements may be nested inside a single <Server> element.

THE CONNECTOR

The next type of element is the <Connector> element, which defines the class that does the actual Handling requests and responses to and from a calling client application.

THE ENGINE

The third container element is the <Engine> element. Each defined <Service> can have only one <Engine> element and this single <Engine> component handles all requests received by all of the defined <Connector> components defined by a parent service

THE HOST

The <Host> element defines the virtual hosts that are contained in each instance of a Catalina <Engine>. Each <Host> can be a parent to one or more web applications, with each being represented by a <Context> component.

THE CONTEXT

The <Context> element is the most commonly used container in a Tomcat instance. Each <Context> element represents an individual web application that is running within a defined <Host>. There is no limit to the number of contexts that can be defined within a <Host>.

V. MODULES

A modular design exponentially reduces complexity of ideas , facilities flexible change (important aspect in effective software maintenance), and results in easier implementation with the help of parallel development of different parts of the complete system.

MODULES:

MODULE DESCRIPTION:

1. CURRENCY ENROLLMENT

In this module, we can design and implementation of currency enrolment. In this every currency having tag number, currency value and serial number. Here first the User wants to create an account and then only they are allowed to access the Network. Once the User creates an account, they are to login into their account and request the Job from the Service Provider. Based on the User's request, the Service Provider will process the User requested Job and respond to them. All the User details will be stored in the Database of the Service Provider. In this Project, we will design the User Interface Frame to Communicate with the Server through Network Coding using the programming Languages like

Java. By sending the request to Server Provider, the User can access the requested data if they authenticated by the Service Provider.

2. RBI SERVER
Bank Service Provider will contain information about the user in their Data Storage. Also the Bank Service provider will maintain the all the User information to authenticate when they want to login into their account. The User information will be stored in the Database of the Bank Service Provider. To communicate with the Client and with the other modules of the Company server, the Bank Server will establish connection between them. For this Purpose we are going to create a User Interface Frame.

3. HARDWARE IMPLEMENTATION
In this module we are going to interface the Embedded Kit, by which NFC   values can be observed. And NFC is communication network is interfaced with the Microcontroller. So that the device can obtain the values. In every shop, office or any place, we install money counting device which would read the currency. Once the device reads the currency means it directly transmits to the RBI server. This system will identify the total money transferred using device by the company. RBI server can also easily track the transaction details.

4. ANDROID APPLICATION
In this module, we can design and implementation of develop the android application for detect the black money. We would provide reader device which can be attached to the mobile via OTG connectivity to any of the merchants or vendors. In case of any immediate transactions or small event transactions, this system can be utilized. In this NFC reader connected with the mobile phone will read the NFC tags embedded in the currency. So same way as in the NFC admin can easily track the transactions happened via mobile NFC id.

5. QR CODE PROCESS
QR code short for Quick Response code is a specific two-dimensional code readable by dedicated QR code readers and smart phones. The code consists of black module arranged in a sequence pattern on a white background. The information encoded can be text, URL or other data. In case of small vendors like street business merchants vegetable selling people and so, Public can scan the QR code which contains the account details of the server. Automatically amount would be credited to the specific user account.

6. CASHLESS TRANSACTION
 In this module, we will create and implementation of cash less transaction. As per the government policy, we are implementing cashless transaction using card. As we are know card transaction is activated in the bank.

7. BLACK MONEY DETECTION
In this module, we will create and implementation of black money detection. Using the entire above four methodologies RBI server can easily track all of the transactions (Income & Expenditure) made by every individual users, merchants or vendors. This is directly compared with the total audit report provided by these people. This system will strongly detect the black money process.

8. EXPIRY SMS ALERT
In this module, we will create and implementation of sms alert for expiry date of currency. Every currency note having expiry date. In case currency is expiry means automatic sms alert to corresponding user. This system will totally eradicate the black money.
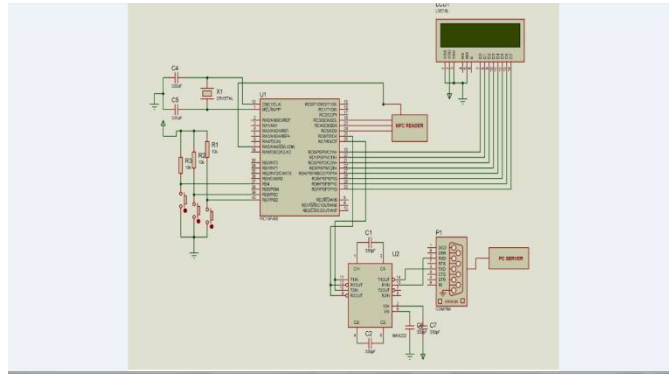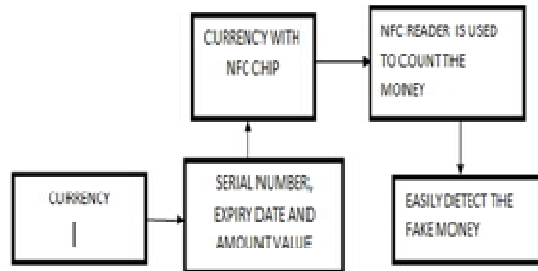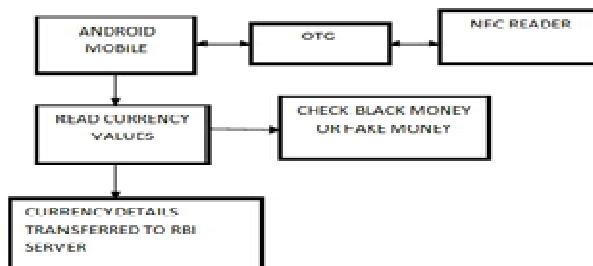
VI. CIRCUIT DIAGRAM

The above given circuit comprises entirely of the hardware and software components. This diagram shows PIC interfaced with the NFC reader which is in turn interfaced to the server through interface. And this is the simple overview of our project design.

VII. FLOW CHART
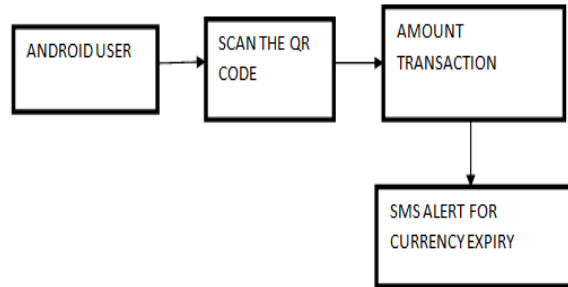
LEVEL 0:

LEVEL 1:

LEVEL 2:

VII. SIMULATION AND GUI(GRAPHICAL USER INTERFACE)
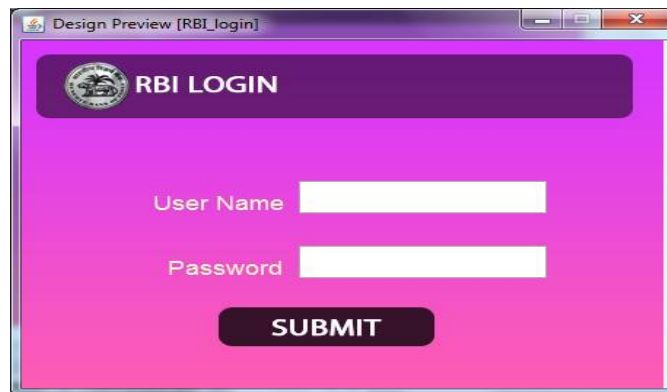
VIII CONCLUSION AND FUTURE SCOPE

(A)CONCLUSION:

In this project we are implementing four methods to improve Indian economic stability. Using 4 methodologies RBI easily can track of all the transactions like income and expenditure made by every individuals users/merchants or vendors(domestic and industrial use). This is directly compared with the total audit report provided by this by these people. This system will strongly eradicate the black money sector. Also as we are using the feature of "expiry date" in the currency, the user is automatically notified and so feels a sense of being a part of something whole.

(B)FUTURE SCOPE:

1. We are currently using cloud server for the dumping of all the data and though the output is desirable the next generation of this project would be the use of "Big data" were the data sets that are so large or complex that traditional data processing applications are inadequate.

2. Complete implementation of cashless transaction. When there is no hard cash transaction the money lost to economy by black money and fake currency decreases exponentially. Finally we can hope for economic stability.
  .

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