An NON NFC Ticketing System with New Approach of a Read Write Mode

Ms. Amruta A. Mhatre[1] Mrs. Kanchan K. Doke[2]
[1,2]Department of Computer Engineering
[1,2]Bharati Vidhyapith College of Engineering Kharghar, Navi Mumbai

Abstract— A key application of Near Field Communication (NFC) can be found in the field of Electronic Fare Management in this project we are implement a ticketing system for local trains using the concept of (Non NFC) Non near field communication .It can radically changes existing system of isolated interoperable fare management .In this paper a scenario for the integration of an electronic ticketing system into an existing public transport system based on Non NFC is introduced, Electronic Fare management system consists of sophisticated structure and processes. Therefore at current stage of development only selected subset of features is essential for prototypical implementation is presented in this paper.

Key words: component; formattinT; style; styling; insert (key words)

I. INTRODUCTION

Near Field Communication (NFC), was launched by Sony, Philips and Nokia with the establishment of the NFC Forum. The NFC and Non NFC Forum is a non-profit industry association for advancing the use of NFC and Non NFC short-range wireless interaction in consumer electronics, mobile devices and PCs.

NFC and Non NFC is a standards-based, short-range wireless connectivity technology that enables simple and intuitive two-way interactions between electronic devices(Cell phone) and Non NFC has the capability to write to the RFID (Radio Frequency Identification) chip which in not present this facility in NFC . In RFID technology items marked with tags contain transponders which emit messages in the form of signals. RFID readers were used to read those messages. NFC & Non NFC is now integrated with this RFID technology. The tags to be readable by NFC reader should have 4 to 10 byte unique ID. This unique ID is used for the identification of the tag. With NFC technology, consumers can perform contactless transactions, access digital content and connect NFC-enabled devices with a single touch & Non NFC can read and write electronic device and shear data.NFC simplifies setup of some longer-range wireless technologies, such as Bluetooth and Wi-Fi.

NFC & Non NFC (Non Near Field Communication) is a young radio technology which finds special application in the field of mobile consumer electronics. It is designed for bidirectional data transmissions over a distance of up to 10 cm and a maximum data rate of 424 kb/s. Most of the RF energy is concentrated in the allowed 14 kHz bandwidth range, but the full spectral envelope may be as wide as 1.8 MHz when using ASK modulation .Non NFC we use only in android mobile.

II. MODES OF COMMUNICATION

Three modes of communication are defined by NFC and Non NFC forum.
- Read/Write mode
- Tag emulation mode
- Peer-to-peer mode

A. Read Or Write Mode:

In read or write mode the NFC enabled devices can read or write to the tag. For example smart posters.

B. Tag Emulation Mode:

In tag emulation mode the NFC enabled device acts as a smart card. For example contactless payments.(UK & US)

C. Peer To Peer Mode:

In peer to peer mode two NFC enabled devices can communicate with each other for the exchange of information. For example exchange of business cards between two phones.

III. MODES OF OPERATION

NFC &Non NFC depends upon straight magnetic/electrostatic coupling between devices instead of freely broadcasting of radio waves, such as in Wi-Fi. NFC &Non NFC devices can operate on low electric or magnetic field strengths due to its short range.NFC system can operate either in active or passive mode depending upon requirements.

A. Active Mode:

In both mode devices generate RF (radio frequency) field to transfer data. In this situation any of the devices can be the initiator and other will be the target. During the communication, the initiator starts the communication in a particular mode at a specific speed. Target finds out the current speed and replies back to the initiator. Termination of the communication takes place either when two devices move out of the range or application gives command to terminate it.

B. Passive Mode:

In passive mode, only one device generates the RF field and other uses load modulation to transfer data. In this situation initiator of the communication will generate field and target will use load modulation. This mode has a key benefit for battery powered devices. For battery powered devices low consumption of battery is the basic priority. Thus NFC and Non NFC allows battery powered devices such as cell phones to operate in passive mode. In this mode RF field is generated on the other side. Thus battery power is saved that was needed to be used for generating RF fie.

IV. EXISTING SYSTEM PROBLEM

Fig. 1: M-Ticketing Issues

The local train ticketing system existent in Mumbai provides different ticket issuing services to the user, Some of them have been enlisted below:

A. Monthly/Quarterly Pass:

The local train system provides a monthly or quarterly pass to the regular customers as per their desired source and destination stops. This pass must be carried along with the ID card which is issued when a commuter get a pass made for the first time. Various concessions for the commuters belonging to colleges, schools and professional organizations are provided.

B. One Day Validity Ticket:

These tickets are issues in long queues at the various ticket counters. The validity of the card is for the entire day and might be single i.e. one way or return i.e. round trip as per the need of the commuter. Wastage of paper is a matter of concern in this type of ticketing system and the long queues make it time consuming as well.

C. Punch Coupons:

For those who are in need of a ticket by avoiding the long queue, the punch coupons are the preferable option. This is basically a booklet of coupons of denominations Rs.50, Rs.30 etc. and the desired amout of coupons can be punched as per the fare of the transit.

D. Smart Card:

This is by far the most advanced method wherein a card is provided to every smart card user which is unique and has a prepaid account in the ticketing database. The commuter has to only show this card at one of the Smart Card ticket issuing machines and select the destination of the journey. Thus the fare for the journey will automatically be deducted from the prepaid account and the paper ticket will be issued. From the above methods of ticketing some of the major flaws are as security issues since if stolen the ticket can be used by anyone else, extensive use of paper and time consuming.

V. PROPOSED SOLUTION

The NFC and Non NFC Ticketing Application combines latest generation technologies such as short message services (SMS).All the architectural components of the application are fully described, detailing both software and hardware features and also the relative communication scheme.

Over the last few years the availability of the wireless technologies such as Wi-Fi, Bluetooth, Radio Frequency Identification(RFID), made users increasingly more "mobile", setting them free from a fixed working station, so allowing them to perform day-to-day actions anytime and everywhere. Each one of these technologies is suitable for a particular context of use within a specific scenario. For example, Bluetooth is particularly useful when the device the user wants to interact with, is not on his/her line of sight. However, a Bluetooth-based interaction is not immediately perceivable for the user because it is not possible to associate its operation mode (scanning the surroundings), to an action occurring in the real life. Conversely, by means of an RFID-based interaction, the user can replicate the act of "touching" an object to interact with it in the same way that people reach a switch to light a room, or press a button, to move the elevator towards a given floor, considerably decreasing the user's cognitive load.

In such a scenario, defined by growing wireless infrastructure and by the mobility of users, it is hard to imagine a device that has more influence on the people's life and is, at the same time, so universally accepted, as the mobile phone.

For this reason, wireless technologies for mobiles, based on RIFD technology, such as Near Field Communication (NFC) and Felicity Card (FeliCa, a contactless technology developed by Sony Corporation), seem to be the more suitable human-computer interaction solution, because they inherit advantages from both RFID and mobile technologies. As for cell phones, these are not only largely used by people all over the world, they are also personal objects, always carried in pockets, or bags, or their owners. On the other hand, RFID services are very easy to use and they can rely on a constantly growing infrastructure. Examples are electronic ticketing systems in use in London, Milan, Rome, etc. all based on contactless cards.

In this paper the main aim is to introduce a new ticketing system for the local train system in Mumbai. This system will make use of the Near Field Communication and Non Nfc technology along with the mobile phone (GPRS /GPS Enabled) to carry out the ticketing transactions. The commuter will subscribe for the Non NFC Ticketing mode of ticketing by registering his mobile number and other relevant details that will be safely stored in the database.

Fig. 2:

With every subscription a card will be given to the commuters for carrying out the transactions. Each and every card will be uniquely identified by an RFID scanner that is fitted at the stations and connected to the server. A prepaid account will be attached to the subscription.

Fig. 3:

When the commuter wants to issue a ticket, he will have to show his card at the RFID scanner. This will contain the authentication details of the user which will be checked with the database. After successful authentication the commuter will enter the class, start and destination fields as per requirement and send it to the server using the GPRS feature. The fare for the same will be calculated and the same amount will be deducted from the user's prepaid account. After this the ticket will reach the commuter's mobile in an RMS (Record Management Store) format which cannot be modified, fabricated or tampered by the user thus maintaining the security aspect.

The sever side transaction can show like this ,customer can file the form ,that form submitted to sever side, sever give you all details like how many tickets customer wants(I /II /Child tickits) destination station etc.

The basic components that would be included in this project with their operations are shown in the figure below.
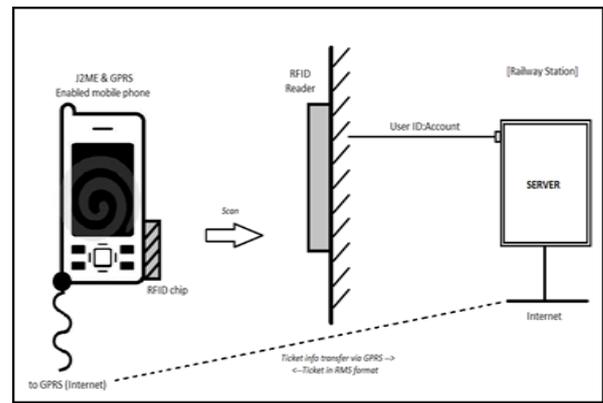

Fig. 4: Block Diagram (Architecture)

A. Components:

1) Mobile Phone:
The first component will be a GPRS enabled mobile phone with an RFID chip attached to it. The mobile phone will be fed with a computer program coded entirely in J2ME.

2) RFID Reader:
The RFID Reader is the second component which is meant to be mounted on the wall of Railway Stations that would be accessible to the commuters.

3) Server:
This is the most important component that is supposed to manage the entire system. The server will consist of the user database i.e. their unique ID's and a computer program coded in VB.

B. Working Stage:
The basic working of the system with the above mentioned three main components is explained as per the flow under. Initially the commuter willing to issue a ticket will open the application fed into his mobile phone. The application would consist of all the necessary details to be entered for issuing a basic ticket like destination, no of commuters, etc. After successfully entering the details the user will submit those over the internet and sever screen will look like.

Fig. 5:

The next step would be that the user will have to quickly get his mobile phone scanned with the RFID Reader mounted on the Railway Stations, which will lead scan the RFID chip on the users phone thus obtaining his unique ID. This ID will be transferred over to the Server. The Server in turn will connect to the internet to fetch the details entered by the user and create a ticket in RMS format. RMS format is a kind of data storage format which cannot be tampered by the user. This RMS ticket will be sent to the users mobile phone via the internet thus completing the entire transaction.

In the meanwhile the server maintains an account of every user and while a ticket or transaction has been requested the amount will be deducted from the balance, further making it easier in the payment terms too.

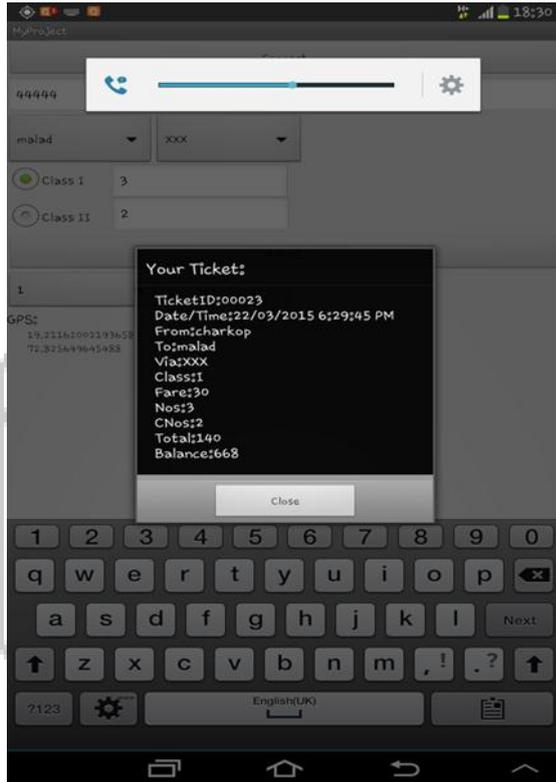Final ticket can show in candidates mobile are shown below.

Fig. 6:

VI. CONCLUSION

The scope for the project Queue less Ticketing System for Local Trains has thus been thoroughly studied and also the implementation of the same has been taken care of successfully. Even if currently this system is meant to be implemented just for academic project purpose but the motive behind this project is to actually create a revolution in the ticketing world for the ease of the commuters of the 22nd century.

REFERENCES

[1] System Integration of NFC Ticketing into an Existing Public Transport Infrastructure 2014 international work shop on NFC.
[2] NFC Ticketing: a Prototype and Usability test of an NFC-bas Virtual Ticketing application ISO2014.
[3] NFC Forum Bluetooth Secure Simple pairing using NFC.NFC Forum [online]October 18,2011.http:// www.nfc.forum.org/resources/app docs/ NFC Forum
[4] 2009 First International Workshop on Near Field Communication "NFC Ticketing a Prototype and Usability test of an NFC-based Virtual Ticketing system
[5] Stefano Levialdi Ghìron, Serena Sposato Computer Science Dept Univ.of Rome
[6] "Fourth International Workshop with Focus on Near Field Communication System Integration of NFC Ticketing into an Existing Public Transport Infrastructure"[2012]
[7] "M-Ticketing Whitepaper"
[8] Public Transport- interoperable fare Management System Organization for standardization std.ISO240141:2007.
[9] "Interoperable Fare Management Project" (IST-2007-214787)
[10] ECMA -340 Near Field Communication Interface and Protocol(NFCIP)2004
[11] ECMA -340 Near Field Communication Interface and Protocol(NFCIP)-2010
[12] Konstantinos Markantonakis."Practical NFC Peer-to peer Relay Attack Using Mobile Phones"UK 2010
[13] Security in Near Field Communication (NFC)-Strength and Weekness"
[14] ISO/IECI18092,informationTechnology Telecommunication and in-formation exchange between system.