Electronic Ticketing System for Public Transport using NFC Technology

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Abstract— In this project the main aim is to introduce a new ticketing system for the BUS system. This system will make use of the Near Field Communication technology along with the mobile phone (Android and GPRS Enabled) to carry out the ticketing transactions. The NFC Ticketing application combines latest-generation technologies such as Near Filed Communication (NFC). The Near Filed Communication (NFC) is used in such service which integrates mobile tickets and mobile payments. By using this technology, travel card readers cannot distinguish the mobile phone from travel card. Mobile phone works as a travel card even when battery is depleted.

Key words: Near Field Communication (NFC), Electronic Ticketing System (ETS), NFC Mobile device, NFC Cards

I. INTRODUCTION

Project is based on implementing a ticketing system for buses in electronic ticket management using the concept of near field communication (NFC). It can radically change existing system of isolated interoperable fare management system. In this project, a scenario for the design of an electronic ticketing system into an existing public transport system based on NFC is introduced. Electronic fare management system consists of sophisticated structures and processes.

II. PROPOSED SYSTEM

The project is implemented using NFC technology. This project suggests building a NFC system that can identify passengers in public transport as well as does all accounting purpose related to travelling expenses. Automated accounting of public transport can be used to provide useful estimates of the cost of travelling from one bus stop to another as well as the crowd density can be measured inside the public transport. But in case of India measuring crowd density is of no use. Near field Communication (NFC) tags has been proposed to be used in this project. Public would carry NFC card with them. As soon as they enter into the bus they have to show the NFC card to the Conductor. The conductor will read the NFC tag by using his NFC Based Android cell phone. The cost would be automatically deducted according to the distance travelled.

III. MODULES

The project is basically divided into two main parts:-

1) *Server:*
   - Administration management
   - Employee management
   - Passenger management
   - Account renewal
2) *Android Application:*
   - Admin Login
   - Ticket booking
   - NFC Reading

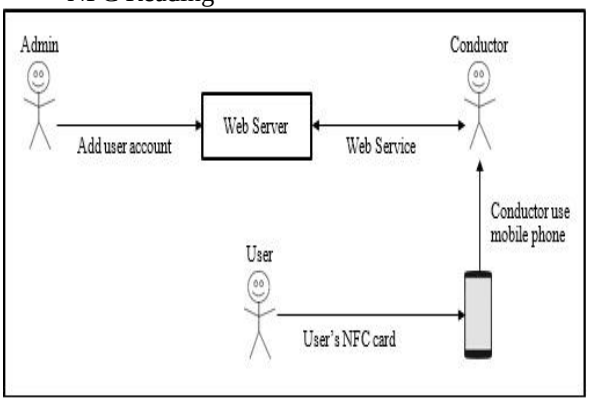

Fig. 1: Block Diagram of ETS using NFC Technology

A. How it Works?

As soon as the bus arrives at the bus stop, the passenger would board the bus and show the tag to the Conductor. The Conductor in the bus will read the NFC tag using android based NFC reader. NFC based card that will have a unique ID number. The card is rechargeable from certain electronic booths placed at certain locations of the city.

The reader will detect the tag and require certain information from the passenger. According to the route distance between departure & destination the cost would be deducted from the NFC tag. The cost can be deducted according to the distance travelled by the public transport vehicle. The reader will accept the card if the card has required credit to travel that distance. After the whole day, the individual bus reader will know how much credit has been transferred to the corresponding account and also the information can be found in the main database. Cross checking of all those information will allow better monitoring, transparency and thus reducing corruption.

B. Near Field Communication (NFC):

NFC is a technology based on short-range wireless connectivity that enables simple two-way interactions between electronic devices. NFC technology allows users to perform connectionless transactions, use digital content and connect to NFC-enabled devices with a single touch. Unlike Bluetooth and Wi-Fi, NFC makes it easy to setup of some longer-range wireless technologies. It is also consistent with the global contactless standards (ISO 14443 and/or ISO 18092). Contactless devices which are already developed can also interact with NFC enabled devices and their services. NFC compares in speed and range with other wireless technologies such as Wireless USB, Wi-Fi, WiMAX, GSM, ZigBee, Bluetooth, 3G that can be used in mobile phones.

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V. CONCLUSION

The system is completely automated so it reduces the human effort. The cards being reusable, they are much more convenient compared to the project based ticketing system. Even the bill printer helps to keep the record of the entire expense of the bus. Any unwanted events can be avoided as all the person carrying NFC tickets are monitored every time they travel.

VI. FUTURE SCOPE

Finally, as a future work, we want to extend this e-ticketing NFC system (for one provider giving one determined service) by analysing its performance in a scenario with multiple service providers giving the same service, evaluating delay differences between a central server (cloud, remote desktop) and an online scenario connecting all the databases of the service providers. This last scenario would use Atomic Broadcast in order to make atomic operations to the databases. Moreover, our intention is to continue improving the delay response times and also to include new security requirements such as transferability.

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