EasyGo Transit System
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Abstract:
The most widely used public transport system is the Metropolitan Train facility. However, this Train facility is not as smooth as the need of the hour, particularly in today's congested metropolitan cities. Standing in long queues at ticketing counters, quarrelling with Ticket Checker for trifle matters make the journey uncomfortable for the passengers. That is why; we have proposed an idea for implementing wireless mobile sensing for ticketing the passengers traveling in train. The wireless mobile sensing is mainly based on latest nRF technology. The nRF Hardware is attached at every station & in passenger's mobiles. Passenger's mobility is tracked completely with the help of nRF sensing, For this purpose, an interface is built between nRF and passengers’ mobile phone using a specifically developed Android app "EasyGo". The interface helps passenger to book ticket locally in station. The passenger’s mobile phone receives ticket ID from the server when passenger books ticket. Once user reaches the destination, User receives a popup stating to exit or continue the journey. If user wishes to continue the journey, then the ticket is updated deducting corresponding amount. If the journey is continued without ticket, then Auto SMS alert is made to the ticket checker.

Keywords: E-Ticket, Mobile Phone, nRF, Android app, Server

I. INTRODUCTION
Like most things in this universe, transit fare collection methods are still evolving. There are many forces that contribute to this evolution including the amount of the fare, the complexity of the underlying fare structure, available cost-effective technology, and resistance to employee theft, ease of audit, passenger convenience, throughput, inter-modality growth, and social pressures. These forces have driven the migration from cash to exact change only to tokens to magnetic stripe technology. The forces are still at work to continue the evolution to newer and better fare payment systems. The conventional system of public transport is based on paper based bus or railway tickets that ultimately lead to chaos among public. With the growing popularity of smart phone and nRF technology, the use of smart phone for public transport card is the future development tendency. The system based on smart phone can help people book their ticket easily where the smart phone can connect to the network. The service ability of urban public transport system can be improved by this system.

II. LITERATURE SURVEY
There were many works previously carried out related to the automated ticketing system using various methods and technologies. Some of them are enlisted here:

A. Smart Card Applications In Integrated Transit Fare, Parking Fee And Automated Toll Payment Systems The Maps Concept, Ronald F. Cunningham

The use of an electronic smart-card as an alternative means for users’ to access and pay for transport services are suggested in this paper. This method involves recharging the smart card and swipe & go in the stations. The major disadvantage using this method is that user may forget to recharge the smart card or it may get damaged overtime or stolen or even it can be faked [1].

B. Public Transport Recharge System Based On Smart Phone, HaoTian Feng, Ming Xu, YongMei Huang

The use of smart phone for public transport card recharge system is suggested in this paper to make it easier and convenient for people to go out and recharge anywhere. This system has two different realization methods, one for NFC smart phone and the other for non-NFC smart phone. People can recharge their public transport cards anytime using their smart phone where the phone can connect to the network. The major disadvantage is the NFC leaves the system open to attacks and the card can be faked and stolen easily [2].


The authors portray about the public transport ticketing system, prevailing in the megacity Dhaka (Bangladesh) which introduces severe malfunction in the system, malicious argument among public, corruption and most of all traffic-jam. The proposed system emphasizes on conductor-less driving using RFID which overcomes all the above defects. The RFID can be exploited easily and faked to cheat the system. Our proposal actually suggests a much more public friendly, automated system of ticketing as well as the credit transaction with the use of nRF and Android based ticketing system[3].

D. Surround Sense: Mobile Phone Localization via Ambience Fingerprinting, Martin Azizyan, Ionut Constandache, Komit Roy Choudhury

The authors argue that the increasing number of sensors on mobile phones presents new opportunities for logical localization. They postulate that ambient sound, light, and color in a place convey a photo-acoustic signature that can be
sensed by the phone’s camera and microphone. In-built accelerometers in some phones may also be useful in inferring broad classes of user-motion, often dictated by the nature of the place. By combining these optical, acoustic, and motion attributes, it may be feasible to construct an identifiable fingerprint for logical localization. They propose Surround Sense, a mobile phone based system that explores logical localization via ambience fingerprinting. This proposal gives effective results with 87% accuracy but its’ not economical and increases the cost of implementation [4].

E. FM-based Indoor Localization, Yin Chen, Dimitrios Lymberopoulos, Jie Liu, Bodhi Priyantha

The authors propose to use FM broadcast radio signals for robust indoor fingerprinting. Because of the lower frequency, FM signals are less susceptible to human presence, multipath and fading, they exhibit exceptional indoor penetration. They also propose to use additional signal quality indicators at the physical layer (i.e., SNR, multipath etc.) to augment the wireless signature, and show that localization accuracy can be further improved by more than 5%. This localization method increases the cost of implementation and may overlap with the existing FM broadcast signals [5]. After going through all these papers, we get the idea to propose a nRF and Android based Easy Go Transit System. The idea is to create a system capable of tracking passengers and identifying misbehaving commuters, paper-less ticketing system and easier and faster payment through an android app.

III. SYSTEM DESCRIPTION

This project combines nRF and Android technology to design an EasyGo Transit System as shown in Fig. 1. In this system, nRF, a microcontroller is used to track the passengers and to identify misbehaving passengers.

![Figure 1. The Fig. 2 represents the activity flow of EasyGo Transit System.](image1.png)

IV. MODULES

A. Android App Deployment

Mobile Client is an Android application which is created and installed in the Users’ Android Mobile Phone. So that we can perform the activities. The Application First Page Consist of the User Login Process. The application is created using inbuilt Classes in the Android. After coding, the app is generated as Android Platform Kit (APK) file. This APK file will be installed in the User’s Mobile Phone as an Application. Using this APK user will be registering with the server by providing mobile number & Email ID & Unique ID.

B. Ticket Server

The Server is deployed using tomcat application which is used to communicate with the Mobile Clients. The Server can communicate with their Mobile Clients by connecting to server network. The server manages the ticket transaction requests from the clients.

C. Ticket Booking And Transaction ID Generation

In this module we implement the android deployment to connect with ticket sever once the android user start its journey he/she has to open the application and to enter the source and destination. Once the ticket is booked by user that day, passkey is generated and amount is debited form the bank account.

D. Misbehavior Monitoring And Penalty

The nRF is attached at every station & in mobiles. User’s mobility is tracked completely. Once user reaches the destination, a Normal / Voice alert is provided. User can terminate the travel or continue the travel. If user is continuing the travel, then ticket is updated and amount is subtracted from the account. If the travel is continued without payment, then
double the times a charge is reduced. Auto SMS alert to the ticket checker in case of travel by a passenger without ticket.

V. FUTURE ENHANCEMENTS

In future, the project will be integrated with the Virtual Assistants such as Google Assistant, Siri, Alexa and many others to improve the efficiency and user friendliness of the application. Also, automated ticket booking based on users’ travel data analysis will also be implemented.

VI. CONCLUSION

The system is expected to be fully automated, reliable, transparent and convenient. The whole system can also be used in bus and other transit systems apart from railway ticketing system with small or no modification. The smartphone being portable and handy, they are much more convenient compared to the paper based ticketing system. The smartphone also can be used to be a universal travel pass that will allow any transportation on any route. Any unwanted events can be avoided as all the person carrying smartphones are monitored and tracked every time they travel. The travel plan can be modified at any time without any hassle. Also the possibilities of reducing chaos in the stoppage that we usually experience in Metro city are immense.

VII. REFERENCES


[2]. HaoTian Feng, Ming Xu & YongMei Huang, “Public Transport Recharge System Based On Smart Phone”, 2016 Sixth International Conference on Instrumentation & Measurement, Computer, Communication and Control.

