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Intelligent Electronic Toll Collection System on Highway (Android App)

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ABSTRACT

In few years, the number of vehicles is getting increased day by day due to this the amount of traffic in most of the roads are increased. There are some of the highway roads, where the people need to pay the toll tax. Most of the toll plazas are manually worked which is time consuming process and increases heavy traffic, fuel wastage and other issues. To automated this process, we propose a new Toll Collection Android App which uses to pay the toll tax using them mobiles and simply scan generated QR code on toll plaza. The proposed system provides fast result as compare to traditional systems. Thus, the vehicles won't have to stop at toll plaza to pay toll which would save the time and efforts and reduces long queues on toll plaza and traffic.

Keywords— Android Application, toll plaza, QR code, cashless transaction

1. INTRODUCTION

1.1 Objectives of Project

Toll collection systems plays an important role in the growth of infrastructure all over the India. It is a kind of the money that has to pay to the road authorities while processing from one place to another. This money turns into a kind of tax that is used in the construction of roads, flyovers and expressways. Toll facilities help to reduce congestion and improve mobility and provide an additional source of funding for local construction and maintenance projects.

Along with growing number of vehicles in major cities, the toll plaza is an option for smooth transportation. The increasing use of toll roads will be followed by the increase in highways infrastructure to support optimum service to users. In the late 90s toll plaza was controlled manually. Those systems require two people for opening and closing of the toll barrier and

another two are for collection of toll tax and also data keeping. Later on, in the year of 1995s the development of Express Highway Systems introduced semi-automatic toll plazas, in which data is the opportunity to reduce the traffic congestion in toll plaza during festive seasons. The manual toll collection system has number of drawbacks like illegal toll collection, it requires more man power, leads to vehicle congestion and high wastage of fuels due to long waiting time.

Online Toll Collection App is an android application developed to make easy payment of toll tax. This application helps people to make online pay their charges of toll while crossing toll plazas. This system makes the work easier at both sides toll users as well as collectors.

1.2 Aim

The aim of this system is allowed vehicles to pass through the toll plaza with minimum time and make the cashless transactions. And also reducing the man power which is working at toll plaza to collect the toll tax and make it user friendly and convenient use.

- We allow people to pay their toll taxes on mobile no need to stop on toll plaza to pay the toll tax.
- Cashless traffic and long queue on highways.
- Time Consuming.
- Reduces traffic and long queue on highways.
- Reduce man power working on toll plaza.
- Cut down the travelling time on highways.

2. LITERATURE SURVEY

2.1 Existing System

[1] "Automatic Toll Collection Using QR Code" This survey Kasturi Shah, Prajakta Joshi, Disha Garg examined the automatic toll collection using QR code. In this study, he focused on collecting toll according to a vehicle and provides a uniform toll collection system. The approach of automatically

4. METHODOLOGY

toll collection helps to avoid unnecessary delay in the collection of tolls and provide a safe, secure, effective strong system in the real-world transport system. For an effective and fast collection of tolls on the toll plaza, he developed a QR code-based toll collection system. QR code mounted on the vehicle used to read vehicle information with the help of QR code reader.

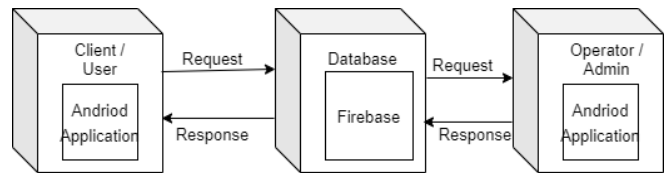


Fig. 4.1 System Architecture Diagram

[2] “Application Design of Toll Payment using QR code” In this study the Yudhi Kristanto, Bagus Priambodo examined the validity and reliability. The test application is the main process in the android platform. This will test the application to make transactions on the QR code interface and the results that come out will be recorded into the history menu automatically or not. In QR code interface, then we will fill the user data such as user ID, username and the credit balance amount. However, the data after the transaction occurred such as user ID, the location of toll gates, the amount to be paid and the date and time of the transaction.

[3] “A Survey on QR codes: in context of Research and Application” The author examined that it includes the basic understanding of QR code. It shows a comparison between one dimensional and two-dimensional barcodes. Also, it includes the various examples of usage of QR codes and all different techniques of diverse fields that have been proposed by using a QR code for the research is mentioned

[4] “Automatic Toll Collection Using QR Code” The authors declared the different types of methodology like QR Code Generation, QR Code Printing, QR Code Paste/Show, Recharge Money, Manage Vehicles, Check Deduction & QR Code based toll payment system, Revenue Analysis etc.

2.2 Propose System

The propose of this system is to develop and implement toll collection system on highways based on android application. The proposed system reduces the disadvantages of manual toll collection process. It is an android application which is user friendly to use and to pay toll tax.

In this project, there are two types of android application that is one for user and second for admin panel. The first application is toll user, in this application user need to register with own details and then select our journey from source to destination then app calculates token according to toll plaza in their journey. Then users can purchase this token by using online payment method. After purchasing tokens, QR codes generated for each token. This generated QR code can be scanned at toll plaza by admin or operator side second application and confirm the toll collection can received. After this toll collector open the barrier to pass the users through toll plaza.

Advantages of Proposed System:

- (a) Reduction in vehicle waiting times.
- (b) Cashless Transactions.
- (c) Reduces the man power.
- (d) Traffic Control and Security.

3. THECNOLOGIES

3.1 For Front-end

- Android
- Java Programming
- XML

3.2 For Back-end

- Firebase

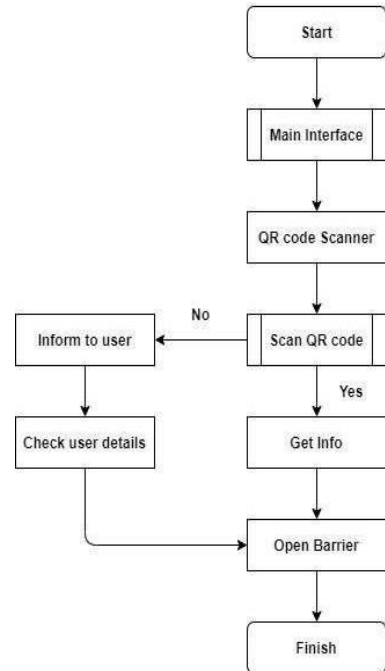


Fig. 4.2 User Flow Diagram

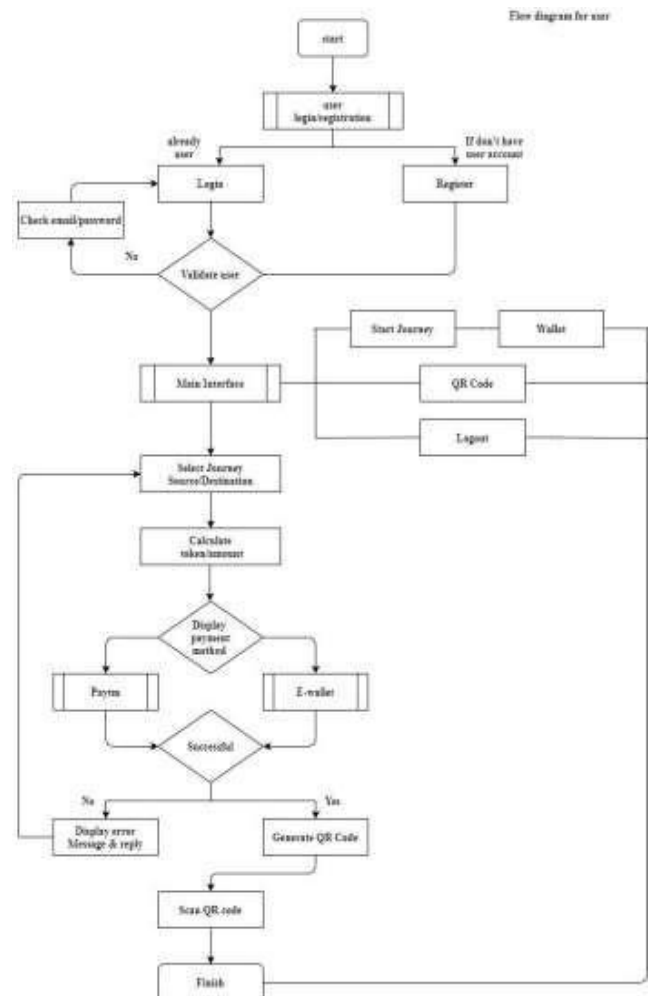


Fig. 4.3 User Flow Diagram

5. IMPLMENTATIONS

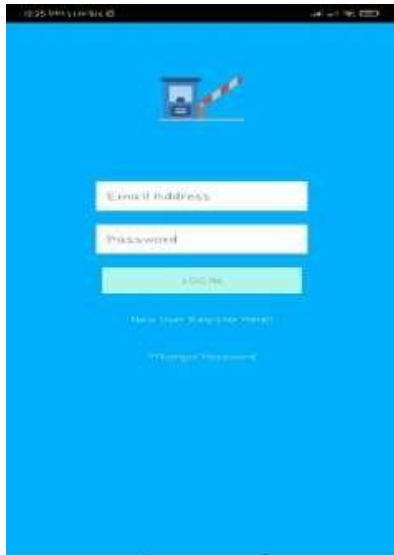


Fig. 5.1 client login page



Fig. 5.2 client registration page



Fig. 5.3 Client Dashboard



Fig. 5.4 Token Payment Mode



Fig.5.5 Token payment using card page



Fig. 5.6 QR code generation page



Fig. 5.7 server login page



Fig. 5.10 QR code scanner page



Fig. 5.8 server registration page



Fig. 5.11 QR code info after scanned page



Fig. 5.9 Server dashboard page



Fig. 5.12 open barrier after token used page

3. CONCLUSION

By making this application for toll collection we have the best solution over money loss at toll plaza by reducing man power required for toll collection on toll plaza and also can reduce the traffic and long queue of vehicles on toll plazas indirectly resulting in reduction of time at toll plaza. This system makes the work easier at both sides and to pay the amount in very efficient way. Wastage of time and fuel because of the large traffic jams has been solved by implementing this android application which is user friendly to use and make payment.

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