AUTOMATED TOLL TAX COLLECTION SYSTEM USING NFC (ATTCS)

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INTRODUCTION:

The modernization of transport has become one of the essential signs for the urban modernization level, the increase in the number of cars leads to serious problems concerning transport system. Electronic Toll Collection facilities offer travellers the ability to pay toll electronically. The electronic toll collection using NFC & android application is a technology that will allow user to make the payment of highway tolls automatically. This system also allows authorities to keep track of blacklisted vehicles that pass through tolls. This terminology will in turn save the time as well as the money by decreasing the waiting time as well as the queues of vehicles at the tollbooth.

The NFC tag will be having a unique identification number (UIN) provided by the toll authority and customer’s details. The active NFC tag is used in the tollbooth. Whenever the vehicle passes through the tollbooth, the NFC tag data will be read by NFC reader & same will be sent to the server for verification. Server will check tag details & depending upon the type of the vehicle, the toll amount will be deducted from the user’s account. The notification about the toll amount deduction will be sent to the customer via SMS. The developed android application will be used to recharge the customer’s account and keep track of accounts transactions.

OBJECTIVES:

This system used to reduce the manual presence near toll gate as well as the time required to pay toll and avoids the scope of presenting fake documents at the time of document verification. A vehicle owner need not carry any documents with him often; instead use a NFC tag which consists of a unique id that specifies the RC details, insurance validity, emission status etc. This information is stored in registration data base and as per the registration their vehicle details also will be stored in a separate data base named vehicle registration.

On the completion of all necessary details, an account will be created for that user or vehicle owner to recharge and make necessary transaction of toll tax. When working with this system initially all the vehicle documents will be verified and then required amount of toll tax will be deducted from his/her account. And if there is any violation reported against the vehicle then authorities will be notified. This helps the police to keep track of blacklisted vehicles.
METHODOLOGY:

The architecture diagram of the system is shown above. An android device with NFC facility can be used as NFC reader that can be used to scan tags of vehicles reaching the toll booth. The device reads and sends the tag id then it will be send to the server, it retrieves all the information related to the vehicle including the amount available. The toll tax according to type of vehicle is reduced from the user’s account. If the vehicle is blacklisted by any authority they will be notified about the arrival of vehicle at the toll booth.

User registration, adding vehicle details, etc. are done using website developed. The website is developed used visual studio 2010 IDE using C# and ASP.NET. MySQL is used as the backend.

The android application is created using Eclipse IDE and android development tools. Eclipse contains a base workspace and an extensible plug-in system for customizing the environment.

RESULTS AND CONCLUSION:

The Automated Toll Tax Collection System provides a better way to carry out operations of a toll booth very effectively and efficiently. The users do not have to spend a long time in queues for payment of toll tax. Through the system it enables user to pay toll tax from his previously created account within seconds after reaching the toll booth. The user gets notification on transactions done in his account through SMS and email. Users need not carry documents related to their vehicle like Registration certificate, Emission certificates, etc. The system allows Police officers to get notifications about blacklisted vehicles when they pass through tolls.
Fig 1: Adding users

Fig 2: Vehicle verification
Fig 3: Rate management

Fig 4: Transaction summary (Android application)
**SCOPE FOR FUTURE WORK:**

As a future work, we focus on making the system completely automatic than the present semi-automatic approach thus avoiding the presence of man power at tollbooths completely by implementing automatic scanning of tags and providing more security options in the toll booths.