TOLLFREE-An Smart APP For Tollgate Payment and Management System Using Barcode and NFC Payment

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ABSTRACT: There are 21 tollgates in Tamilnadu which was controlled National Highway Authority of India. But all of them are in still man based collection system its not fully automated which cause more traffic queue and time delay so to avoid some traffic they introduced smart card system but the payment method is not fully satisfied for the consumer. In our paper we introduced a TOLLFREE app concept of easy payment methods using barcode and NFC which reduce traffic and time delay. It is helpful for travelers who use Smartphone where they can pay the tollgate bills just on the go by this app. The full transaction details are maintained by the government by their toll database which contain all the user bank details. This paper also contain some safety and security systems to avoid safety threads.By this App, government can monitor vehicles easily , make all the tollgates fully automated and avoid illegal gate entry.This paper ensures a fully automated and Secured way of transaction for the toll payment

KEYWORDS:Tollfree app,NFC,Barcode,toll database, bank transaction ,Fully Automated.

INTRODUCTION:

The Tollfree app is android and ios based one which is used for the payment of toll billings easily.To implement this ,System,A separate passway or gate is allotted near tollgate which is called SmartToll .In that smart toll a barcode and NFC sensor will be available the user should login to the app show the account barcode or NFC the sensor scan it deducts the account in toll database debit the money from user account and send the bill to the account through the app.For non-smartuser the normal system will be available.For more than 60% of people in Tamilnadu or India are semi-smart phone user who can access smartphone.It can reduce the waiting time of 50% maximum.And this project can be undertaken by the highway authority to ensure a modern technology travel for the travelers and for highway security.

RELATED WORK:

There are many recent works in this tollgate concept but still now the automation is a compatible task for the government in implementing it .These are the advancement made so far in the tollgate system.

1.Radio Frequency Identification System:

The tollgate system using RFID technology enables the electronic collection toll payment .This system is capable of determining if the car is registered or not and then informing the authorities of toll payment violation,debits etc.RFID is an ageneric term used to identify technologies utilizing radio waves automatically identify people or object.RFID recognizes the vehicle by their vehicle RFIDtag number and provide the details about the owner and the vehicle by searching in their library system.It is only for detection and providing details and not for security or payment modes.

FIG 1.1 RFID system in tollgate automation

2.SMART CARD SYSTEM:

In this system ,the government launches an smartcard for tollusers its almost like an recharge card.The user can recharge the card as some amount and while he crosses through the tollgate he just swipe it where the balance will be reduced according to the fee.But it has drawback that this card is

valid for certain tollgates and the recharge of this card is an tedious one .Somehow for shortrange and frequent travelers its an good one what about the rest.

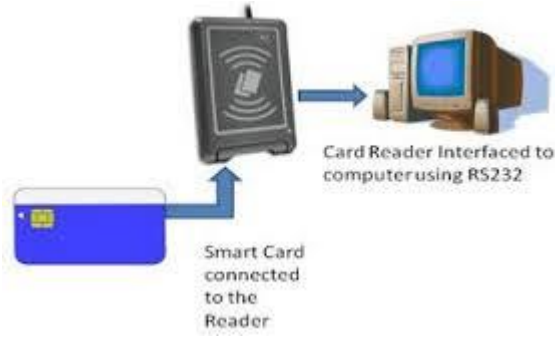

FIG 2.1 Smart card Tollgate system

3.Intelligent Microcontoller system:

In this system we use ARM based LPC2148,PIC18F452,RF434 ,Zigbee and GSM.In this system three subsystem are present those are central database system ,tollgate unit and vehicle unit .The RF34 sends the necessary vehicle identification information to tollgate unit based on user request .GSM send the vehicle starting intimation to user and also receive the necessary command from the user to stop the vehicle.Keypad is used for authentication password to access to start the vehicle .When a vehicle comes in the vicinity of the tollgate the tag attached to the vehicle communicates with the toll gate station and the information tag is sent to central database station using zigbee wireless communication protocol .At the other side the central database system receives this information and compare the database for sufficient details and the amount details .If all the details are clear the gate will be opened otherwise the gate closes automatically.

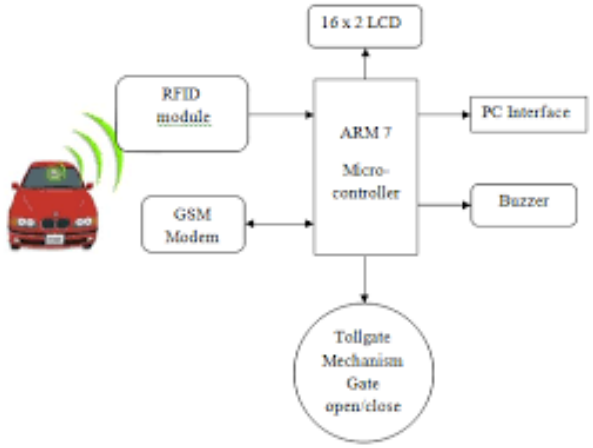

FIG 3.1 ARM controller tollgate system in automation

PROPOSING SYSTEM:

In advancement of these concept and satisfying the demerits we proposed a app which make all of the same function and also much more of it.It works on all smartphone devices and additional features also make a best of it.This paper describes about the toll management system of bringing the tolls into an traffic free one ,So we named the app as “TOLLFREE”.

4.FUNCTION OF TOLLFREE:

- SIGN IN OR SIGN UP
- BARCODE GENERATION
- HOME MENU
- PAYMENT PORTALS
- STORING TOLL BILLS
- TRACKING TOLL PATH

The app starts by displaying its name and ask the user to direct into sign in or sign up page.

4.1.SIGN IN or SIGN UP:

If the user is new he /she should sign up for using this app otherwise he/she can login by providing the login details.

FIG 4.1.Tollfree app intro and sign in and sign up menu

4.2.SIGN UP :

In sign up page the user need to provide the name,user name,password,phone number ,email, license details,address etc.Then the user should accept the terms and condition of this app and Click create an account.An conformation mail or OTP will be send to the user for confirmation of account.After the conformation ,a unique barcode and user no will be generated for that account these all stored in the account details of the user .All the account details of this app are encrypted and stored in a secured database since all the details are private. After the sign up procedure the user sign in using username or email-id and password .The Home screen of the app gets open.

4.3.TOLLFREE MENU:

In this app menu it contains user details with the barcode for scanning process,NFC payment ,bill deails,toll path tracker etc.The user will choose according to his wish.

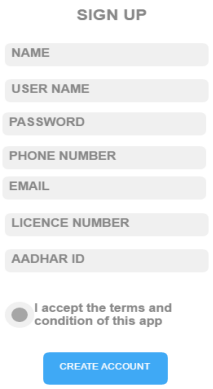

FIG 4.3.SIGN UP PAGE

5.WORKING OF TOLLFREE APP:

.The initial thing is to be done is the government should create a toll database which consists of all the user details and their bank details for the respective user license .When the account is created by the license an barcode for the user will be generated and stored in the app database and toll database. The toll database is regularly maintained by the government authority to monitor the user and app activities. Thus all the user filling detail process will be completed and now they are ready to use the TOLLFREE.

The main target of this app is to user should pay the toll charge easily without any delay and to store the history of payment details ,so that he/she can aware of what the amount they are paying and where they are paying.The government can track all the tollfree user instantly and establish productive support for the user for a safe journey.

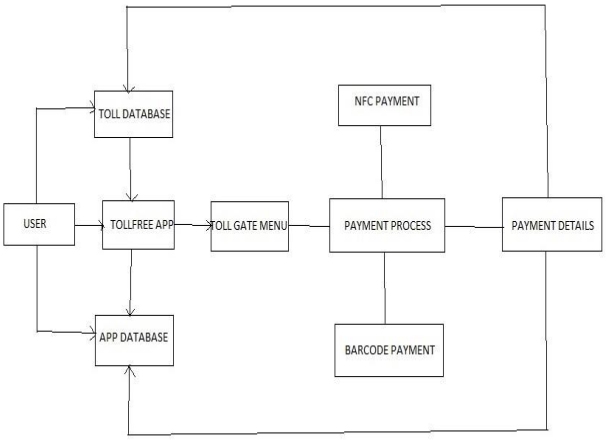

FIG 5.WORKING OF TOLLFREE APP

PAYMENT METHODS :

The major part of the App is the payment ,Because the payment of toll fee going to play the major role in automation and time delay.To avoid this ,we have made an efficient payment system which brings time efficiency and automation.We introduce two types of payment system in this paper which are going to be discussed.

5.1.PAYMENT PROCEDURE:

Before going to the payment process,the user should provide their bank details to the toll database via government e-portals and also to the app just for verification details for both NFC and barcode .The app sync both the details whether it matches the payment connection will be established.

FIG 5.1.PAYMENT DETAILS

SMART PAYMENT:

Smart payment involves two type of payment Barcode payment and NFC payment .Now we discuss about Barcode payment.

5.2.BARCODE PAYMENT:

The major way of payment in this app is barcode payment .During the registration of user a Unique barcode will generated for the user.The barcode also act as object between toll database (where the user provide the bank rights) and app database.The first step the user should sign in to the account.The menu screen opens then select payment ,select barcode or NFC .The barcode will be scanned by the toll sensor and it get into the toll database of the user and the toll fee will be deducted from the bank account .The transaction details will updated in toll database as well as app database .The barcode method can be done both online and offline so the user no need of worrying about the internet ,when he connected to the internet the information get updated .And also the vehicle register number will scanned by the camera and during the payment the number also will be listed in the billing page.The user can also track the toll path of what he had travelled and also the payment history for budget analysis.

FIG 5.2. Barcode payment method

5.3.NFC PAYMENT:

It was one of the most advance technology of payment method .The credit or debit card is electronically mounted in the smartphone and using NFC and NFC sensor the user can pay money using the smartphone .In our app we consist of all codes for NFC payment,If the user is available with NFC he/she can use the NFC payment in this app.The NFC sensor transact the amount from user bank balance to the toll balance when the nfc details of the user is scanned .And the transact details will be updated both in Toll and app database.Thus we also use the modern technology to make a app a better one.

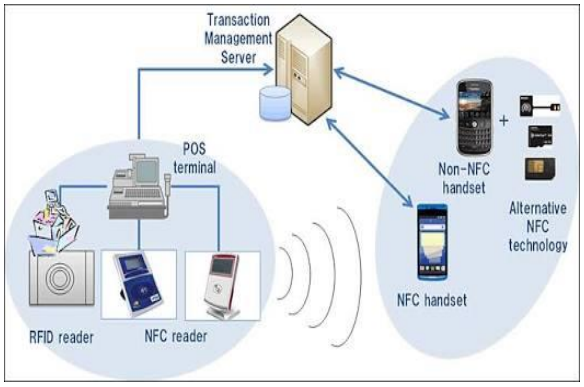

FIG 5.3 .NFC PAYMENT METHOD FOR TOLLFREE

CONCLUSION:

Toll gates are becoming more and more traffic nowadays and the reason is slow payment method and manbased collection system .Many ideas came upon to make toll gate automated but nothing reached the best result so far and all the concepts are not compatible budget.So we tried our level best of making these concept with concern and developed this TOLLFREE app which is a smart technology of paying toll bills easily

and provide full automation ,security and some additional features for the app user for their travel.

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