

Smart Fine Collection System by Introducing Enhanced Driving License using NFC and GPS

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Abstract

This paper is based on software application for mobile devices which is used to automate the Fine Collection System. The drivers will be issued with new multi-application driving licenses based on contactless smart cards. The new licenses will be introduced by RTO, the police department, which will use electronic driving license technology. The driving licenses include storage area. This space will be used to store driving license data which will be read by NFC phone so that it can be verified by police officers in cases involving suspected fraud or other criminality. The proposed system will also consist of a GPS tracking system in which the traffic police can enter the number plate and track down a criminal. The tracking device will be installed in the cars which will be sending data to the server and this data will be sent to the police tracking him. This system will be accurate and keep the records of all the criminal activity of an individual.

Keywords: Android, Electronic Mail, Global Positioning System, Location Tracking, Near Field Communication

I. INTRODUCTION

The need for manual fine collection system is completely reduced in this method and this system works through NFC. A complete NFC system consists of a transponder (tag), reader/writer and computer host[1]. The transponder, better known as the tag. The microchip contains memory to store a unique data and to receive and send data back to the reader. These tags are powered by the electromagnetic signal received from a reader. Development in technology bring digital world to be border-less. The e-mail service will be used which is helpful to send e-mail to a targeted user. We will be using this service in order to send a message to the user who has committed any crime to inform him about the amount and the place where he needs to pay the amount. This particular device works using radio frequency. In the year of 2011, Google was integrating this device into a Android-based cell phone, which made transactions using virtual money gradually developed.

The NFC tag is used as a unique identity for account of a particular user. When a vehicle driver caught by a traffic police, its driver is prompted to scan his NFC tag (license). If the identity (serial number of the tag) is matched with the one already stored in the system, the historical records of that driver get fetch on a mobile phone. If the ID is matched by the microcontroller, the user is sent a mail to his e-mail id about the amount of fine to be paid and user gets to drive through the area. Traffic police can also place a new complaint about that driver. After this, the vehicle gets immediate access to drive through. This NFC based system also has some additional features. There can be incidents when a user tries to run away and avoid the fine so to overcome this problem we will be using GPS technology. In this system whenever a user tries to run away the police needs to note down the number of number plate and select an option of GPS tracker and enter the number. Then the GPS tracks down the user and helps police reach the place where he currently is traveling to and catch the offender and take appropriate actions. With the help of this system the chances of an user breaking the rule and being not punished is reduced.

II. LITERATURE SURVEY

Based on report and investigation on existing system, this system has additional feature than previous one.

In existing system everything is done using pen and paper. Flaws in this is wastage of paper, loss of records. Solution to this is provided in the proposed system by using NFC and Database which would help to records and prevent the loss of data[1][3]. Flaws: no proper System to catch the offender. Solution to overcome this issue we are using the GPS technology which would help us catch the offender if he tries to run away[2][5]. In Current system Corruption and bribing is going on large scale. Flaws: The actual amount of Money does not reach the office, affects in the development in RTO system. The Solution to this issue is

that we are using the email service in which we will send a mail and the user has to pay the amount in court due to this there will be reduction in corruption. In existing system now days any person can wear the traffic police uniform. Flaws: Take Money, Take undue Advantage, the user can't make out if he is a genuine police officer or not. By using the proposed system only the ones who are genuine police officer's would be able to login into the system and take the necessary action.

III. EXISTING SYSTEM

The current system that is used for the fine collection system has many flaws and loop holes in it. There is a need to overcome this loop holes in the existing system. The existing system makes the use of pen and paper that is the challans that are given to the offender on breaking the traffic rules. It is very difficult for the department to keep the track record of each and every individual and the amount of offences committed. As the system consist of paper work the papers mostly gets lost or damaged or tempered. Due to this it is hard time for RTO office to maintain proper records. During patrolling if an offender commits a crime and is caught it is difficult to find out if the license is fake or real and in the same manner it is difficult for the common people to find out if the officer who is pretending to be an official authority or a fake one. There are many cases where the user runs away after being caught and the police persons can't take the appropriate action on the offender. Even there are many cases where the vehicles possess fake number plate and the police officers can't recognize it. So to overcome this loophole in the existing system we have proposed a new system to help us solve the issues.

IV. SYSTEM ARCHITECTURE OF PROPOSED SYSTEM

Proposed system is divided into three main modules. The first module is admin and second one is user and third one is traffic police. The architecture of proposed system is shown in following Fig 1.1

A. Database

Database use for storing driving license details, complaint register against the driver if any, police officer details.

B. Police Android APP (Traffic Official's)

It is app use for registering the complaint against the driver or for viewing the details of driver in case of problem or violence of the rules. With the help of this app traffic police can also track the violators. The police can also lodge a complaint using the app.

C. Driver NFC License (Card Holder's)

It is driving License issued by RTO officials to driver or person who wants the License. License will be NFC embedded.

D. RTO (Web Application) (Admin)

RTO (Admin) is the authorized person which gives the license to other person. Admin is an important person which do's the validation of document. The admin can add new users and new traffic police and can also manage the users and traffic police data.

E. GPS

The Global Positioning System (GPS) is the latest advanced technology used to track the current information regarding location of any system [2].

GPS satellites transmit at least 2 low-power radio signals. The signals travel by line of sight, meaning they will pass through clouds, glass and plastic but will not go through most solid objects, such as buildings and mountains. However, modern receivers are more sensitive and can usually track through houses.

A GPS signal contains 3 different types of information:

Pseudorandom code is an I.D. code that identifies which satellite is transmitting information. You can see which satellites you are getting signals from on your device's satellite page.

Ephemeris data is needed to determine a satellite's position and gives important information about the health of a satellite, current date and time.

Almanac data tells the GPS receiver where each GPS satellite should be at any time throughout the day and shows the orbital information for that satellite and every other satellite in the system.[9] Technological development in an exponential manner have paved a way to access hardware directly by customized application interface such as GPS, web service, programming cameras were elucidated[4]

The GPS system will be installed in the car of the drivers and will send the position of car to the server at regular interval. When a person breaks rule and tries to run away the police can track it using GPS.

F. NFC

Near Field Communication is a short distance wireless technology, which comes embedded in some smartphones that allows the user to exchange information with a smart card or other NFC device at 13.56 MHz[3][8]. The usage of NFC can be done through

3 major ways: card emulation, reader mode, peer to peer (P2P) mode. The function of NFC introduced by Google into Android 2.3 (API level 9) device. In Android 2.3, the ability of device is limited in only reading the tag. In Android 2.3 data writing and trading ability through mode Peer to Peer (P2P) began to be implemented within android devices. The nfc android package provides access to NFC function, allows application to read NDEF message (NFC Data Exchange Format) which located at NFC tag[8][10]. A smart card is a card that contains a passive NFC chip that can be read by an active NFC device which is called the reader[1][7]. The communication range of NFC is typically less than 10 cm. The NFC has three operating modes: peer-to-peer (P2P), card emulation mode and reader writer mode[3].

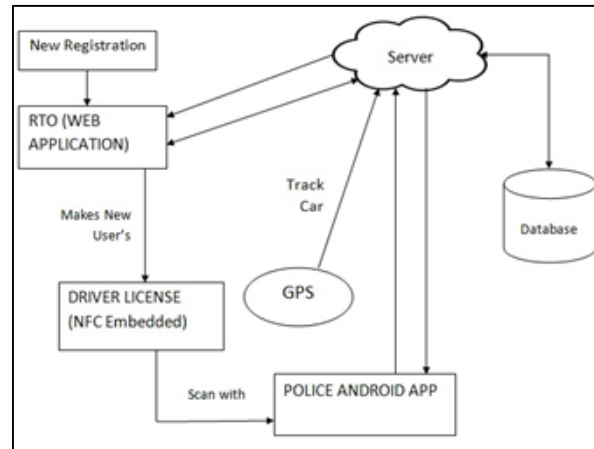


Fig. 1: System Architecture

V. PROPOSED SYSTEM

Automated Fine Collection System is basically a digital system to overcome the manual task. This kind of system has been existed in Countries like France, Norway and Spain to reduce the manual work and process the Fine Collection system with ease. Many modern smart phones and tablets have an integrated scanner that can read NFC chips[1][8]. All one needs to do for driver's license is, attaching a single low-cost NFC chip to the license. The NFC chip stores a unique combination of numbers. This ID is read by the smartphone with the underlying NFC technology that uniquely associates with the driver's master data in the web database. They just need to hold their driver's license up to their smartphones. The phone scans the chip and reads the unique id from the chip that fetches driver's data[6]. The GPS is a small device that can be easily fitted in a car[2]. GPS device is designed to send and receive the information about the current position of any object. The GPS sends the data to the servers about the information of its location this data can be read and stored and the object can be traced[4][9]. With the help of this technology we can even track down users who are trying to run away. The data connection can be either through a mobile data connection or via a local wireless network. We are basically introducing a new system for RTO using Android app which includes Near Field Communication and global positioning system. The global positioning system which will be used to track drivers.

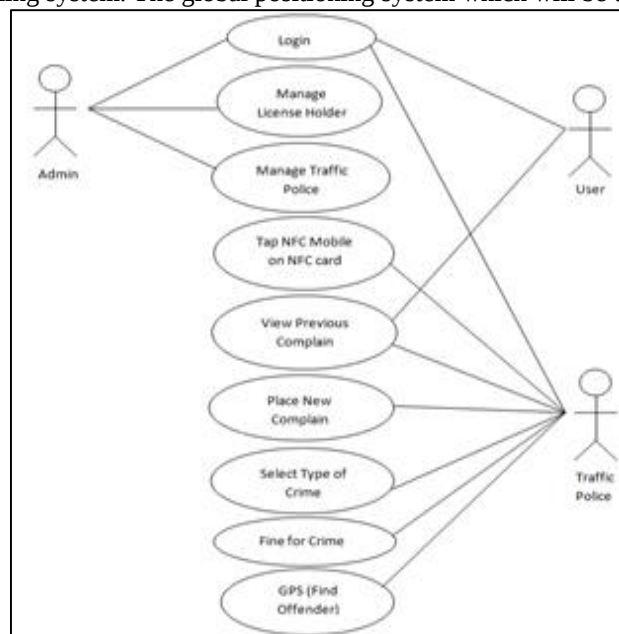


Fig. 2: Proposed system work flow

A. Characteristics of each Module

1) Admin Module

- Admin can login into the application.
- Admin can add new traffic police details who are newly appointed.
- Admin check the documents and if those documents are legal then he will make a new user account into the application and provide a new license to the user.
- After creating a new user account user will get the username and password by SMS.

2) Traffic Police Module

- Traffic police login to the android application.
- If any user caught by traffic police then police will get the driving license and tap using android phone.
- After tapping, police can view the previous records, can place a new complaint.
- After placing a new complaint the fine amount will be sent to the user on its mobile phone via SMS which he needs to pay in the court.
- Traffic police can also track down the person who has violated the rules using the GPS tracking system embedded inside the car by just noting down the car number plate and entering into his GPS app.

3) User Module

- User can login into the system using username and password.
- User can view the complaints which are placed against him.
- User can also view various rules and regulations and monitor the new changes made in the rules.

VI. CONCLUSION

In this we are using NFC technology which is the new growing technology. The smart phones are now enable with NFC using this we are develop the system for the RTO officers making the work of RTO digital and automatic .It will reduce the manuals work and make the easy and fast implementation of the process. In this paper we have put the idea of automating the current scenario in Fine Collection system which will help us in billing and lodging complaints and bring more transparency and make work easier. This is an effort to automate the current system in Fine Collection System and hoping for future developments in the Fine Collection system.

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