

AUTOMATIC SINGLE PAYMENT GATEWAY USING ANPR TECHNIQUE

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Abstract— Computer and information technology has a major influence on the society and the society is becoming more and more dependent on technology. The main objective behind development of “Automatic single payment gateway using ANPR technique” is to make the vehicle payment methods complete automatic and simplified. The purpose of this project is making a single payment gateway for parking fee, fuel stations, toll collection according to vehicles and builds the real time application which recognizes vehicles licenses number plate at entry gate. Automatic fee collection is considered as one of the intelligent transport systems. It is aimed at making vehicle taxation more efficient, reliable, and safe and environment friendly. For the identification of the vehicles, the information of the vehicles is already stored on the central database. So captured number and information will be sent to the nearby police station for theft detection.

Keywords— ANPR Technique; Intelligent Transport System; Single payment gateway; Theft detection.

I. INTRODUCTION

Automatic Number Plate Recognition (ANPR) is a system capable of recognising number plates from closed circuit television (CCTV) images for various different uses. A sophisticated software optical character recognition (OCR) engine and algorithm converts camera images, via specialist video capture, into identifiable data. This allows the capture of critical information such as the registration of every vehicle entering a site. The above mentioned technique can be used to simplify payment methods for parking, fuel stations and tollgate. This system recognizes vehicles licenses number plate and deducts the required amount from the respective account. It is aimed at making vehicle payments more efficient, reliable, and safe and removes unnecessary traffic delays; keep an eye on any car that might not be correctly registered and informs corresponding authorities. Existing system of manned toll gate, fuel stations or parking systems, where everything is done manually from filling the fuel to collecting the money requires workforce of man power and is time consuming. The method of automatic number plate recognition system can be used to make the automatic single channel payment for parking, fuel stations, toll gate etc. This system uses Automatic Number Plate Recognition System to read the vehicle’s registration plate which is associated with a prepaid account which acts as a mode of payment for parking, fuel station, toll gates etc.

II. LITERATURE SURVEY

In United States Of America, Mobile ANPR use is widespread among US law enforcement agencies at the city, county, state and federal level. ANPR is becoming a significant component of municipal predictive policing strategies and intelligence gathering, as well as for recovery of stolen vehicles, identification of wanted felons, and revenue collection from individuals who are delinquent on city or state taxes or fines.

The United Kingdom has an extensive (ANPR) automatic number plate recognition network. Effectively, the police and security services track all car movements around the country and are able to track any car in close to real time. Vehicle movements are stored for 2 years in the National ANPR Data Center to be analyzed for intelligence and to be used as evidence. In 1997 a system of one hundred ANPR cameras, codenamed GLUTTON, was installed to feed into the automated British Military Intelligence Systems in Northern Ireland. Further cameras were also installed on the British mainland, including unspecified ports on the east and west coasts. In Germany, the Federal Constitutional Court of Germany ruled that some areas of the laws permitting the use of automated number plate recognition systems in Germany violated the right to privacy. More specifically, the court found that the retention of any sort of information (i.e., number plate data) which was not for any pre-destined use (e.g., for use tracking suspected terrorists or for enforcement of speeding laws) was in violation of German law.

In Australia, Several State Police Forces, and the Department of Justice (Victoria) use both fixed and mobile ANPR systems. The New South Wales Police Force Highway Patrol were the first to trial and use a fixed ANPR camera system in Australia in 2005. In 2009 they began a roll-out of a mobile ANPR system (known officially as MANPR) with three infrared cameras fitted to its Highway Patrol fleet. The system identifies unregistered and stolen vehicles as well as disqualified or suspended drivers as well as other 'persons of interest' such as persons having outstanding warrants.

III. LIMITATIONS OF EXISTING SYSTEM

- Spot pay and park by manually entering vehicle numbers and manually collecting money in vehicle parking system, fuel stations and tollgates.
- In India, this complete automated ANPR system has not been implemented for tollgates, fuel stations and parking
- Current system uses local database for maintaining information where no two systems are internally connected.
- The existing automated tollgate system which is being used in many countries does not use GSM service to convey deduction and recharge details and also is not secured by using 4-digit pin.

IV. PROBLEM FORMULATION

Existing system of manned toll gate, fuel stations or parking systems, where everything is done manually from filling the fuel to collecting the money requires workforce of man power and is time consuming. The method of automatic number plate recognition system can be used to make the automatic single channel payment for parking, fuel stations, toll gate etc.

V. DESIGN MODULES

A. Automatic Number Plate Recognition Module

Automatic number plate recognition (ANPR) is a mass surveillance method that uses optical character recognition on images to read vehicle registration plates. They can use existing closed-circuit television or road-rule enforcement cameras, or ones specifically designed for the task. They are used by various police forces and as a method of electronic toll collection on pay-per-use roads and cataloguing the movements of traffic or individuals. ANPR can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of the day. ANPR technology tends to be region-specific, owing to plate variation from place to place.

B. User Front-End Module

In this module, we would be creating a HTML page where the access will be given to the users to register his/her account, they need to select a 4-digit pin, enter the vehicle information. Once the user is registered in his next visit he has option to recharge or modify the account is provided. Any updated information will be updated to central database.

C. Central Database Module

Central database is the complete data storage system for entire network where all the updated information from each and every system connected to that server will get updated. This also consists of the data given by police to detect the theft vehicles in order to find the traffic rules violators.

D. Micro-Controller Module

For security purpose we are including a 4-digit password option for our users to guarantee more secured and authenticated system. A microcontroller atmega-32 is programmed with alcd display. This entire module is connected to central server which matches the pin entered by user with the pin in the database and give authentication to the user.

E. GSM Module

GSM Module is used to convey the recharge and deduction details to the user to ensure that the user is updated with his account details and balance. The user will be prompted to enter his/her phone number during the creation of account this number will be stored in th database, thus any information that shoud be conveyed to user will be sent as a text message to his mobile, the user also has the option to change this phone number in the update account option.

VI.HARDWARE AND SOFTWARE REQUIRMENTS

A. Hardware requirements:

Intel P3 1Ghz or higher CPU, USB Port
RAM: 512MB
External Camera (Webcam)
Hard disk: 50GB
Pin Pad
Atmega32 Microcontroller
LCD Display

B. Software requirements:

Operating Systems: Windows XP/7.
Softwares : Microsoft Visual Studio, SQL Server Management Studio.
Programming Languages: .NET Framework, SQL.

VII. DESIGN AND DEVELOPMENT DIAGRAM

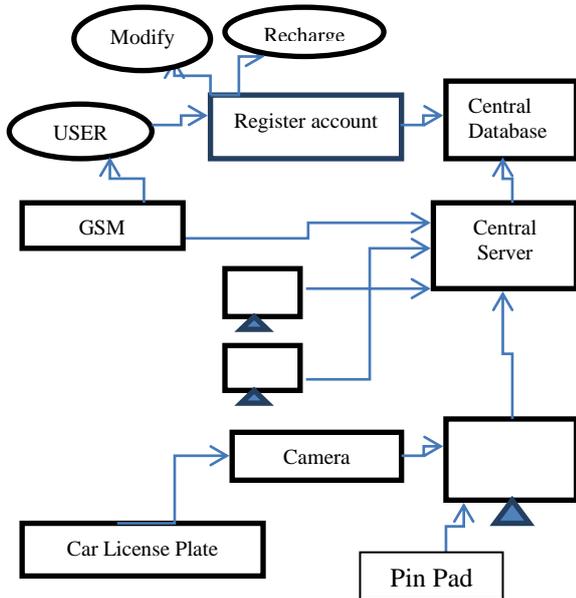


Fig 1 . Design Diagram

VIII. DATA FLOW DIAGRAM

1) ADMIN

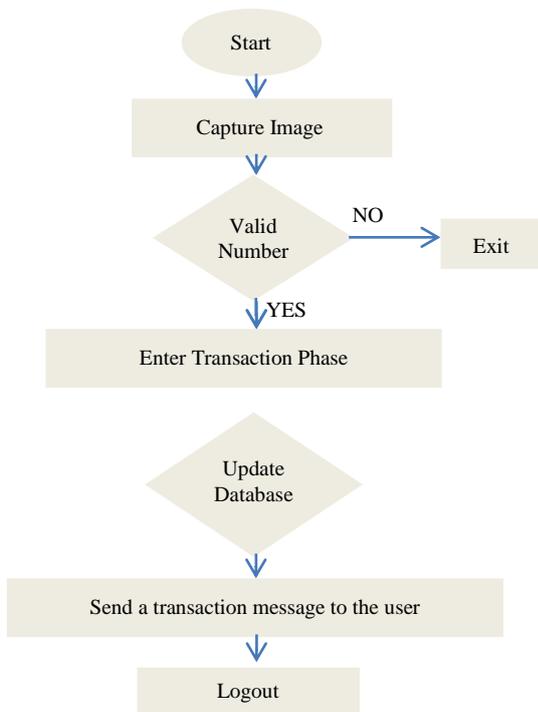


Fig 2 .Data Flow Diagram For Admin

2) USER

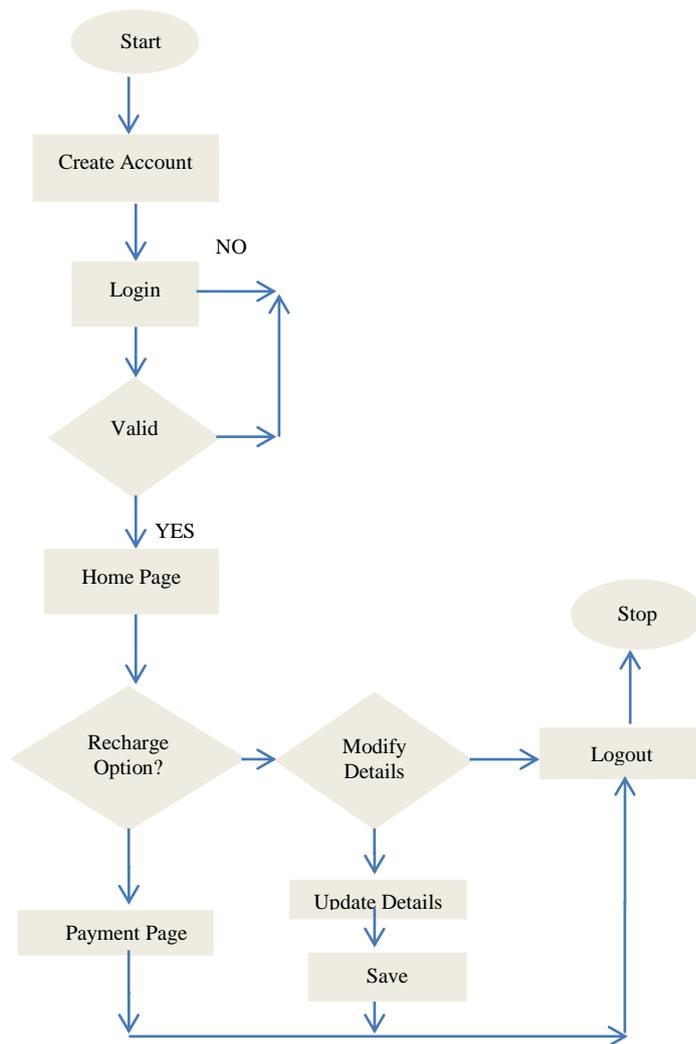


Fig 3 . Data Flow Diagram For User

The working of admin phase starts from capturing the number plate and validating it, after the completion of validation phase the further transaction happens and will be updated in the main database, the gsm module triggered by the admin sends a message to the user updating about the transaction happened.

The working of user phase starts from creating a account using our webpage and logging in to their home page to access different options like recharging account, modify the pre-entered data.

IX. APPLICATIONS

- Reduces human effort, as the full system is automated there is no much man power needed such as for collecting the money giving the change, giving the receipt etc.
- Reduces time , as the users of our system need not have to wait in the queue for filling the fuel ,parking or toll booth because automatically system recognize the vehicle and the job is done.

- Theft detection, if the vehicle is been lost, in case if that vehicle arrives in any one of the system we can detect the vehicle and inform the police through our GSM service.
- It is fully automatic, since there is no need of much man power, user can easily use the system by himself and do his require job such as filling the fuel, at parking, at toll booth.

X.CONCLUSION

The proposed system using Automatic number plate recognition is used by various police forces and as a method of electronic toll collection on pay-per-use roads and cataloguing the movements of traffic or individuals.

ANPR can be used to store photograph of the driver for theft detection.

This system can be used in car park management reducing the existing complexity, can be used as a payment mode in fuel station to make it simpler and payment process fast and efficient, tollbooths can be made complete automatic thus reducing the traffic and travelling time. Cops can use this system to catch the traffic violators.

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