Automated tollgate System Using Online Payment And Image Processing

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Abstract - *In our daily life, travellers pay an amount of money in the form of tax through tollgate to the government. The national highways have toll gates where people pay tax for using the highways by standing in the queues. This will cause in the break of journey and waste of time. To overcome the waiting problem this system was proposed where automatic toll tax will be collected from the people using image processing and online payment of the money. In image processing system the image of the number plate will be captured and compared with the database. To capture the image of the vehicle number plate the camera will be fixed at tollgate. And in the online payment tax will be given where money deduction will take place only if the user get registered. This makes tollgate transaction more convenient for the public use.*

Key Words: Image processing, Camera, Online payment.

1.INTRODUCTION

India is a country where we get to observe most extensive National highways. Government plans various phases to complete the projects under construction. The government signs agreement with the private companies who build the infrastructure like road, port and other stuff for a particular span of time generally in years. The invested amount is charged from the vehicles passing on that newly built highway. This charged amount is called as toll tax.

Due to increasing in number of vehicles, the traffic is increasing in tollgates too, which will cause in the wastage of time near the tollgate by forming the queue. In most of the tollgates the manual collection of tax will be done where even the manpower is required. So the automatic toll collection will need to be implemented. This will make the collection of the toll tax easier and faster. To make the automatic toll tax collection, image processing and online payment is implemented in this project. Here the vehicle crossing through the tollgate whose number plate image will be taken by the camera where image processing is done and this number is need to be compared with the database. The user need to be registered himself before. Only if the user is registered the comparison of the number will be done and the tax will be directly deducted from the dummy account. The benefits are:

1. Shorter queues at tollgates.
2. Faster service as not exchanging toll fees by hand.
3. No need to wait and request for receipts.
4. Increased capacity without using more infrastructures.

2. LITERATURE SURVEY

A system which explains the problem of waiting period and payment concerns in conventional manual toll collection system. The paper proposes a system which includes transponder, antenna, traffic controller system and central server. The transponder is a RFID tag which has unique identification number. It also stipulates the types of tags as discussed in the paper[1].the traffic controller system builds a system differently from others. This system manages the allocation of incoming vehicles across a set of parallel tollgates. It makes use of lane allocation algorithm. This algorithm allocates the gates entry for each of the car approaching among the available set of tollgates.

Electronic Toll Collection System utilizes Radio Frequency Identification (RFID) [3] technology. A RFID tag is mounted on each vehicle with unique ID. This ID is invisible on tag, it contains all the information about the vehicle and owner. When vehicle reaches at toll plaza tag will emit the radio wave signal. RFID reader receives the signal from tag, decode that signal and send to the ARM controller [4]. The controller will display the vehicle number and amount on LCD. Microcontroller is interfaced with computer to collect the vehicle data through serial port for future use. When accessed form database, it shows all the vehicle details on computer screen such as ID, vehicle number, date and time. Microcontroller checks the balance, if sufficient balance is there, it deducts predefined amount from prepaid account and update the balance in that account [3]. FASTag is a simple to use, reloadable tag which enables automatic deduction of toll charges and enables one to drive through toll plazas without stopping for the cash transaction. FASTag is linked to a prepaid account from which the applicable toll amount is deducted. The tag employs Radio-frequency Identification (RFID) technology and is fixed on the vehicle's windshield. FASTag can be recharged by making payment through cheque or online through Credit Card/ Debit Card/ NEFT/ RTGS or through Net Banking. FASTag account can be recharged up to a maximum of Rs 1 lakh and a minimum of Rs 100. Toll Plazas may have a dedicated FASTag lane or provision for validating FASTag through a handheld reader [2]. You need to have some balance in FASTag in advance whenever you travel.

3. EXISTING SYSTEM

Automated Toll booth and theft detection system [6] tells the mechanism of the toll collection system. An RFID reader is used to commune with the RFID tag. The reader has the receiver that exhales radio waves. The tag should answer back by sending the data. GSM module is used for relating the entire system through The internet. When the vehicle pass through the tollgate, the LCD system displays the information about that vehicle. The Motor Drive organizes the gate of the system. IR sensor is used to sense the presence of the vehicle. The alarm indicator shows the illegitimate crossing of vehicles through the tollgate. Smart key Access Control Systems [7] have a client – server model based system with an SQL server handling multiple vehicle monitoring systems. They have designed a user interface using the Microsoft .NET Framework. Smart key also operate in the 900MHz band but have a small range of 30 meters. RFID based toll collection system [5] uses active RFID tag which uses car battery power. The implementation is divided into the design of two modules- the Vehicle Module (Active Tag) and the Base Module. The two modules communicate via RF modem connected to each module.

4. BLOCK DIAGRAM

This technique performs an act that reduces the work. Our arrangement shows the image processing method which is applied to the vehicle number plate. The camera will be exist in the toll gate. When the vehicle pass the toll gate the image processing take place and the image of the number plate will be captured.
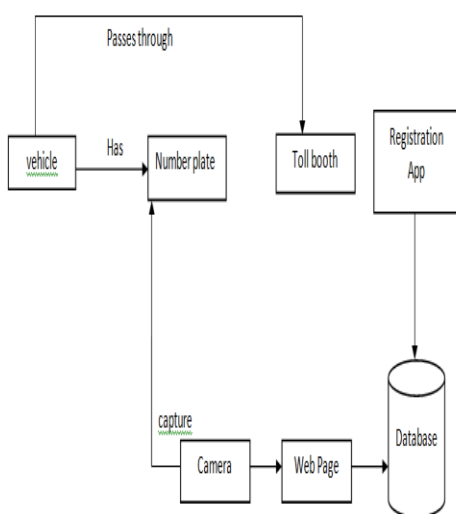

Fig 1:Block diagram of ATC using image processing

In other hand the user should be registered with all the details in the registration application. The required user details will be in the database along with the number plate details. The captured number will be compared with the number in the database. If the number matches then the amount points will be checked and deducted and the balance amount will be shown.

5. RESULT

Figure 2 shows the screen shot for recognisation of the number plate in the toll gate. The recognisation is done by the image processing. The image processing follows the following fundamental steps.

1. Image Acquisition: This is the first step or process of the fundamental steps of digital image processing.
2. Image Enhancement.
3. Image Restoration.
4. Color image processing.
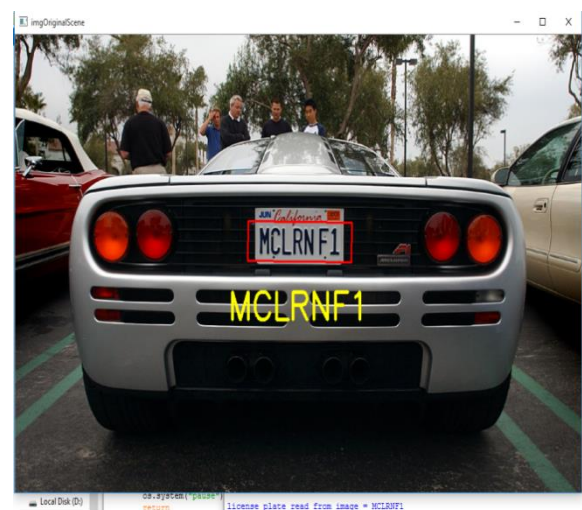5. Wavelets and Multi-Resolution processing.
6. Compression.

Fig 2:Final output

6. CONCLUSION

The automated toll collection system in highways based on image processing and online payment, design scheme was put forward. It can be provided with the convenient transport for the public and avoid the traffic congestion. It is of low cost, high security, far communication distance and high efficiency, etc. This kind of toll collection system can save valuable time and also can improve technology level of charge and reduces the manual collection of the tax. This reduces the delays that often occur on roads. Automated toll collection system is an effective measure to reduce management costs and fees, at the same time, greatly reduce noise and pollutant emission of toll station. In the design of the proposed Automated toll collection system, real time toll collection system have been designed. This system of

collecting tolls is eco-friendly and also results in increased toll lane capacity.

7. REFERENCES

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