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Automatic Toll Collection Using OCR Technique

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Abstract---Toll Collection in India is a matter of concern as the toll checkpoints are hotbeds of corruption. The purpose of this project is to propose a technique where collection of tolls can be done electronically using image processing technique where we can detect the vehicle and thereby deduct the toll amount. Using this technique we can make an attempt to eradicate corruption from toll checkpoints in India. The current scenario is that the vehicle needs to slow down at the toll collection area in order to pay the amount which leads to traffic problem and sometimes the toll collector doesn't collect the toll fee from the owner. So the proposed technique will maintain all the records of the toll collected as there is no physical cash involved in this technique.

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I. INTRODUCTION

Time is the more precious in today's world, hence everything has been automated. But still in India we wait in long queue in toll plazas to pay the toll fee. This is because of the complex toll system architecture. And still in India manual toll collection system is used. Manual toll collection is most widely used collection method in India. It requires a toll collector or attendant. Based on the classification of vehicle, toll cash is collected by the collector. The collector, who also dispenses change, may accept and sell scrip, tickets, coupons, making an entry of the vehicle in the system and issuing receipt to the patron. Due to manual intervention, the processing time is highest. The main idea behind implementing this system is to automate the toll fee collection in toll plazas of Indian roads

Automated Toll Collection System has been implemented in some countries like Canada, Poland where the toll amount is deducted from the vehicle owner's bank account and a notification can be provided in the form of a message. Automatic toll collection has facilitated the concession to the private sector of the construction and operation of urban freeways.Also, it has made feasible the improvement and the practical implementation of road congestion problem in a limited number of urban areas to restrict auto travel in the most congested areas.Automated Toll Collection in India is beneficial because it can provide a means with the help of which we can reduce the congestion near the toll collection areas and also help in reducing corruption at the toll checkpoints.[3] Usually the congestion near the toll collection areas is because the vehicle owner pays the toll in the form of physical cash.

The vehicles number plate will be detected using a camera that will be placed at the toll checkpoint, with the help of which an image processing technique called as OCR which will be implemented to extract the registration number of the car from the number plate. With the help of this extraction the details of the vehicles owner will be extracted from the database and the respective amount will be deducted, from the owner's bank account which is linked to the person's vehicle number plate. This ensures easy toll collection without any chaos.

II. LITERATURE SURVEY

Automatic Number Plate Recognition (ANPR) System is proposed by Shriram Kishanrao Waghmare, A. K. Gulve, Vikas N. Nirgude that automatically recognizes the number plate of the vehicle. In this paper proposed approach is present. It has considered the Indian number plates, where rear follows the number plate standards. This system consist of few algorithm like "Feature based number plate Localization" for locating the number plate, "Image Scissoring" algorithm for character segmentation and proposed algorithm for character recognition using Support Vector Machine (SVM).System can recognize single or double line number plate.[1]

An algorithm for license plate recognition (LPR) applied to the intelligent transportation system is proposed on the basis of a novel shadow removal technique and character recognition algorithms. This paper has two major contributions. One contribution is a new binary method, i.e., the shadow removal method, which is based on the improved Bernsen algorithm combined with the Gaussian filter. r. This paper also presents improved techniques for image tilt correction and image grey enhancement. Our algorithm is robust to the variance of illumination, view

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angle, position, size, and colour of the license plates when working in a complex environment.[4]

AUTOMATIC TOLL COLLECTION SYSTEM USING RFID is proposed by Satyasrikanth P, Mahaveer Penna, and Dileep Reddy BollaAutomatic. Toll Tax systems have really helped a lot in reducing the heavy congestion caused in the metropolitan cities of today. It is one of the easiest methods used to organize the heavy flow of traffic. When the car moves through the toll gate on any road, it is indicated on the RFID reader that it has crossed the clearing. The need for manual toll based systems is completely reduced in this methods and the tolling system works through RFID. The system thus installed is quite expedient reducing the time and cost of travelers since the tag can be deciphered from a distance.[3]

Automatic Toll Collection System Using QR Code is proposed by Vinod Suryawanshi, Aditya Gosavi, Unmani Joshi , Sagar Suri .This paper aims to design and develop a new efficient toll collection system using QR Codes which will be a low cost alternative among all other systems. The system is based on Computer Vision vehicle detection using OpenCV library Java platform. In this system, a camera captures images of vehicles passing through toll booth thus a vehicle is detected through camera. On the other hand user generates a QR code for his vehicle and pastes it on the windscreen of his vehicle. Depending on the area occupied by the vehicle, classification of vehicle is done as light and heavy. When server comes to know the type of vehicle, then it accesses the information and accordingly, appropriate toll is charged.

III. DESIGN OF ARCHITECTURE

The overall system is based on scanning the number plate very precisely and then capture the image of the number plate. For this we need a camera installed at the toll plaza at such a angle that capturing of number plate of any vehicle will be easier and clear.For efficient capturing of image the camera should be placed perpendicular to the vehicle. Then after capturing, the image is processed using OCR(Optical Character Recognition) technique which will convert the image containing text and number to machine-encoded language.

The OCR technique used for image processing has several steps:

A) Acquisition of image
B) Conversation of image into grey image
C) Dilation the captured image
D) Horizontal edge and vertical edge processing
E) Segmentation of image for region of interest
F) Extraction of the required image from region of interest
G) Conversation of image into binary image
H) Segmentation of image in alphanumeric characters

I) Recognition of individual character in the extracted image

Due to which, only the character and number are recognized and other part of the plate is eliminated. Once we get the extracted data, it is compared with the database. The comparison is done using correlation algorithm, in which each character is compared one by one. As the vehicle number is linked with the user's bank account, the toll amount is automatically deducted from his account. Then the receipt is given via message to the user's registered mobile number. For this purpose GSM model is used to send the message. After the entire process is done, the gate opens for the vehicle to pass the toll plaza. For gate mechanism we are using the dc motor to control the opening and closing of the gate.
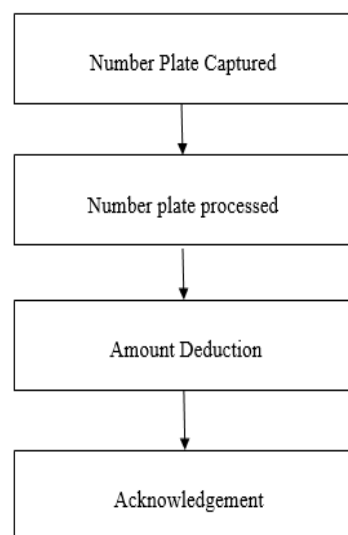
Design Implementation

There is a buzzer installed at the toll plaza to inform the authorities that something is wrong. The buzzer will ring due to various conditions like, if the vehicle number is not present in the database, or if the number is under stolen database. In such conditions authorized person will lookinto the matter personally and will perform the required action.

Database is the most important part of the system, which contains all the information about the user, its vehicle and details about the bank account. There is a separate databasefor police vans and hospital ambulance as they are not chargedwith toll amount. A separate database is created for stolen vehicles, to segregate them from registered vehicles.

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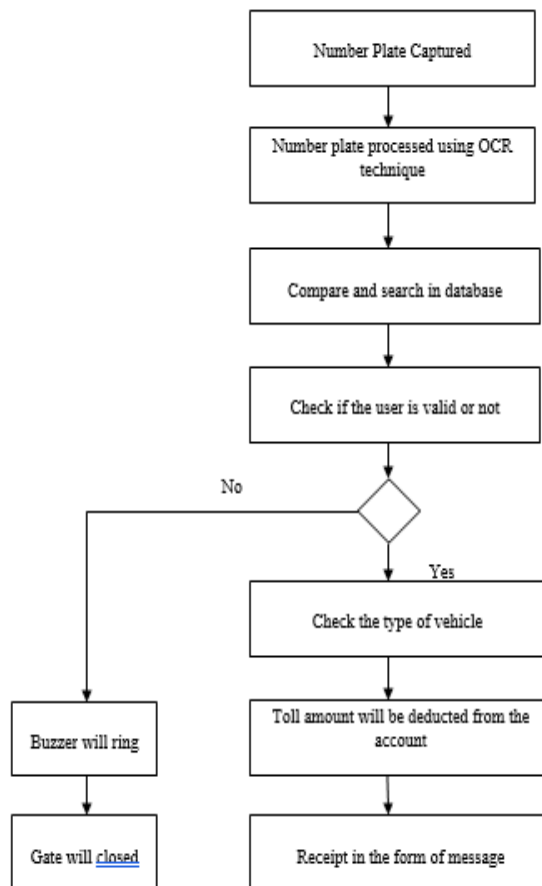
IV. CONCLUSION

The simulation results showed that the proposed algorithm of Number Plate Recognitions using OCR is executed well. Thus, a system for ImageProcessing Based Automatic Toll Booth in the Indian Condition which is very secure and highly reliable and can be obtained easily [2] It can use for the remove all drawbacks in the current system such as time and human effort and it also doesn't require any tag only required best quality camera and fixed font number plate. In the Future Work one must use the Billing System can be implemented.

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