

Computerized Vehicle Number Plate Recognition and Fine Generation

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Abstract - This project is introduced for detection of vehicle number plate and generating fine for the same. It is based on Image Processing. In this project an image of a vehicle number plate is captured using an android application which is parked in a no parking zone. After capturing the image this number plate is detected using Edge detection algorithm. Once the number plate is detected it then starts with character recognition using K-nearest neighbor algorithm. Once the characters are recognized it then compares with the database of the server and match the found number with the number present in the database. As the match is found it then send the message to the vehicle owner with a specific amount of fine to be paid. This project is done to elude the clerical work and making the system digital and also diminish the human efforts.

Key Words: K-nearest neighbor, Image Processing, Character Recognition, Edge Detection.

1. INTRODUCTION

India is a rapidly developing nation and growth can be easily visible from various things. As the development is occurring from the past few decades the needs and the way of living is also been changing day by day. In order to compete with the developed countries in respect to the way of living we are accommodating various new things in our life style like travelling in our personal vehicles and avoiding public transportation. But this development has resulted congestion and traffic around the people. Apart from traffic issues another complication that occurs to people is of parking. In a developing nation there is lack of parking spaces and people tends to park vehicles in a no parking zone. In order to tackle the problem various technologies have been introduced. One of the technology is computerized vehicle number plate identification and fine generation to the vehicles parked in a no-parking zone.

Computerized vehicle number plate identification is an analysis in computer vision, pattern identification, image handling and artificial intelligence, is one of the most vital feature of the intelligent transportation system of human community in 21st century. Computerized vehicle number plate identification includes four major segments: edge detection, plate recognition, character recognition and character extraction. [2] Once the number plate is identified a fine of a particular amount is generated and sent to the respective vehicle owner in the form of a message.

2. RELATED WORK

Parking spaces in India have been a big problem from last decade due to increasing population, and it will grow exponentially until government finds a way to eradicate the

problem. Computerized number plate identification and fine generation provides an efficient way to the government to solve this issue. In past there were many software and technologies such as ANPR [2], LPR [1], Plate-Smart [3], etc. These methods have their share of outcome. Usually when a car is parked in a no-parking zone traffic officer used to generate penalty to the vehicle owner through paper work, so due to physical entry there are chances of committing manual errors. So, to elude this blunder Computerized Vehicle Number Plate Identification and fine generation helps the traffic officer to generate a fine to the vehicle owner. In this paper android application substitute the physical work and make the system digital which ease the work of government.

3. PROPOSED SYSTEM

Actual working and design of the proposed system, with the help of flow diagram is described and explained in this section. The system consists of two main modules:

- 1) Vehicle number plate identification.
- 2) Fine generation to the vehicle owner.

The first module consists of following steps:

- The user has to initially login into the android application by providing the handset number.
- The server sent a One Time Password (OTP) to the user through which one can login into the application.
- The user then clicks an image of a vehicle using an android application and sending the image to the server side for further processing.
- The server side conducts the processes such as edge detection, plate recognition, character recognition and character extraction.

- a) Edge detection and plate recognition:

Edge detection is an image processing ability for finding the boundaries of objects within the picture. Various edge detection algorithms include Sobel, Canny, Roberts and fuzzy logic methods. In this project edge detection and plate recognition of vehicle is performed by using Canny Algorithm.

- b) Character Recognition and Extraction:

Once the plate is identified the next step is to identify the characters within the plate. The algorithm for character recognition and extraction is Optical Character Recognition (OCR). There are various algorithms that can be performed into an OCR. In this project character recognition and

extraction is executed using K-nearest neighbor (KNN) algorithm.

The second module consist of the following steps:

- 1) Once the above steps are completed then it checks the database for the extracted number.
- 2) From the database as the match is found it sent a particular amount of fine message to the vehicle owner.
- 3) The message is sent to the owner by using a GSM SIM 800.
- 4) If the match is not found from the database then it displays a message "Unknown vehicle detected".

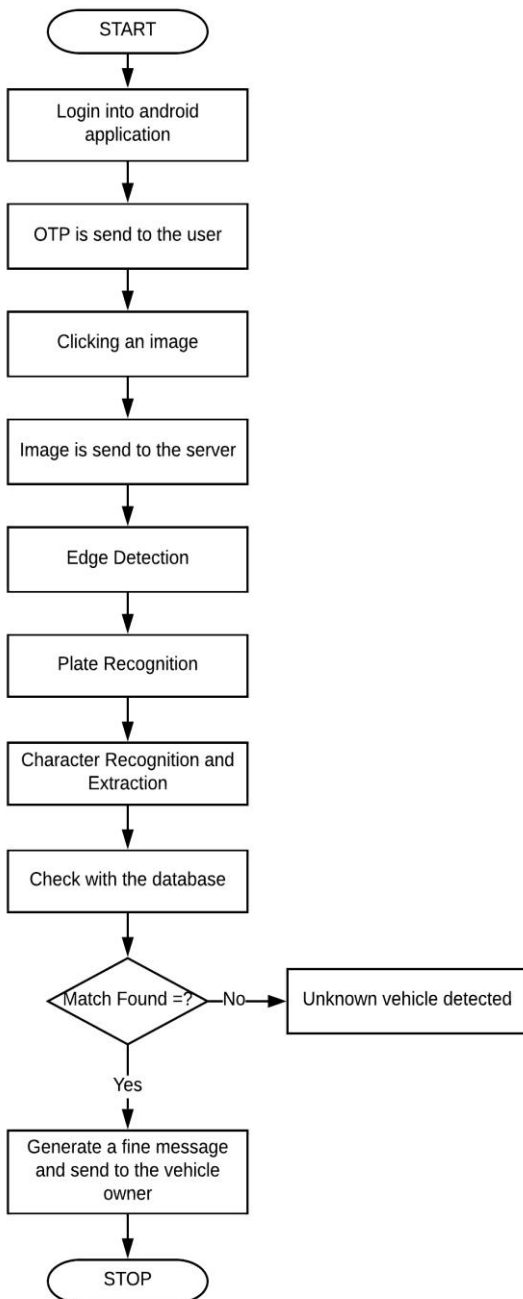


Figure 1: shows the flow diagram of the proposed system, following operations are to be performed.

4. RESULTS

In the previous system there was only one main unit which use to only detect the number plate and then extract the number from it. In the present system there are two main units. In first unit the image is captured of a vehicle and is sent to the server side and plate identification is done. The second unit checks the database and finds the match and then sent fine message to the vehicle owner.

Following are some screenshots of the system:

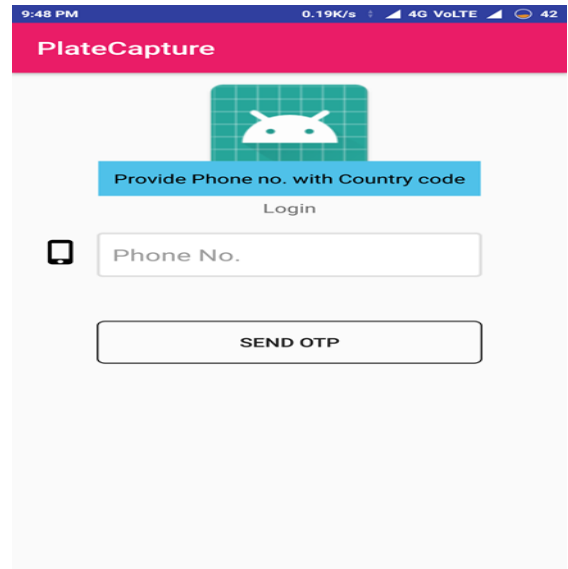


Figure 2: shows the Login page for user. The user can log into the application by providing required credentials.

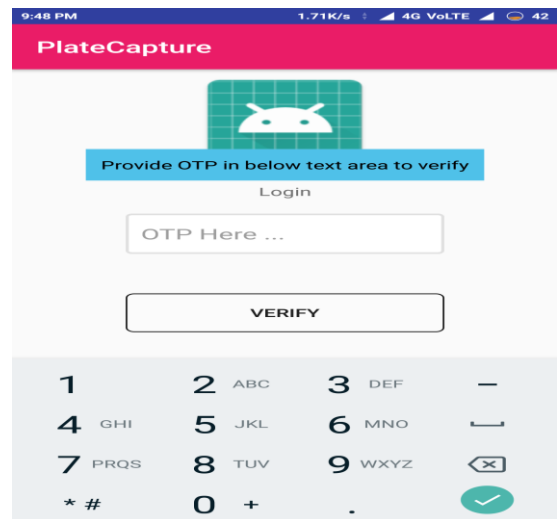


Figure 3: Shows the OTP page. The user has to enter the OTP received on the handset and verify it.

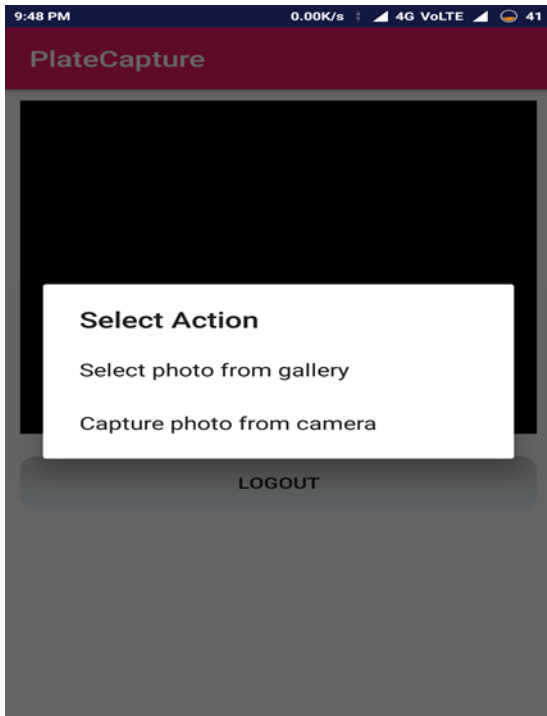


Figure 4: Shows the two options from where the user can upload the image to the server.

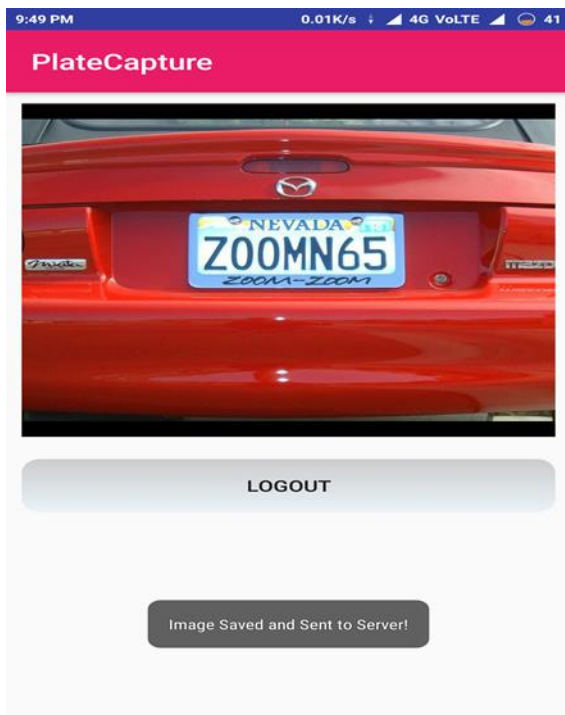


Figure 5: Shows the image is successfully sent to the server side.



Figure 6: Shows the database of vehicles and its owner from which the match is to be performed.



Figure 7: Shows the database where fine updating is done.

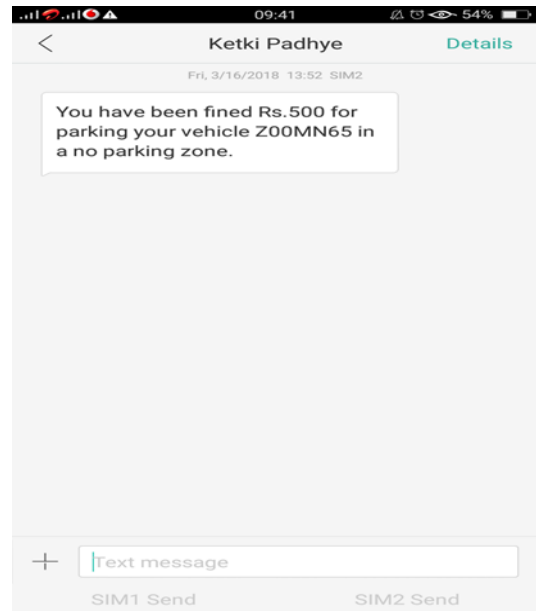


Figure 8: Shows a fine message is sent to the vehicle owner.

5. CONCLUSION

In detecting security hazards, the Computerized Number Plate Identification and Fine Generation System plays an important role. In this system the server receives the vehicle number plate. The system uses stream of image processing methods for distinguishing the vehicle from the database stored in the PC. If a high-resolution camera is used then the

speed of the system and robustness is increased. The probability of detecting and identifying the vehicle number plate is defined using statistical research. Once a number detection and character identification process is completed it will then check the obtained vehicle number with the database it is available with. It then extracts the contact number and generate a fine message to the vehicle owner. This will help to make the process of generating fine more fast and easy. The system is capable to reduce a lot of human efforts and paper work.

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