# AUTOMOBILE NUMBER PLATE RECOGNIZATION SYSTEM USING IMAGE PROCESSING

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***Abstract:-***Automobile number plate recognition is an image processing technology which uses number plate to identify the automobile. The objective is to design an efficient authorized automobile identification system by using the automobile number plate. The system is implemented on the entrance for the toll gate payment system, security control of a highly restricted area like military zones or area around top government offices, school, college or society parking. The developed system first detects the automobile from the video and then makes frame from the video part by part. Automobile number plate region is extracted using the image segmentation in an frame. Tesseract Optical character recognition (OCR) technique is used for the character recognition. The resulting data is then used to compare with the records on a database so as to come up with the specific information like the vehicle owner, place of registration, address, etc. The system is implemented and it performance is tested on video. It is observed from the experiment that the developed system successfully detects and recognize the automobile number plate from video.

**Keyword:- Image Processing ,Tesseract ,OCR ;**

## I.INTRODUCTION:

India is a 2nd most populated country in the world and also a developing country, and increasing population means increase in number of vehicles and managing them is a humongous task. Often this organized chaos leads to traffic jams and traffic rule violations and also this problem is seen while passing through toll gates. The idea is to completely automate the process of recognizing vehicle using existing cameras on highways, toll gates etc. Plate recognition range, where the cameras are able to capture the vehicles plates with sufficient resolution, starts from 20 to more than 50 meters away from the camera location. What we are doing is to completely automate the toll and parking fee payment systems using vehicle recognition system which will also help in monitoring fake number plates thus providing security, efficiency and at the same time saving cost. Since, number plate is the only trustworthy identity of a vehicle in Intelligent Transportation Systems (ITS) and correct vehicle identification depends highly on the accuracy of number plate recognition systems.

## II. LITERATURE SURVEY

### Title 1: SYSTEM FOR COLLISION PREDICTION AND TRAFFIC VIOLATION DETECTION

Abstract: The invention refers to a system for monitoring, analysing and reporting incidences of traffic violations at a predetermined area in real -time, prospectively or retrospectively. Specifically, the invention refers to a system and method of monitoring, analysing, predicting and reporting or Warning the incidence of a pastor imminent traffic violation by acquiring a moving object Within a predetermined boundary, assigning a path to the moving object and based on a plurality of thresholds, determining the likelihood of a traffic violation type and occurrence.

### Title 2: A hybrid License Plate Extraction Method Based On Edge Statistics and Morphology

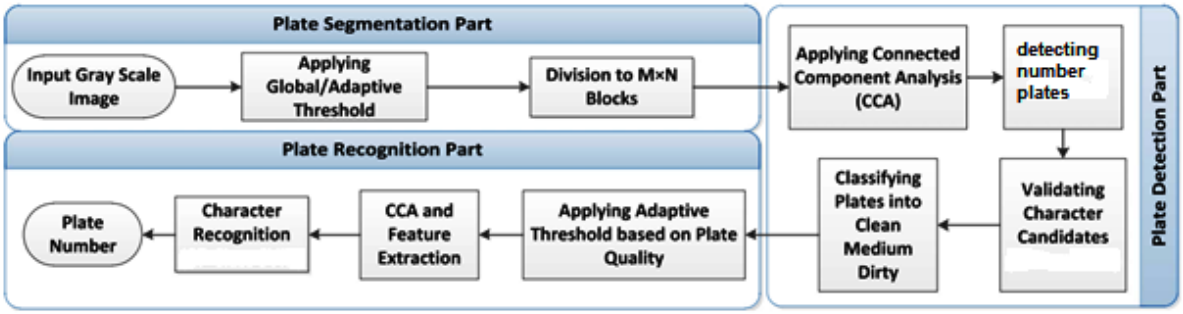
Abstract: A hybrid license plate extraction algorithm based on the edge statistics and morphology for monitoring the highway ticketing systems. The method can improve the location rate only by the edge statistics. The proposed approach can be divided into four sections, which are, vertical edge detection, edge statistical analysis, hierarchical-based license plate location, and morphology-based license plate extraction. The algorithm can quickly and correctly detect the region of vehicle license plates. Under the experiment databases, which were taken from real scene, 9786 from 9825 images are successfully detected. The average accuracy of locating vehicle license plate is 99.6%.

### Title 3: Combining Hough Transform and Contour Algorithm for detecting Vehicles License-Plates

Abstract: Vehicle license plate (VLP) recognition is an interesting problem that has attracted many computer vision research groups. One of the most important and difficult task of this problem is VLP detecting. It is not only used in Precognition systems but also useful to many traffic management systems. Our method is used for the VLP recognition system that deals with Vietnamese VLPsand it can also be applied to other types of VLPs with minor changes. There are various approaches to this problem, such as texture-based, morphology-based and boundaryline based. In this paper, we present the boundary line-based method that optimizes speed and accuracy by combining the Hough transform and Contour algorithm. The enhancement of applying the Hough transform to contour images is that the much improved speed of the algorithm. In addition, the algorithm can be used on VLP images that have been taken from various distances and have inclined angles between ±300 from the camera. Especially, it can detect plates in images has more than one VLP. The algorithm was evaluated in two image sets with accuracy of about 99%.

## III. PREVIOUS SYSTEM

Previous system combines Sobel edge detection operator and soft-threshold wavelet de-noising to do edge detection on images which include White Gaussian noises. In recent years, a lot of edge detection methods are proposed. The commonly used methods which combine mean de-noising and Sobel operator or median filtering.This method is mainly used on the images which includes White Gaussian noises.




## IV. PROPOSED SYSTEM

**4.1 SYSTEM ARCHITECTURE:**A system architecture diagram would be used to show the relationship between different components. Usually they are created for systems which include hardware and software and these are represented in the diagram to show the interaction between them.

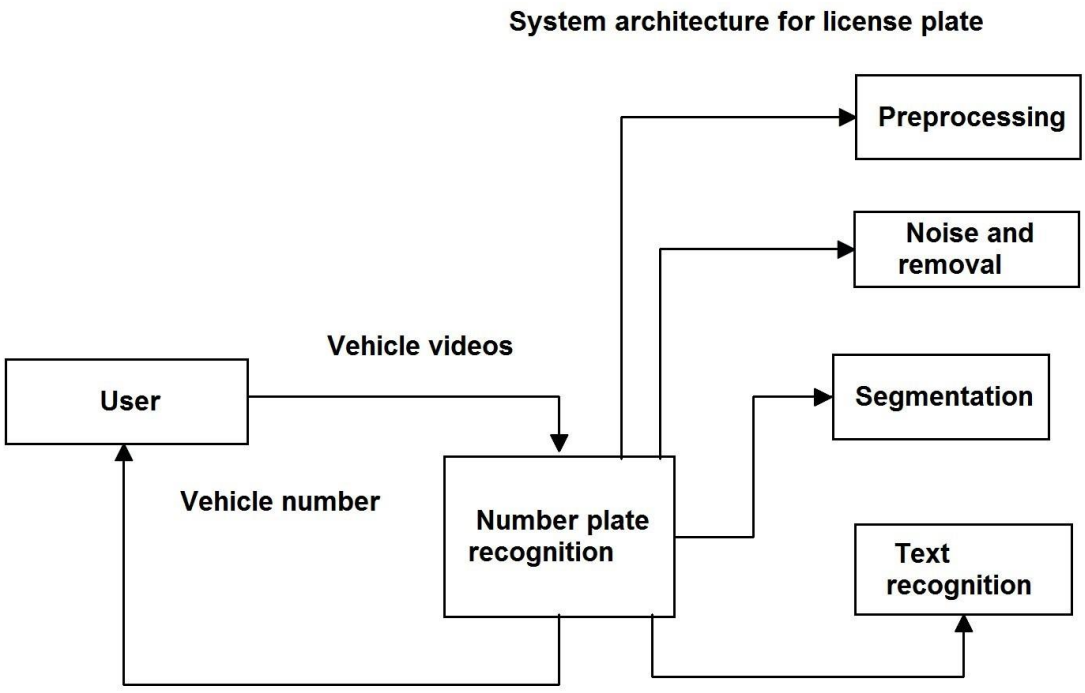



**Figure 4.1 system architecture**

**DATA FLOW DIAGRAMS:** A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated.

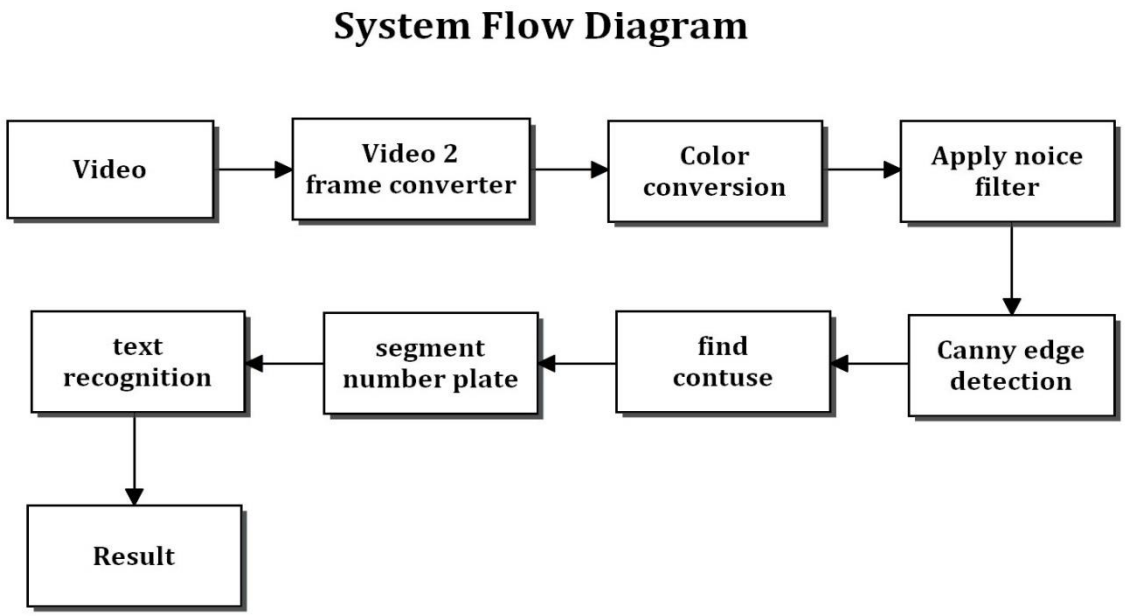



**Figure 4.2System Flow Diagram**

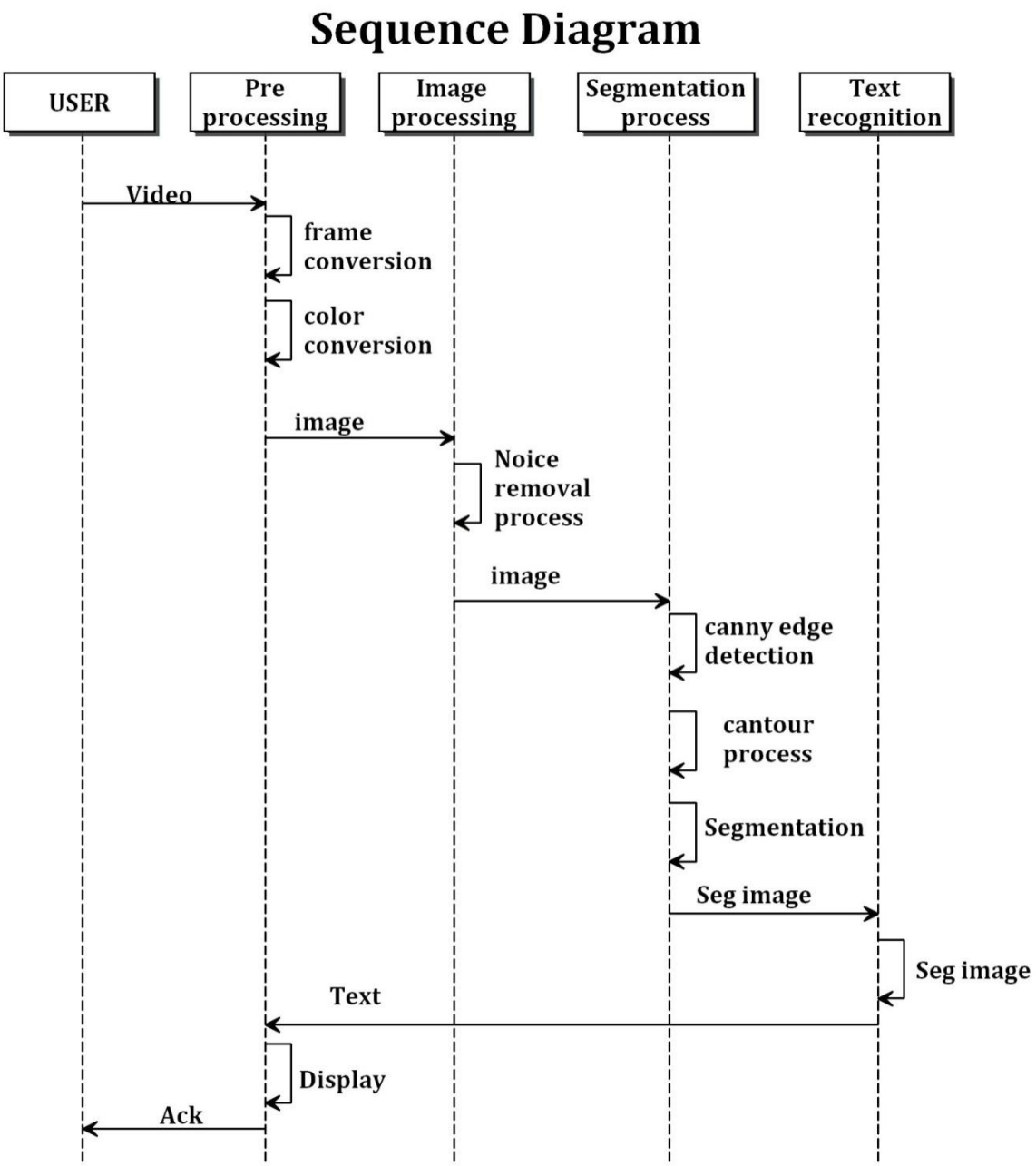



**Figure 4.3 Sequence Diagram**

**USECASE DIAGRAM**:A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.

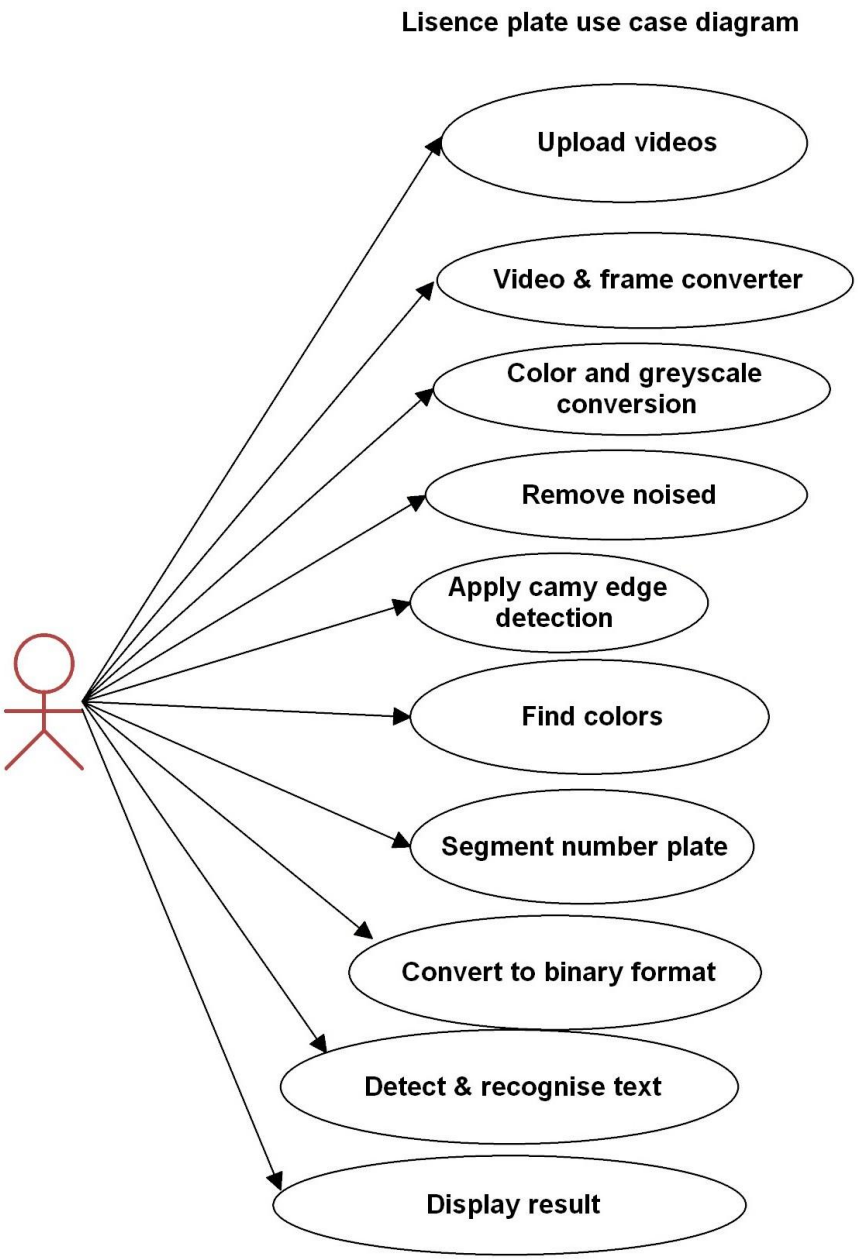



**Figure 4.4 Use case diagram**

## V. TESTING AND RESULTS

| | |
|---|---|
| SUBJECT | VIDEO TO FRAME |
| INPUT | VIDEO FILE |
| OUTCOME | VIDEO FRAME |
| OUTPUT | AS EXPECTED |
| STATUS | PASS |

Table :- Test Case(1)

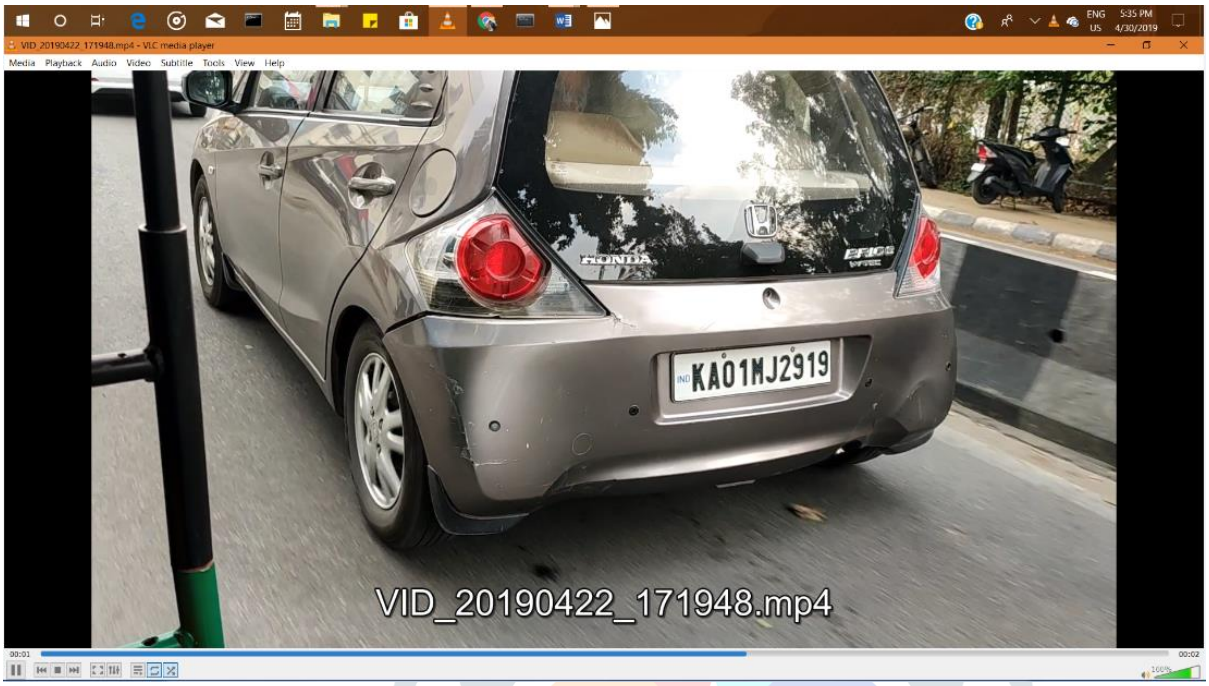



FIGURE:- Video File

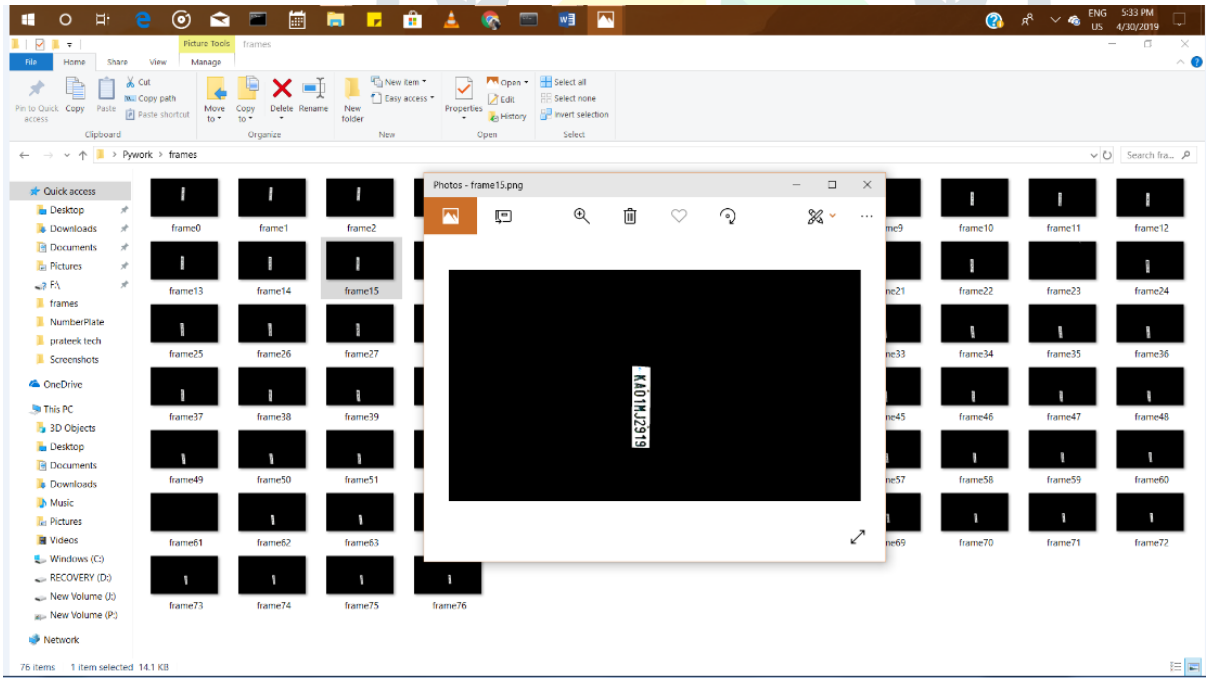



Figure:-Video Frames

| | |
|---|---|
| SUBJECT | FRAME PROCESSING |
| INPUT | VIDEO FRAME |
| OUTPUT | CHARACTER RECOGNIZATION |
| OUTCOME | AS EXPECTED |
| STATUS | PASSED |

Table :- Test Case(1)

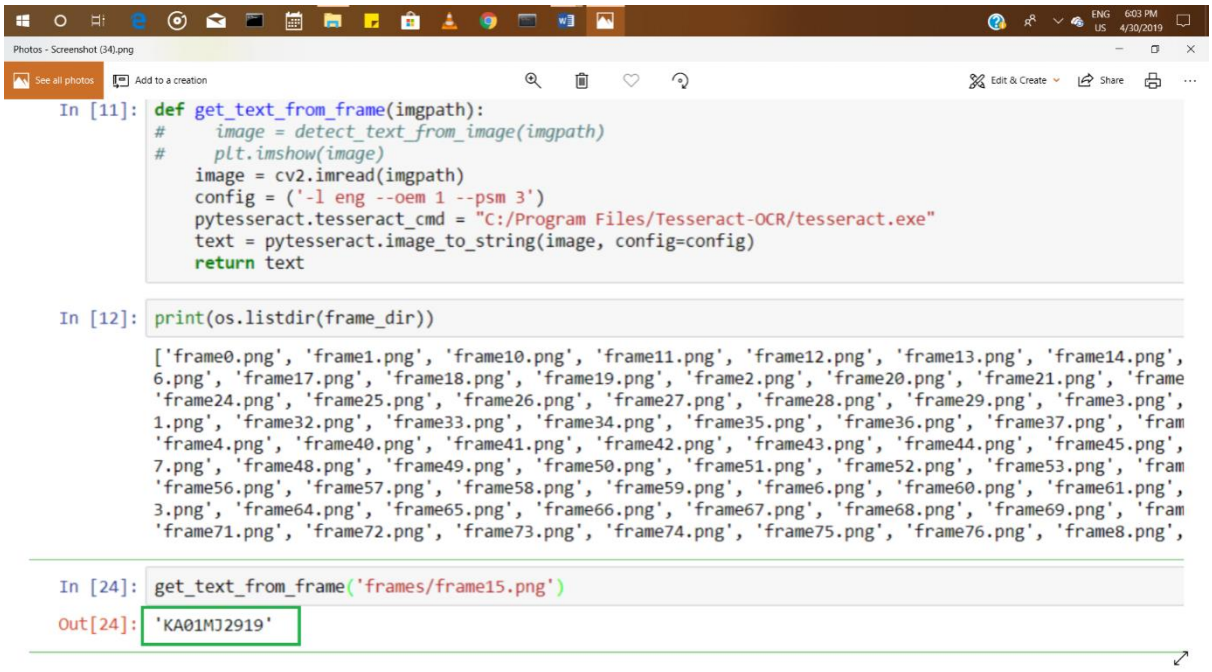



FIGURE:-Number Plate Character Recognisation

## VI. CONCLUSION

In this project work we proposed complete working of vehicle number plate character recognition model using image processing, OpenCV, tesseract OCR, and pillow. Our developed system gives 100% accuracy in almost all cases as shown in Testing and Results. It's much better than existing technologies such as RFID and NFC as **R**adio **F**requency **I**dentification technology is expensive as they have to generate RFID tags and NFC has short communication field range of less than 10m and vehicles should have NFC devicesin them whereas our system makes use of cameras and computers already present on site and only requires only our developed working software model.

## VII. FUTURE SCOPE and APPLICATIONS

In the future, the system can be interface with the Camera for capturing the image and live video and performing real-time processing. With the advancement in technology, it can be implemented with various real-time technology for better security.

Applications are:

a) It will be used for automated payment systems in tolls and parking.

b) It will be used for tracking fake number plates.

c) It will be used in vehicle tracking & no waiting in queue for passing via toll gates.

d) Security control over the highly restricted area by not allowing vehicles other than authorized vehicles.

**VIII. ACKNOWLEDGMENT**

The authors thank their management and institution K. S. Institute of Technology for providing them the resources and platform for showcasing their idea. They would also like to thank their Prof and HOD Dr. Rekha B Venkatapur and all the lecturers and professors for motivating them into framing this research.

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