



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

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Moving Vehicle Number Plate Detection

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ABSTRACT: This paper introduces the concept of automatic license plate recognition. The traditional manual monitoring of the license plate has become very difficult due to the huge increase in the number of vehicles day by day. Thus automatic plate detection has become a necessity. This technology can be used for various applications including traffic monitoring, tracking stolen cars, managing parking toll, red-light violation enforcement, borders and customs checkpoints. One of the most important applications of this technology is at the toll plazas. This can help in making the process of toll collection easy, cashless and fast. This paper contains the algorithm for recognition of the number plate using Morphological operation, Thresholding operation, Edge detection method, Bounding box analysis for number plate extraction, character separation using Segmentation and character recognition using Template method and Feature extraction

KEYWORDS: Automatic plate detection, Thresholding operation, Morphological operations, Connected component labelling.

I. INTRODUCTION

Automatic License Plate Recognition is becoming increasingly important technique in the intelligent transport system. It is used as a mass surveillance method that uses the character recognition technique to read the license plate number from the image of the vehicle. These can be used by various police forces and as a method of electronic toll collection on pay-per-use roads and monitoring traffic activities, such as red light adherence in an intersection. The license plate of the vehicle is detected using image processing and the plate number is extracted out and appended into a table. The process of plate recognition is done using Open CV libraries and Python 2.7. An image of a vehicle containing the license plate number is fetched from the source file and contour methodology is used for extraction of the number plate. There are three major part of license plate recognition: The number plate extraction, character segmentation and character recognition. The whole procedure begins with fetching the image of the vehicle to the system.

II. RELATED WORK

Further from which the number plate is extracted. The algorithm used in the process is: 1. Taking the image as input. 2. Converting the image from RGB to Gray scale. 3. Further converting it into the threshold form. 4. Finding the possible characters in the image using contours. 5. The possible characters are extracted out and are separated from the main image 6. Then the plate number is read and stored in the table. In this paper the number plate recognition for both the Indian cars as well as foreign cars is presented. Images have been captured with different illumination conditions, background and orientations. Various filters have been used to deal with problem of contrast and lighting. The Sobel vertical edge detection and morphology are employed to locate the number plate and projection analysis is used for the character segmentation of the number plate. Template is used for the character recognition of the plate. Once the characters for the Number plate are recognized, they are saved in a text file for further computation and payment of the toll tax could be collected by their linked bank accounts by the respective department

III. METHODOLOGY

The working of the project is demonstrated by the block diagram above. Firstly, the image is given as an input to the system and then converted into Grayscale format from RGB (red-green-blue) format. This conversion is done to remove the noise from the image so that the image processing becomes error free. After the noise is removed from the image, the threshold image is formed. Using the threshold image the possible characters of the license plate are found.



The Automatic License Plate recognition system consists of three modules namely: 1. Extraction of Number plate 2. Character segmentation 3. Character recognition

The algorithm automatically detects number plate without user interaction that contains only number plate to be detected.

IV. EXPERIMENTAL RESULTS

Figures shows the results of text detection from an image and inpainting by using exemplar based Inpainting algorithm. Figs. 2, 3, 4 (a) shows the original image. (b) is the image obtained by applying first set of criteria. All objects whose area greater than 10000 and filled area greater than 8000 are eliminated and major axis lengths are in between 20 to 3000 are considered to be text. Still, some small non-text objects are detected.



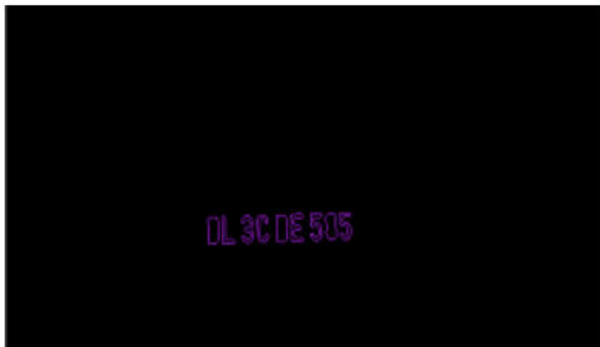
1. Original image

3. Grayscale image

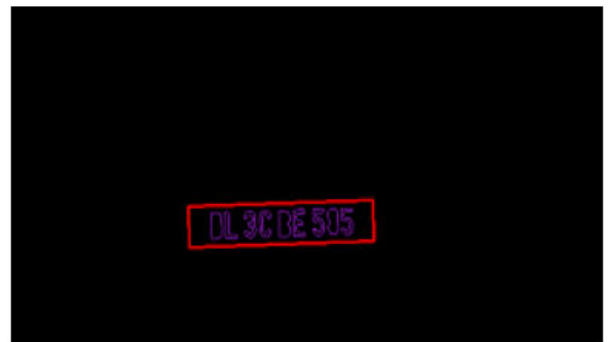
4. Threshold image



5. Edge detection



6. Character extraction



7. Possible Plates



8. License Plate Extraction



9. Grayscale license plate



10. Threshold image of license plate



11. Resized threshold license plate image



12. Contour formation



13. RGB1 contour image



16. Printing the plate number.

V. CONCLUSION

We were able to solve a subset of a very difficult and complex problem. No 100% accurate algorithm has or will ever exist for such a task. However, this license plate recognition strategy works great for plates complying with certain essential requirements (like colour of text on license plate, speed of vehicle, orientation of license plate, distance of vehicle from the camera, etc.). Database of the image consists of images with different size, background, illumination, camera angle, distance etc. The experimental results show that, number plates are extracted successfully based on the vertical edge detection technique, character segmentation, feature extraction based character recognition which is based on neural network give result with the success rate of 92% for the foreign vehicles and for Indian it is 45%. The success rate for Indian cars is low due to the orientation of the license plates, irregular font used to write the characters on the license plate and distorted number plates.

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