

Video Based Number Plate Recognition

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Abstract: - This system constantly processes incoming camera footage to detect any trace of number plates. While detecting a number plate in front of the camera, it processes the camera input and extracts the number plate image from the video. Processes the extracted image and extracts the number plate number from it using easy-ocr. Thus, put forward a fully functional vehicle number plate recognition system using video based number plate recognition. Even for camera surveillance based security system, Important and difficult task is to recognize a car number plate from video. So here we come up with a solution. Extract the license plate from an image using some computer vision techniques and then use Optical Character Recognition to recognize the license number. Extraction of license plate image from car-image detection algorithms (otshu threshold method), Preprocessing-noise removal, gray scale conversion, edge detection etc., Plate extraction, Character segmentation. To design and develop a license plate detection and recognition system, will work efficiently under the conditions of slow moving objects and the objects which are merged into the background due to different traffic environment conditions, robustness against progressive or sudden illumination changes, Occlusions, identification time of the system should be as short as possible. The system should detect all the types of vehicles, recognize all the license plates of the country and should also be resistant to any kinds of disturbances, which may occur in images and mechanical plate damages which may appear in reality. The attributes of the License plates play important role in the recognition process. The size, colour of the license plate, its font face i.e. size, colour of each character, spacing between characters, the number of lines in the license plate. Video processed number plate recognition is the identification system of vehicles for collecting the toll payment. The way to identify the moving vehicle on the tollgate is by identifying the number plate which is achieved by image processing algorithm. Recognizing vehicle number plates is purely localized and difficult to follow the standard pattern assigned by the government, so the recognition is quite difficult but it is much needed system.

Key Words: —*Safinamide Image processing, OCR, Edge Detection, Grayscale.*

I. INTRODUCTION

Due to automation, minimum human interference is required and this provides the facility so that the time and energy can be saved and efficiency can be improved. The most challenging task faced by the user is waiting in the toll plaza since manual work consumes more time and payment methods are not easier. It leads to wastage of fuel by waiting as well as precious time to a great extent which leads to traffic congestion. Collecting the tolls and maintaining the records of different vehicles and transaction of money by using video based number plate detection.

For vehicle identification purposes, one of the best techniques is license plate recognition.

To find the most efficient way to recognize the registration information from the digital video (obtained from the camera) is the main intension of this project. This process usually comprises of three stages. First stage is the license plate localization, regardless of the license-plate size and orientation. The second stage is the segmentation of the characters and last stage is the recognition of the characters from the license plate. Thus, our project uncovers the fundamental idea of various algorithms required to accomplish character recognition from the license plate during Template Matching. This process of character recognition consists of steps like Image processing, Resizing and Character localization that are required to be performed on the image in order for Template Matching to be done.

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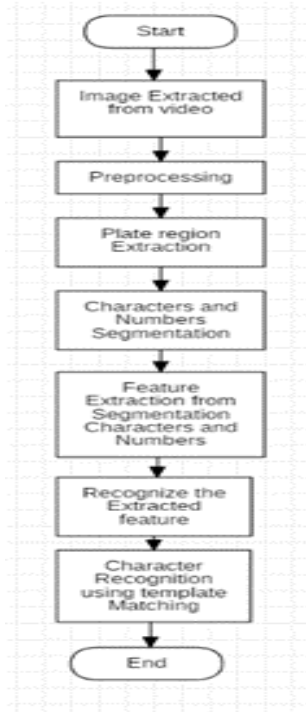
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II. METHODOLOGY

The following flowchart depicts various methods that are used in the detection of fake currency using image processing.



To reduce the noise, blur the input Image with Gaussian Blur then convert it to grayscale. Find vertical edges in the image. To reveal the plate, binarize the image. For binarization, apply Otsu's Thresholding on the vertical edge image. In other thresholding methods, choose a threshold value to binarize the image but Otsu's Thresholding determines the value automatically. Apply Closing Morphological Transformation on thresholded image. Closing is useful to fill small foreground regions between background regions in a thresholded image. It reveals the rectangular box of white colour in image of license plate. To detect the plate, find contours in the image. It is important to binarize the image before finding contours so that it can find more relevant and less number of contours in the image. Draw all the extracted contours on original image. To find the minimum area rectangle enclosed by each of the contour and validate their side ratios and area. The minimum and maximum area of the plate as 4500 and 30000 is defined. To find the contours in the validated region and validate the side ratios and area of the bounding rectangle of the largest contour in that particular region. After validating, get a perfect contour of a license plate. The extraction of the contour from the original image is done. To recognize the characters on license plate precisely, Apply image segmentation. For that first step is

to extract the value channel from the Hue Saturation Value format of the plate's image.

III. ALGORITHM

- To reduce the noise, blur the input Image with Gaussian Blur then convert it to grayscale.
- Find vertical edges in the image.
- To reveal the plate, binarize the image. For binarization, apply Otsu's Thresholding on the vertical edge image. In other thresholding methods, choose a threshold value to binarize the image but Otsu's Thresholding determines the value automatically.
- Apply Closing Morphological Transformation on thresholded image. Closing is useful to fill small foreground regions between background regions in a thresholded image. It reveals the rectangular box of white colour in image of license plate.
- To detect the plate, find contours in the image. It is important to binarize the image before finding contours so that it can find more relevant and less number of contours in the image. Draw all the extracted contours on original image.
- To find the minimum area rectangle enclosed by each of the contour and validate their side ratios and area. The minimum and maximum area of the plate as 4500 and 30000 is defined.
- To find the contours in the validated region and validate the side ratios and area of the bounding rectangle of the largest contour in that particular region. After validating, get a perfect contour of a license plate. The extraction of the contour from the original image is done.
- To recognize the characters on license plate precisely, Apply image segmentation.
- Apply pytesseract or easyocr to extract the characters from number plate.

IV. RESULTS AND DISCUSSION

Extracting the images from the real time video and by applying otsu's threshold method and morphological transformation method, extracted the following images as mentioned below.

Figure.1. represents the most important step which is image acquisition which extracts the captured image from video for our process. Figure.2. represents vertical edges. Figure.3.

Binarization. Figure.4. Character segmentation. Figure.5. represents extraction of the characters separately.



Fig.1. Image acquisition



Fig.2. Vertical Edges



Fig.3. Binarization



Fig.4. Character Segmentation

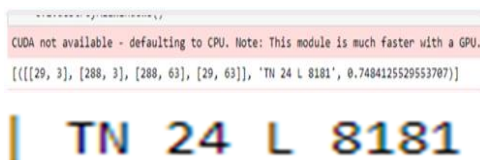


Fig.5. Characters Recognition

V. CONCLUSION

The benefits of video based car number plate recognition are quite remarkable. This paper presents a recognition method in which the vehicle plate image is obtained by the digital cameras and the image is processed to get the number plate information. A rear image of a vehicle is captured and processed using various algorithms .OpenCV is one of the most flourishing technologies because library is cross-platform and focuses mainly on real-time image processing. Government should take some interest in developing this system as this system is very economical and eco-friendly .This change will help in progress of nation.

REFERENCES

- [1]. Cheng-Hung Lin et. (2019).-License plate recognition using YOLOv2.International Journal of Innovative research in computer and communication Engineering.[5],59.
- [2]. D. Zheng, Y. Zhao, and J. Wang, "An efficient method of license plate location," Pattern Recognition Letters, vol. 26, no. 15, pp. 2431–2438, 2005
- [3]. E. R. Lee, P. K. Kim, and H. J. Kim, "Automatic recognition of a car license plate using color image processing," in Proceedings of the 1st IEEE International Conference on Image Processing (ICIP '94), vol. 2, pp. 301–305, Austin, Tex, USA, 1994.
- [4]. Fikriye Öztürka , Figen Özena (2012). -A New License Plate Recognition System Based on Probabilistic Neural Networks. Procedia Technology [1], 124 – 128.
- [5]. G. A. Samra and F. Khalefah, Localization of license plate number using dynamic image processing techniques and genetic algorithms, IEEE Trans. Evol. Comput. 18 (2014), 244–257.
- [6]. K. Deb and K.-H. Jo, "A vehicle license plate detection method for intelligent transportation system applications," Cybernetics and Systems, vol. 40, no. 8, pp. 689–705, 2009.
- [7]. K. Indira, K. V. Mohan and T. Nikhilashwary, Automatic license plate recognition, in: Recent Trends in Signal and Image Processing, pp. 67–77, Springer, Singapore, 2019.
- [8]. N. F. Gazcón, C. I. Chesñevar and S. M. Castro, Automatic vehicle identification for Argentinean license plates using intelligent template matching, Pattern Recogn. Lett. 33 (2012), 1066–1074.
- [9]. Nuzulha Khilwani Ibrahim, Emaliana Kasmuri, Norazira A Jalil, Mohd Adili Norasikin, Sazilah Salam(2013).License Plate Recognition (LPR)- A Review with Experiments for Malaysia Case Study. The International Journal of Soft Computing and Software Engineering [JSCSE], 3[2] ,86 – 87.
- [10]. Rayson Laroca et. (2018). - AI- License Plate Recognition System using CNN. YOLO [you only look once]. International

Journal of Innovative research in computer and communication Engineering. [5], 5-13.

- [11]. Sergey Zherzdev, Alexey Gruzdev(2018).LPRNet: License Plate Recognition via Deep Neural Networks.
- [12]. Sergio Montazzolli Silva and Claudio RositoJung (2018).License Plate detection and recognition in unconstrained scenario.ECCV.5-14.
- [13]. Shrutika Saunshi¹, Vishal Sahani², Juhi Patil³, Abhishek Yadav⁴, Dr. Sheetal Rathi⁵. (2017). - License Plate Recognition Using Convolutional Neural Network. IOSR Journal of Computer Engineering (IOSR-JCE). [2], 28 – 32.
- [14]. S. Qiao, Y. Zhu, X. Li, T. Liu and B. Zhang, Research of improving the accuracy of license plate character segmentation, in: 2010 Fifth International Conference on Frontier of Computer Science and Technology, pp. 489–493, IEEE, Changchun, Jilin Province, China, 2010.
- [15]. Y. Zhang, J. Wang and X. Yang, Real-time vehicle detection and tracking in video based on faster R-CNN, J. Phys. Conf. Ser. 887 (2017), 012068.