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LICENSE PLATE NUMBER RECOGNITION USING MORPHOLOGICAL EDGE DETECTION WITH OPTICAL CHARACTER RECOGNITION

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ABSTRACT

The License Plate Number Recognition (LPNR) system plays a vital role in security management and traffic control management, such as parking enforcement, surveillance operations and recovery of stolen vehicles. In images and videos, License plate number recognition (LPR) algorithms are composed of the following three steps: 1) license plate extraction 2) segmentation of plate chracters and 3) character recognition. Due to diversity of plate formats and non-uniform illumination condition during image acquisition, this task is quite challenging. In order to reduce the issues such as processing time and recognition rate, in this paper, morphology based edge detection is proposed for the detection of edges. Also, an optical character recognition method is used for recognizing the characters. . The process involves image processing, grayscale conversion, image enhancements and so on.

I. INTRODUCTION

An image is used to convey useful information in a visible format. An image is nothing but arrangement of tiny elements I n a two-dimensional plane. These tiny elements are called Pixels. A large number of pixels combine together to form an image, whether small or large.

Monitoring vehicles for law enforcement and security purposes is a difficult problem because of the number of automobiles on the road today. An example is this lies in border patrol: it is time consuming for the officers to physically check the license plate of each car. Additionally, it is not feasible to employ a number of police officers to act as full-time license plate inspectors. Hence There must exist a way for detecting and identifying license plates without constant human intervention. Various license plate detection algorithms have been developed in past few years. Each of these algorithms has their own advantages and disadvantages. This paper described the method in which license plate is detected detected using confidence related predictions.

We have implemented a system that can be used to extract the license plate number of a vehicle from an image or video based on some methodologies .

II. RELATED WORK

In this paper [1]. An algorithm for USDOT number recognition was introduced which consists of two stages: first, an elastic deformation model for localizing the USDOT tag in the captured image. Next, CNN is trained using SVHN dataset and sweep the trained classifier across the localized USDOT number region.

This paper [2] has attempted to provide a comprehensive survey of License Plate Recognition From Still Images and Video Sequences: A Survey research on LPR and also to offer some structural categories.

In this paper [3] , a geometric framework for rectangular shape detection using candidate shapes in RGB channels and scale spaces was proposed. A connected component is called (in terms of 8-connectivity) in an edge image a candidate shape. . Image structures used in a primal sketch are Gaussian blob regions, while image structures used in candidate shapes are edges.

In this paper [4], a new method to minimize manual annotation required for training an OCR engine in an ALPR system by using an unsupervised domain adaptation via subspace and dictionary learning.

In this paper [5] , methods for segmentation and annotation free ALPR with improved plate localization and automatic failure identification was proposed where a set of candidate regions are first extracted using a weak SNoW classifier and then scrutinized by a strong CNN classifier in the second stage

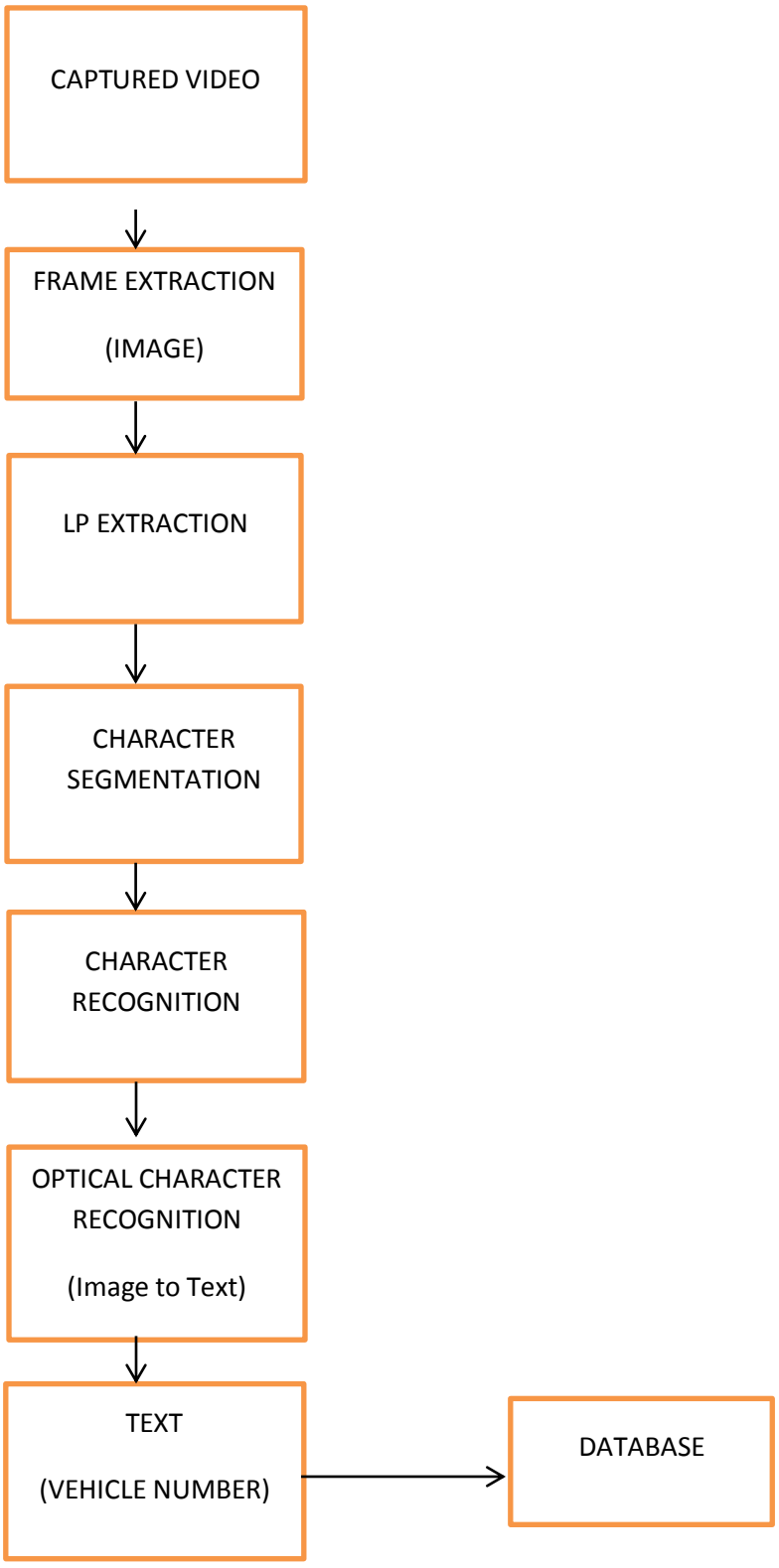
III. PROJECT PROPOSAL

Our license plate recognition system can be roughly broken down into the below block diagram. In the Proposed System, number plate recognition is done. A new technique is introduced that detects LP symbols without using any information associated with the plate's outer shape or internal colors. The proposed system is composed of two phases: 1) Image processing phase and 2) CNN with OCR phase. A new genetic-based prototype system for localizing 2-D compound objects inside plane images was introduced and tested in the localization of LP symbols. Here, we implement the Car License plate through image and videos.

A novel algorithm for license plate recognition in complex scenes, particularly for the all-day traffic surveillance environment. This is achieved using mathematical morphology and Convolutional Neural Network (CNN). A pre-processing step is applied to improve the performance of license plate localization and character segmentation in case of severe imaging conditions. The first and second stages utilize edge detection and mathematical morphology followed by connected component analysis. CNN is employed in the last stage to construct a classifier to categorize the input numbers of the license plate. The algorithm has been applied on car images with different backgrounds, license plate angles, distances, lightening conditions, and colors.

The advantage of this system is that the distorted images are successfully detected due to independency on the shape, color and location of the plates. A new prototype system for localizing 2-D compound objects inside number plate images was introduced and tested in the

localization of LP. Detecting license text and at the same time distinguishing it from similar patterns. Morphology Edge Detection gives the clear extraction of license plate number.



A. FRAME EXTRACTION

Video contains huge amount of information at different levels in terms of scenes, shots and frames. The issue that needs to be addressed in order to discover knowledge from videos is the elimination of irrelevant information. The key frames extracted must summarize the characteristics of the video, all the key frames on the time sequence gives visual summary of the video to the user. In this module, the image of the car that is extracted from the video or directly an image itself is the input. The process is to input the source image or video from the file from which the plate number of the vehicle is to be found.

Fig. 2 Frame Extractions

Input: Edge matrices E1 and E2, both of dimensions M*N, and movement tolerant threshold.

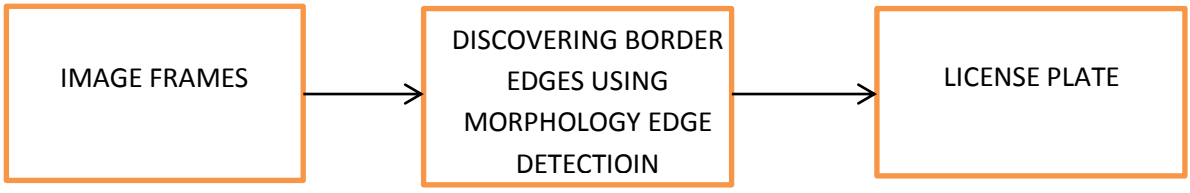
B. LICENSE PLATE EXTRACTION

The license plate extraction stage influences the accuracy of an LPR system. The input to this stage is a car image, and the output is a portion of the image containing the potential license plate. The license plate can exist anywhere in the image. Instead of processing every pixel in the image, which increases the processing time, the license plate can be distinguished by its features and therefore the system processes only the pixels that have these features.

The features are derived from the license plate format and the characters constituting it. License plate color is one of the features since some jurisdictions (i.e., countries, states, or provinces) have certain colors for their license plates. The rectangular shape of the license plate boundary is another feature that is used to extract the license plate. The color change between the characters

and the license plate background, known as the texture, is used to extract the license plate region from the image. The existence of the characters can be used as a feature to identify the region of the license plate. Two or more features can be combined to identify the license plate number.

Edge-based methods are simple and fast. However, they are based on the continuity of the edges. When combined with morphological steps that eliminate unwanted edges, the extraction rate is relatively high. Hence we use Mophological based edge detection method to extract the license plate region from the image.



C. SEGMENTATION

The isolated license plate is then segmented to extract the characters for recognition. An extracted license plate from the previous stage may have some problems such as tilt and non-uniform brightness. The segmentation algorithms should overcome all of these problems in a pre-processing step.

a) Grayscale Conversion:

Grayscale dilation with a flat disk shaped structuring element will generally brighten the image. Bright regions surrounded by dark regions grow in size, and dark regions surrounded by bright regions shrink in size. Small dark spots in images will disappear as they are `filled in' to the surrounding intensity value. This Process Make our source image color to opposite term. Applying HSI to get the Invert of the image. **Input:** Extracted Image

Gray= (Red+ Blue+ Green)/3

((0.3*R) + (0.59*G) + (0.11*B))

Output: Replace the original Red, Green and Blue value with the new Gray value

b) Equalize Technique:

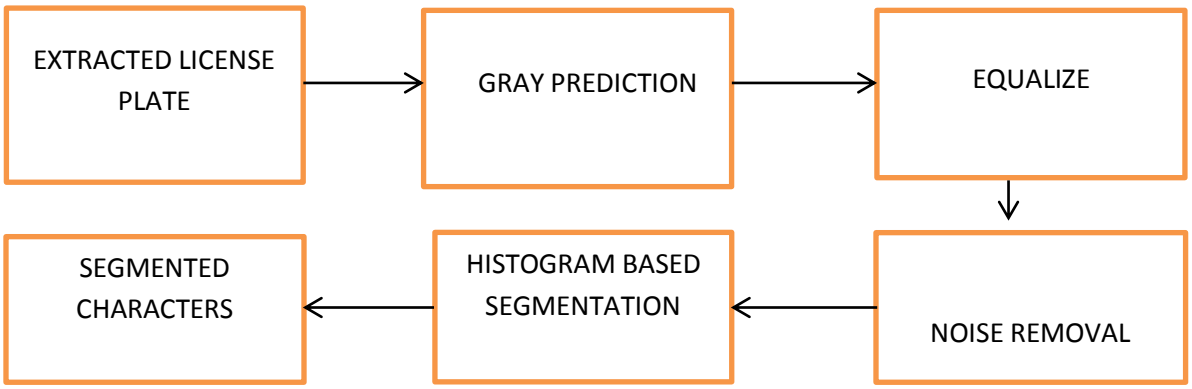
The spatial domain is represented by the conventional image. The processes of adjusting contrast, sharpening; background removal, etc. are all forms of spatial convolution

c) Noise Removal

Noise is the result of errors in the image acquisition process that result in pixel values that do not reflect the true intensities of the real scene. Linear filtering is used to remove certain types of noise. Certain filters, such as Gaussian filters as an averaging filter is useful for removing grain noise from an image.

Segmentation refers to the process of partitioning a digital image into the multiple segments(set of pixels as known as super pixels) the goal of segmentation is to simplify and or change the representation of an image into something that is more meaningful and easier to analyze.
We use an algorithm based on the histogram detects fragments and merges these fragments.

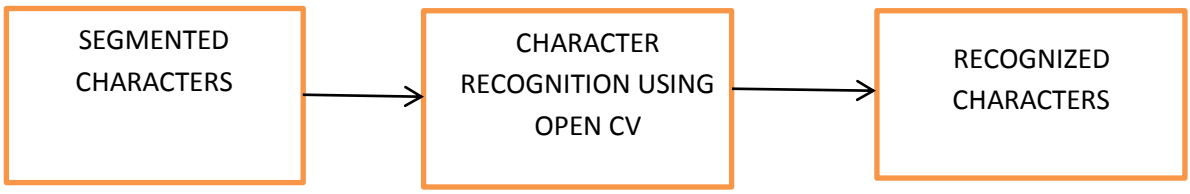
Histogram are constructed by splitting the range of the data into equal-sized bins (called classes). Then for each bin, the numbers of points from the data set that fall into each bin are counted.



D. CHARACTER RECOGNITION:

The extracted characters are recognized and the output is the license plate number of the vehicle. For the recognition of segmented characters, numerous algorithms use statistical classifiers, computational intelligence architectures, and common pattern-matching techniques are used.

Here, Convolutional Neural Networks is used to recognize the characters. The text can be extracted from the images and videos by using a method called OCR (Optical Character Recognizer) which can be used for extraction of text from image.This OCR can be done by interfacing the third party tool OpenCV



IV. CONCLUSION

This method of vehicle number plate identification needs a maximum degree of correctness when proposed system working on a very full of activity road or parking which may not be possible manually as a human being tends to get exhausted due to dull nature of job and they cannot stay path of vehicles when there are numerous vehicles are passing in a very short time.

Digital technologies allow significant cost and performance enhancements. For instance, processing embedded into the camera allows for reliable ANPR and reduces bandwidth requirements, allowing for easier to deploy and more cost-efficient solutions. Although some jurisdictions still require photographic proof for enforcement applications, advances in digital security techniques overcome the risk of faking.

V. REFERENCES

[1]. O. Bulan, V. Kozitsky, and A. Burry, "Towards annotation free license plate recognition," in Proc. IEEE 18th Int. Conf. Intell. Transp. Syst. (ITSC), Sep. 2015, pp. 1495–1499.

[2]. O. Bulan, S. Wshah, P. Ramesh, V. Kozitsky, and A. Burry, "Usdot number localization and recognition from vehicle side-view nir images," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit. Workshops, Jan. 2015, pp. 91–96.

[3]. C. N. E. Anagnostopoulos, I. E. Anagnostopoulos, I. D. Psoroulas, V. Loumos, and E. Kayafas, "License plate recognition from still images and video sequences: A survey," IEEE Trans. Intell. Transp. Syst., vol. 9, no. 3, Sep. 2008.

[4]. Q. Li, "A geometric framework for rectangular shape detection," IEEE Trans. Image Process., vol. 23, no. 9, pp. 4139–4149, Sep. 2014.

[5]. Y. Wen, Y. Lu, J. Yan, Z. Zhou, K. M. von Deneen, and P. Shi, "An algorithm for license plate recognition applied to intelligent transportation system," IEEE Trans. Intell. Transp. Syst., vol. 12, no. 3, pp. 830–845, Mar. 2011.