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REAL TIME VEHICLE NUMBER PLATE DETECTION USING OPENCV

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Abstract: Vehicle Number Plate Identification (VNPI) is a part of digital image processing which is generally used in vehicle transportation system to categorize the vehicle. Number plate recognition systems are having varieties of application such as traffic maintenances, tracing stolen cars, automatic electronic Toll collection system etc. Foggy image detection and estimation assist the field of computer vision with auto-focussing technique and quality assessment of the image. This has unlocked the field of Foggy image detection, Foggy image estimation and de-fogging of the images. Foggy image is defined as the phase of image where its content turns out to be difficult to read and understand. The image may become Foggy image owing to limited contrast, untimely exposure, improper lighting environment and indecorous device handling. The proposed work contributes a study on to remove the noise of the image which may hinder the process of Foggy image detection. To identify the optimal threshold value which form the basis of the foggy image detection. To classify the images into foggy image and not foggy image images based on the identified threshold value. A certain amount of difficulties to license plate recognition are caused by the environment of rain and fog. License plate recognition system for this kind of environment is studied in this paper, based on the theory of digital image processing, computer vision and pattern recognition technology.

Keywords: Foggy image, Vehicle number plate, Identification, Image clearance

I. INTRODUCTION

Because of the growing number of cars on the road today, the contemporary city must implement an effective and efficient automated traffic system to manage traffic law enforcement. In this situation, number plate identification plays a crucial role. Number plate recognition is an image processing approach that uses a digital camera or a colour or grayscale digital camera, as well as an infrared camera, to extract the image of a licence plate on a vehicle in order to identify the vehicle using its number plate. The Number Plate Recognition system uses a mix of techniques and algorithms to recognise characters on licence plates, including image pre-processing, object identification, character segmentation, and recognition. It has a camera that detects the number plate object and a processing unit that processes and extracts the characters as well as interprets the pixels into numerically readable characters. The ANPR system has been employed in traffic law enforcement applications such as speed cameras, traffic signal cameras, stolen vehicle identification, and border surveillance. It may also be utilised for building management tasks such as parking and gate control.

With the fast expansion of highways and the widespread use of automobiles, people have begun to place a greater emphasis on modern, efficient, and precise intelligent transportation systems (ITSs). Due to view point shifts, when vehicle bodywork and licence plates have similar colour, multi style plate formats, and

non-uniform outdoor lighting circumstances during picture collecting, number plate detection from vehicle photographs is rather difficult. Machine learning takes a new approach to the problem. The goal is to collect a huge number of number plates, referred to as training data, and then create a system that can learn from those instances. In other words, machine learning uses examples to infer rules for recognising number plates automatically. Furthermore, increasing the amount of training samples allows the network to learn more about numbers and characters, improving accuracy.

II. Literature Survey:

Boon Tatt Koik et al. (2013) proposed development of blur detection algorithms has attracted many attentions in recent years. The blur detection algorithms are found very helpful in real life applications and therefore have been developed in various multimedia related research areas including image restoration, image enhancement, and image segmentation. These researches have helped us in compensating some unintentionally blurred images, resulted from out-of-focus objects, extreme light intensity, physical imperfection of camera lenses and motion blur distortion. Overview on a few blur detection methods will be presented in this paper. The methods covered in this manuscript are based on edge sharpness analysis, low depth of field (DOF) image segmentation, blind image de-convolution, Bayes discriminant function method, non-reference (NR) block, lowest directional high frequency energy (for motion blur detection) and wavelet-based histogram with Support Vector Machine (SVM). It is found that there are still a lot of future works need to be done in developing an efficient blur detection algorithm.

Zhun Wang et al. (2015) proposed License Plate Recognition (LPR) is one of the key technologies of the intelligence of communication management. A certain amount of difficulties to license plate recognition are caused by the environment of rain and fog. License plate recognition system for this kind of environment is studied in this paper, based on the theory of digital image processing, computer vision and pattern recognition technology. In order to improve the ability to identify the license plate, Gamma correction algorithm and the denoising algorithm of color image are added to license plate locating method based on color. In the pre-processing of the segmentation method based on connected area detection, a kind of double color space binarization method is proposed by the article. Finally, a kind of adaptive fusion algorithm based on BP, RBF, GRNN neural network is proposed to finish the recognition for license plate character. Experiment shows that the method adopted by this system applied in the bad environment of rain and fog achieves good recognition effect.

Khushbu et al. (2017) presented Automatic detection of license plate (LP) is to localize a license plate region from an image without human involvement. So far a number of methods have been introduced for automatic license plate detection (ALPD), but most of them do not consider hazardous image conditions that exist in many real driving situations. OTSU based technique is best suited for hazardous image conditions having foggy weather effects, tilted LP area. In this technique after denoising and normalization of the image, the digits and characters within the image can be extracted. In this paper large database set of LPs under different conditions like clear images and images with foggy effects is considered and various performance parameters like MSE, PSNR, SSIM and Aspect Ratio are considered to extract the results. These parameters have shown improvement with percentage 14.93%, 14.12%, 39.21% and 40% respectively.

P. Surekha et al. (2018) proposed in recent times, the number of vehicles on road has exponentially risen due to which traffic congestion and violations are a menace on roads. Automatic License Plate Recognition system can be used to automate the process of traffic management thereby easing out the flow of traffic and strengthening the access control systems. In this paper, we compare the efficiency achieved by morphological processing and edge processing algorithms. A detailed analysis and optimization of neural network parameters such as regularization parameter, number

of hidden layer units and number of iterations is done. Here, a scheme is designed for implementation in real time and controlled using a graphical user interface suitable for the application of parking security in offices, institutions, malls, etc. The system utilizes image processing techniques and machine learning algorithms running on matlab and Raspberry Pi 2B to obtain the results with an efficiency of 97%.

Usman Ali et al. (2018) presented blur detection and segmentation for a single image without any prior information is a challenging task. Numerous techniques for blur detection and segmentation have been proposed in the literature to ultimately restore the sharp images. These techniques use different blur measures in different settings, and in all of them, blur measure plays a central role among all other steps. Blur measure operators have not been analysed comparatively for both of the spatially-variant defocus and motion blur cases. In this paper, we provide the performance analysis of the state-of-the-art blur measure operators under a unified frame work for blur segmentation. A large number of blur measure operators are considered for applying on a diverse set of real blurry images affected by different types and levels of blur and noise. The initial blur maps then are segmented into blurred and non-blurred regions. In order to test the performance of blur measure operators in segmentation process in equal terms, it is crucial to consider the same intermediate steps involved in the blur segmentation process for all of the blur measure operators. The performance of the operators is evaluated by using various qualitative measures. Results reveal that the blur measure operators perform well under certain condition and factors. However, it has been observed that some operators perform adequately overall well or worse against almost all imperfections that prevail over the real-world images.

Chinmayi Gurav et al. (2019) presented there are very large number of vehicles in India as it is very densly populated country across world. So, there is a need of detecting vehicles accurately using traffic management system. This system detects the image of the number plate of a vehicle from video using video processing with raspberry pi and the number is extracted using different methods and algorithms. The system is applicable for entrances of gates in colleges and highly restricted areas. When any vehicle passes by the system the video is captured and then video is converted into images using OpenCV software.

K. Akila et al. (2019) presented about license plate recognition using digital processing of images, where the image of a vehicle is taken and the number plate is then recognized by various layers of digital image processing. The number plate is then allowed to undergo optical character recognition (OCR), this extracts the data and then compares it with a database containing the details of the vehicle. This allows the user to identify the type of vehicle and the identity of the person who is driving the vehicle. It will denote the user about the registration of the vehicle by comparing it with the database of the registered vehicle in the area. The device will consist of a camera which will take the real time footage of the vehicles and a snap from the video of the vehicle is used to recognize the number plate. The processor will process the images and will display the number of the vehicle and the owner of the vehicle in the display, this is achieved by comparing the number of the vehicle with the previously fed data from the database. This device will provide an efficient way for automating a parking system where there will be no need for a human to interfere with the checking of the vehicle and providing passes for the vehicle.

Mahak Gupta et al. (2019) proposed one of the definitions of blurring with respect to Laplacian is decrease in the variance. Blurring with respect to frequency domain means low frequency where high frequency represents edge. It occurs either because of motion or out of focus parameter. Blur is classified in two types (Local and Global Blur). In this research paper, both the blurred and unblurred images are passed through Fourier transform which calculates the high frequencies as well as low frequencies from the images. In other words, it transforms image from spatial domain to frequency domain. Labels for both

blurred as well as unblurred images are chosen as the target i.e. 1 for blurred and 0 for unblurred. These set of images are trained using both support vector machine as well as logistic regression which are tested on the real time images which detects the blur from the images. Trained Model run over the real time image and captures the blur from it. Both state of art method i.e. support vector machine as well as logistic regression is compared in the terms of performance parameters and it is concluded from the results that later winds over the former in both accuracy as well as receiver operating characteristic curve.

P. Ezhilarasi et al. (2019) proposed around the world every vehicle are identified by its number plate. Number plate detection is one of the existing automated video surveillance systems that are used to detect the number plate. This system fails if the number plates are damaged, no proper illumination, blurry images. Thus here we will be able to recognize such damaged number plate. The technique involves four main stages viz. pre-processing, localization, recognition and segmentation. The entire process includes capturing the image, erasing the background details and removing the noise, cropping the number plate and then recognizing the characters followed by segmenting in order to recognize the plate. All this is done in Python because it had better results compared to MATLAB. When done in MATLAB, additional error and noise gets added to the input image and can causes inclusion of a new characters in the number plate and leads to misinterpretation of the number plate. About 100 images were gathered and 98 images of them were detected correctly. The efficiency in recognizing the damaged number plate using our system is about 98%.

Tella pavani et al. (2019) presented License Plate Recognition was a computer system that recognizes any digital image automatically on the number plate. This system includes various operations such as taking pictures, localizing the number pad, truncating characters and OCR from alphanumeric characters. The main idea of this system is to design and develop effective image processing techniques and algorithms to localize the license plate in the captured image, to divide the characters from that number plate and to identify each character of the segment by using the Open Computer Vision Library. This has been implemented in K-NN algorithm and python programming language. Many applications can be implemented by using this system, such as security, highway speed detection, violation of light, identification of handwritten text, discovery of stolen cars, automatic fee collection systems.

III. Conclusion:

This study offers a concise analysis of vehicle number plate detection and recognition techniques utilised for effective traffic monitoring, as well as a rating of the dependability of the systems. A identification system and vehicle number plate detection are essential components of a smart transportation network. Even if it has become more difficult to read car number plates due to shifting lighting, glare, non-uniform licence plates, a variety of styles, and colour effects in the environment, the work has always been difficult.

Recognitions may use some image processing techniques in conjunction with neural networks to detect number plate characters, moving distance images, numbering systems, tilted or side-view shots, etc. This study's classification of vehicle number plate detection and recognition methods was based on their accuracy. High-resolution cameras with more frames will be preferred in the future for better performance and successful licence plate identification. The categorization part's complexity, speed, and chronological order could all be improved. This research contains a thorough assessment of progress and future trends in the identification and recognition of modern car licence plates, which may be useful to scholars interested in this area.

References:

[1]. Boon Tatt Koik, Haidi Ibrahim, "A Literature Survey on Blur Detection Algorithms for Digital Imaging", 2013 First International Conference on Artificial Intelligence, Modelling & Simulation, 978-1-4799-3251-1/13 $31.00 © 2013 IEEE DOI 10.1109/AIMS.2013.50.

[2]. Chinmayi Gurav, Vedika Kamble, Rupali Gurav, Prof. Neha S. Sakhalkar, "A Review Paper on Vehicle Number Plate Recognition", International Journal of Engineering Research & Technology (IJERT), Volume 8 Issue 04, April-2019.

[3]. K. Akila, B. Sabitha, R. Jayamurugan, M. Teveshvar, N. Vignesh, "Automated License Plate Recognition System using Computer Vision", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8 Issue-6, August, 2019.

[4]. Khushbu, Isha Vats, "Automatic License Plate Detection in Foggy Condition using Enhanced OTSU Technique", International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 1, November 2017.

[5]. Mahak Gupta, Jaspreet Kaur, "Automation in Blur Image Detection with Segmentation using Machine learning", International Journal of Advanced Research in Computer and Communication Engineering, Volume 8, Issue 3, March 2019.

[6]. P. Ezhilarasi, S. Rajeshkannan, Kovendan. A K P, T. Sasilatha, K. R. Kayalvizhi, "Damaged Number Plate Recognition", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9, Issue-1S2, December 2019.

[7]. P. Surekha, Pavan Gurudath, R. Prithvi and V.G. Ritesh Ananth, "Automatic License Plate Recognition using Image Processing and Neural Network", ICTACT Journal On Image And Video Processing, May 2018, Volume: 08, Issue: 04.

[8]. Tella pavani, DVR Mohan, "Number Plate Recognition by using open CV- Python", International Research Journal of Engineering and Technology (IRJET), Volume: 06 Issue: 03, March 2019.

[9]. Usman Ali and Muhammad Tariq Mahmood, "Analysis of Blur Measure Operators for Single Image Blur Segmentation", Applied Science 2018, 8, 807; doi:10.3390/app8050807.

[10]. Zhun Wang, Zhenyu Liu, "Improvement of the Vehicle License Plate Recognition System in the Environment of Rain and Fog", International Conference on Information Technology and Management Innovation (ICITMI 2015).