AUTOMATIC NUMBER PLATE RECOGNITION SYSTEM FOR VEHICLE IDENTIFICATION USING MACHINE LEARNING

Ms. Sayali Lokhande[1], Ms.Pragati Sahane[2] , Ms. Sonali Katare[3], Ms. Dnyaneshawari Tawhare[4] , Mrs.Sweta Khandekar

Abstract—Automatic Number Plate Recognition (ANPR) is an image processing technology which uses number (license) plate to identify the vehicle. The objective is to design an efficient automatic authorized vehicle dentification system by using the vehicle number plate. The system is implemented on the entrance for security control of a highly restricted area like military zones or area around top government offices e.g. Parliament, Supreme Court etc. The developed system first detects the vehicle and then captures the vehicle image Vehicle number plate region is extracted using the image segmentation in an image. Optical characte r recognition 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's owner, place of registration, address, etc. The system is implemented and simulated in Matlab, and it performance is tested on real image. We proposed the automatic vehicle identification system using vehicle license plate is presented. The system use series of image processing techniques for identifying the vehicle from the database stored in the PC. The system is implemented in Matlab and it performance is tested on real images. The simulation results shows that the system robustly detect and recognize the vehicle using license plate against different lightening conditions and can be implemented on the entrance of a highly restricted areas.

Introduction: The Automatic Number Plate Recognition (ANPR) was invented in 1976 at the Police Scientific Development Branch in the UK. However, it gained much interest during the last decade along with the improvement of digital camera and the increase in computational capacity. It is simply the ability to automatically extract and recognition a vehicle number plate's characters from an image. In essence it consists of a camera or frame grabber that has the capability to grab an image, find the location of the number in the image and then extract the characters for character recognition tool to translate the pixels into numerically readable character. ANPR can be used in many areas from speed enforcement and tool collection to management of parking lots, etc . It can also be used to detect and prevent a wide range of criminal activities and for security control of a highly restricted areas like military zones or area around top government offices. The system is computationally inexpensive compare to the other ANPR systems . Besides the robustness, the earlier methods use either feature based approached using edge detection or Hough transform which are computationally expensive or use artificial neural network which requires large training data . The presented ANPR system is aimed to be light weighted so that it can be run real time and recognizes Sindhstandard number plate under normal conditions. The ANPR system works in three steps, the first step is the detection and capturing a vehicle image, the second steps is the detection and extraction of number plate in an image. The third section use imagesegmentation technique to get individual character and optical character recognition (OCR) to recognize the individual character with the help of database stored for each and every alphanumeric character. The rest of the paper is organized as follows: will present the software and hardware models of the developed ANPR system. will present the simulation results obtained using the developed ANPR system. Section 4 discusses the results briefly and finally will end the paper with conclusion and future works.

II.Related work(Literature Survey)

K.K. Kim et. al (2000) built a license plate recognition system by following a learning protocol. The camera captures an image inside the car detection module. Then, the picture of the candidate region is provided as output. The two TDNNs were taken as the horizontal andvertical filters to find the license plate. The segmentation rate was 97.5 per cent, and a recognition rate of 97.2 per cent for the proposed system .

- **Chin-Chuan Han et. al (2007)** suggested a device that not only tracks several targets but also obtains highquality images on plate numbers. A

computer with a tuned dual-camera system has been built here by the author; a stationary camera and a pan-tilt-zoom camera are designed to monitor moving conveyance in an open field. The license plate for recognition has been sequentially identified by CNN classifier. As 64 vehicles entered this region illegally, data was composed manually from the science pictures and 59 IDs were accurately detected using this tool

✦ **Madhusree Mondal et. al (2017)** developed an ANPR framework focused on the learning capabilities of convolutional neural networks. The self-synthesized function of CNN was aAused here, as it distinguishes the vehicle states from the number plate.

The system was organized in this work in an echelon network of feature detectors that conducted consecutive processing of visual data pertaining to the dominant visual processing experience of the visual cortex, which influenced the computational model of the CNN. The findings of this research were observed with fewer training samples and turned out to be as 90 per cent higher precision rate

✦ **Andrew S. Agbemenu et. al (2018)** proposed an ANPR method based on the characteristics and variations of the plates therein. The author has proposed in this work an algorithm that is enhanced to perform with Ghanaian license plate for conveyance. The designed model used two candidate detection algorithms as the detection of edges and the algorithms matching the template. The device then implemented the character segmentation technique particularly with square plates to prevent noise effects, arrangement of characters and skewing. At the final point, character recognition was rendered with the use of tesseract OCR engine. Feature detection was slightly low but had a good success rate, with an average speed of 0.185s detecting 454 plates with 90.8 per cent accuracy. The optical character recognition provided an average of 0.031s for the procedure and successfully identified approximately 60 per cent of the detected plates .

✦ Nazmus Saif et. al (2019) have proposed a system to detect and recognize the Bangla license plate from the vehicle picture by using the convolutional neural networks. In this work, main focus to choose convolution neural network in the designed system is preferred because of its configuration for the end-to-end pipeline. CNN clearly outperformeconventional image processing algorithms for their case, and compared generalized CNN models better in different scenarios. The detection research was done using YOLOv3 which consists of 53 convolutional model layers. The second stage after identification is image segmentation and recognition of the characters it is. During this step, the device whips out the number plate region and then moves it to the second YOLO model for segmentation and platform image recognition. As a result, the model was checked with 200 images and correctly recognized the license plate number for 199 images, i.e. 99.5 percent accuracy rate ✦ *Shally Gupta, Department of Information Technology, College of Technology, Govind* Ballabh Pant University of Agriculture and Technology, India, E-mail: shally.gupta.rdr@gmail.com Received date: July 01, 2020; Accepted date: July 20, 2020; **Published date: July 28, 2020** This paper describes a study of vehicle number plate identification in traffic surveillance. ANPR is very helpful and reliable for efficient traffic monitoring. Device with powerful image processing technique can easily detect interested vehicles from various angles and view owner information as output. ANPR systems play an important role in the growth of the smart transport network. Recognition may use the image processing technique combined with neural networks to identify the number plates where the angled or side view images, moving distance images,numbering scheme, and number plate type (background) can be further improved. Detection of objects and neural networks is useful for detecting side views or tilted images and moving images from distance.

III. Flow Diagram

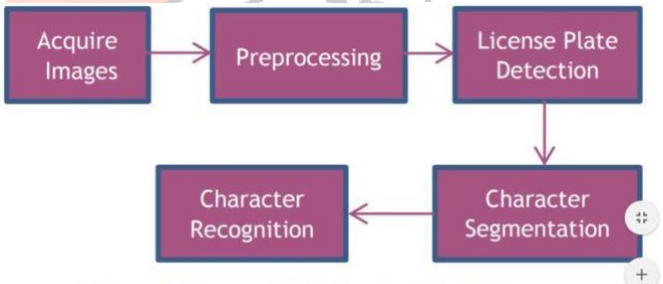

Figure 1: License Plate System Block Diagram

IV. Proposed System

To recognize number plate first of all add templates from A-z and 0-9 and add them into mat file. After that read the image and change over that image into gray scale. Presently the following stride is to find out threshold estimation of the image. In the wake of finding T-esteem change over that image into binary

V. Conclusion

a study of vehicle number plate identification in traffic surveillance. ANPR is very helpful and reliable for efficient traffic monitoring. Device with

powerful image processing technique can easily detect interestedvehicles from various angles and view owner information as output. ANPR systems play an important role in the growth of the smart transport network. Recognition may use the image processing technique combined with neural networks to identify the number plates where the angled or side view images, moving distance images,numbering scheme, and number plate type (background) can be further improved. Detection of objects and neural networks is useful for detecting side views or tilted images and moving images from distance. is to use high-resolution cameras with an increased . number of frames for good accuracies and improved accuracy for recognition in future.

VI. References

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