

Strategies in Traffic Controlling Operations in India

Anuja R. Taywade¹, Pooja Lapkale², Sneha V.Ramteke³, Vaibhavi A Vairagade⁴, Dr. Prakash S. Prasad⁵

Under Graduate Students, Computer Science and Engineering Department, Priyadarshini Institute of Engineering and Technology, Nagpur^{1,2,3,4}

Professor and Head of Computer Science and Engineering Department, Priyadarshini Institute of Engineering and Technology, Nagpur, Maharashtra, India⁵

Abstract: Recently it has been observed that the traffic signals are operating at every square. The Roads shows zebra crossing for the pedestrians to use. While traffic signals are used to regulate the traffic but it is also seen that there are many accidents occurring because of traffic violations. This paper illustrates how the traffic can be watched by using the sensors so that the traffic can be restricted and will be followed properly without violation. Also would make work easier of RTO by directly sending email and message of ticket.

Keywords: Motion Sensors, Camera, Traffic Lights.

1. INTRODUCTION

Now a days there is important responsibility on traffic controller. Traditional traffic signal system in use is control the traffic but if someone breaking a signal then this system is not able to catch them. Therefore to increase the security and to reduce the accidents it needs more traffic police at the every signals. Because of this the human efforts is increase. So smart traffic signal device is essential to make the traffic signal robust and secure .To reduce the human efforts and to increase the efficiency of traffic signal for detecting the vehicle which are breaking the signal we propose a system which will help traffic control unit to identifying the law breakers.

As we know that the traffic lights are automatically getting ON and OFF depending on the timer value, this means the traffic signals are working efficiently. But sometimes the law breakers just break the rules while the RED light is ON. The vehicles are detected by the system with the use of sensors and cameras where the camera will be place alongside the traffic light which will capture image sequences.

Using sensors, the vehicles are monitored with reference to the traffic light indicators. Whenever a RED light is ON, the sensors will be activated. If a vehicle exceeds the control line on the road, after RED light is ON, the microcontroller switches ON the camera, and the images are captured. The captured image goes under the process of image processing and number plate of that particular vehicle is detected. Challan that is the ticket is send via sms and email.

2. RELATED WORK

Dr. Prakash .S Prasad , Shreya A. Patil , Sneha V.Ramteke and Vaibhavi A. Vairagade proposed that detecting the vehicle which crosses the light ray transmitted from IR transmitter, while the RED light is ON .The infrared rays reflected back from the signal breaking vehicle to the IR receiver. The IR receiver sends the message to the microcontroller kit, so that the microcontroller make the cam aware about the signal breaking .Sensor will send signal to the camera for capturing image. Captured image will be stored in the camera's SD card, which will be collected by traffic controller and check it out.

G. Monika N. Kalpana and Dr .P. Gnanasundari proposed that infrared radiation (IR) is electromagnetic radiation with a wavelength between 0.7 and 300 micrometers, which equates to a frequency range between approximately 1 and 430 THz. Its wavelength is longer (and the frequency lower) than that of visible light, but the wavelength is shorter (and the frequency higher) than that of terahertz radiation microwaves. Bright sunlight provides an irradiance of about 1 kilowatt per square meter at sea level. Of this energy, 527 watts is infrared light, 445 watts is visible light, and 32 watts is ultraviolet light.

Kartikeya Jain, Tanupriya Choudhury and Nirbhay Kashyap proposed a system which is used to vehicle identification using the OCR(optical character reorganisation) system which provides the efficient and reliable output. OCR is the system which is used to store the number plate of the vehicle in the database. The number plate is obtained from the



image of the vehicle which is then sent to OCR system which then processes the image and the number plate portion of the vehicle. Once the number plate of the vehicle is detected the characters will be recognized.

1. Scanning the image:-

It is initial step of the OCR system. In this stage the camera captures the image of vehicle. All the captured images will be stored in the set 'X'. The number plate can be of any of the two colours i.e. it can be either yellow or white which contains the intensity of three colours: R (Red), G (Green) and B (Blue). The number plate is converted into binaries on the basics of RGB colours.

2. Processing the image:-

After the image is captured in the initial step, then the captured image is processed so that the image is modified. It is generally done to improve the quality of the image. It involves two steps

a. Conversion of RGB into gray scale:

Here the image of the number plate which is in R (Red), G (Green) and B (Blue) form is converted into gray scale format.

b. Contrast enhancement:

The captured images are enhanced by using histogram equalization on the gray scale image to improve the contrast of the image and to improve the quality of the captured vehicle image.

3. Number plate localization:-

In this step the gray scale image is converted to the

Binary image. Let us consider that 'Y' be the set of number plates. Along with checking the number plate the system will also allocate the parking space .

4. Character segmentation and recognition:

Characters are divided in the blocks and this division into blocks is on the basics of Sobel edge detection. Segmentation is an important process of vehicle recognition because all other steps rely on the output of this step. The segmentation can be horizontal or vertical. If the segmentation of the number plate not done properly then it is difficult to recognize the number plate. The segmentation process sometimes considers extra elements which are unnecessary in the recognition of numbers in the number plate. The structure of the characters after normalization similar to the shape of characters and these are not separable by traditional OCR methods as these differ in size and orientation.

5. Output characters:-

After the characters are recognized they are aligned in a sequence and are stored in the database.

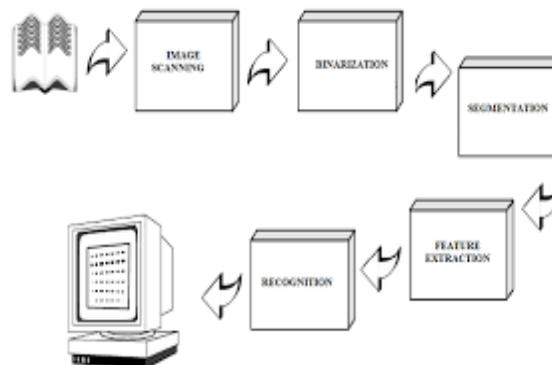


Fig:Process of OCR

Annet Ronika.D and M.S.Godwin Premi proposed that moving vehicles generate different patterns depending on their working conditions and information necessary to classify the vehicles. The processing time is proportional to the size of the input images which will reduce the image size by performing image normalization. The image has normalized resolution. As the working process of the proposed system have been started sensor signal sense signal from the camera which will capture video of the vehicle number plate .the license plate video processing is converted into frames . Analysis number plate detection by character recognition and character segmentation to recognize the license plate. The image is loaded to the morphological processing involves to gray scale conversion which is include with gray scale into



binary images are extracted from morphological process Images are resizing through the pixel values by converting through the frame conversion of the images .The vehicles number plate has been stored and also compared with database which already exists in the database. While entering the number plate it will detection recognition by perception once the vehicle number plate stored in the database it need not over write in database if not saved in the database need to enter the vehicle number plate in the database it will stored as the output of recognition by perception.

3. PROPOSED METHODOLOGY

Methodology for the license plate recognition system.

A. Image acquisition

The efficiency of the algorithm depends on the quality of the acquired image. The image having the highest resolution can be easily extracted and has more accuracy. 40 images of different vehicle's are captured and stored as a database.

B. Pre-processing

The most important in ANPR system is to correctly extract the region of the number plate from the image. The extraction of number plate is based on some features such as the rectangular region over the number plate, characters on the number plate etc. Before the extraction of number plate pre processing operation used to reduce the complexity during the extraction of the number plate and also it reduces the computation time. The input image (RGB) is converted into gray scale image which having intensity level ranging from 0 to 256. The grey scale image is then resized and cropped in order to obtain the region of interest.

C. Character Extraction

Thresholding creates binary images from gray-level by making all pixels below some threshold to zero and all pixels above that threshold to one. Thresholding is done by using the Otsu's method .It is used to maximize the inter class variance between the pixel so that the foreground object can be distinguished from the background image. The mathematical expression for the Otsu's method is given by the following equation.

D. Character segmentation

The character segmentation is a major step, as the accuracy of the character recognition relies on the accuracy of the character segmentation. Various algorithms are developed such as connected component analysis, template matching method etc. we are using the projection method in order to segment each character from the number plate. In order to extract the each and every character, the starting and ending location of plates and top and bottom of the plate is to be determined. Addition of the individual columns and individual rows of the extracted number plate gives the horizontal and vertical projection. The average local minima of the horizontal and vertical projection is taken to threshold the horizontal and vertical projection of the image. The characters are segmented based on the x and y location of the image. The x locations of the plate is determined by change in black to white pixel for all the characters in the image which stores the value when the pixel value changes from 0 to 1.

E. Character Recognition

The segmented characters are given as an input to the character recognition system and the output is the license plate number. The character recognition involves a lot of challenges due to the different size of the segmented characters, breaks occurring in certain characters etc. Template matching method is one of the techniques used for optical character recognition. It can only recognize the character that shows a similarity with the standard template created for each character in the database. In this paper artificial neural network is used to improve the performance of the character recognition.

The goal of this section is to elaborate on the methods of finding the vehicles plates location in captured images. Generally a monochrome camera with a synchronous IR projector and a colour camera are employed in a multi-purpose industrial ANPR system. The monochrome camera with IR projector is responsible for plate detection during the night or other low illumination conditions.

It is worthwhile to note that for the IR projector to be effective the vehicles plates should have been coated with IR reflective materials. The role of IR projectors is also important in detecting dirty plates even in daylight by taking care of the camera exposure time. IR projector power has a close relation with the camera exposure time and the exposure time plays an important role in the final clarity of the vehicles plates. Since vehicles move swiftly, high values of exposure time lead to blurred images while low exposure time values produce dark images. Therefore, it is important to tune the output power of IR projector with respect to the exposure time of the monochrome camera. It is also necessary to have an adaptive procedure to fine-tune the exposure time based on the lighting conditions.



Modifying the exposure time is performed in an adaptive procedure that gets its feedback from the thickness of plate characters. Having thin characters is a sign of high ambient light. In this case, we must decrease the exposure time. On the other hand, achieving thick characters shows that the environmental light is low and we must increase the exposure time.

The modification steps are dependent on the setup and application and must be found experimentally. For example, at sunrise, sunlight reflects from vehicles that move from east to west. In such cases, exposure time should be lowered down to a value that eliminates the reflections.

4. CONCLUSION

This paper focuses in on vehicle detection. Studies reviewed suggests that information about the vehicle was stored in a database and image pre processing techniques are applied to improving contrast and remove noise from the images.

This review shows the how these vehicle detection methods plays an important role in the traffic surveillance systems gives better understanding and highlights the issues and its solutions for traffic surveillance systems.

REFERENCES

- [1] Vaibhavi A. Vairagade, Sneha V.Ramteke, Shreya A. Patil, Dr. Prakash S. Prasad, "Fourth International Conference on Advances in Engineering , Pharmaceutical and Applied Sciences" , 2017
- [2] Ozbay.S, and Ercelebi.E, "Automatic vehicle identification by Plate Recognition", Processing of world academy of science engineering and technology vol9, 2005
- [3]Annet Ronika D., M.S. Godvwin Premi, "Development of Real Time Vehicle Entry Monitoring System", International conference on circuit,power and computing technologies,2015
- [4]Riazul Islam, Kazi Fatima Sharif and Satyen Biswas, "Automatic Vehicle Number Plate Recognition using Structured Elements", IEEE conference on systems, process and control,18-20 December 2015
- [5] Mahesh Babu K, M V Raghunadh, "Vehicle Number Plate Detection and Recognition using Bounding Box Method" International conference on advanced communication control and computing technologies, 2016
- [6]A.George,V.J.Pillai, " VNPR system using Artificial neural network", International conference on circuit,power and computing technologies,2016
- [7] Kartikeya Jain, Tanupriya Chaudhury, Nirbhay Kashyap, "Smart vehicle Identification System using OCR", 3rd IEEE International conference on "computational intelligence and communication technology" , 2017
- [8]Achint Kaur , Urmila Shrawankar , "Adverse conditions sssand techniques for cross-lingual Text Recognition", International conference on innovative mechanisms for industry application,2017
- [9] Rhim Panahi, Iman Gholampour, "Accurate Detection and Recognition of Dirty Vehicle plate numbers for High Speed Applications"

BIOGRAPHY



Dr. Prakash S. Prasad is working as Professor and Head of Computer Science and Engineering Department at Priyadarshini Institute of Engineering and Technology. He is having 20 years of experience in the field of teaching to engineering students. He completed his engineering in 1997, master of engineering in 2006 and PhD in 2014. He is the member of IEEE, IACSIT, CSI, ISTE. He is having more than 36 research paper published in international journals and conferences. He is the editorial member of few international journals. His interest includes real time operating system, kernel programming, system software and operating systems.