

VEHICLE SPEED ESTIMATION AND LICENSE PLATE DETECTION BY TRACKING

¹Amith S Kenchesh, ²Chinmaya G R, ³Kishan M A, ⁴Syed Maaz, ⁵Prof. Naveen Kumar K R

^{1,2,3,4}Students, ⁵Professor

Computer Science and Engineering Department, BIET
Davangere, India

Abstract: Recognition of cars is extremely vital for the management and police investigation systems. The Vehicles are recognized by a variety of plates and speeds that contain a novel combination of alphabets and numbers. However, it is an exhausting and intensive job for humans to manually acknowledge all the lay or passing automobile variety plates. During this paper, we have a tendency to approach coaching primarily based pathway for vehicle variety plate recognition and speed detection with the trailing system. Most of the previous works in automatic variety plate recognition (ANPR) systems have limitations in their operating conditions, like for instance proscribing them to stationary backgrounds, indoor space, restricted vehicle speeds, prescribed driveways, mounted illumination, or match the predefined distance between camera and vehicle. The most objective of our work is to make a sturdy variety plate recognition and speed detection model that works underneath totally different illuminations and angles. If the speed of the automobile is reached some threshold value, detect the vehicle owner and send the Message.

Keywords: Machine Learning, Python, Keras, Twillow

I. INTRODUCTION

Introduction- In the era of technology, the number of vehicles on the road is increasing. Besides that, with advanced technology, the vehicle manufacturers manufacture the vehicle with the only quality. At a similar time in addition, manufacture the vehicle which is able to move faster and faster by enhance the vehicle engine and increase the utmost speed of the vehicle. The number of cases of accidents that happen on road, in addition, increasing dramatically. So, there is a demand to have a low-cost vehicle speed detector system.

However, the instrumentation to use this system is pricey. So, finding totally different instrumentation to chop back the value is vital. Image method technology can serve this well. Beholding can use to identify and track the vehicle. The task of finding the target object in a very image or video sequence is also done by beholding. Image method technology does not want any special hardware. It's supported the software system package half. A typical video recorder and a portable computer area unit are enough to create a vehicle speed detection system.

A video police work is also a really talked-about analysis topic in portable computer vision applications that endlessly tries to sight, acknowledge and track the targets. Every trailing methodology desires a detection methodology in every single frame. Object trailing is that technique the tactic the strategy of following one or extra objects found on the detection method victimization camera. The background is that the foremost typical methodology used for simple object trained workers.

II. LITERATURE SURVEY

Xiao C. H. and Yung N.H.C., [1] in the year 2017 presented "Vehicle Speed Detection from Camera Stream Using Image Processing Methods" The paper deals with the topic of detection of vehicle speed based on information from video record.

F. Perez-González, R. López-Valcarce, and C. Mosquera [2] in the year 2020 presented "A Review Paper on License Plate Recognition System" ANPR provides solution in which the steps to run an efficient intelligent transport network might be taken.

R. Minetto, N. Thome, M. Cord, N. J. Leite, and J. Stolf [3] within the year 2010 "Vehicle Speed detection victimization Frame Differencing for sensible Surveillance System" given This paper presents vehicle speed detection formula and its application for sensible closed-circuit television victimization laptop digital computer at the chosen road lane.

D. G. Lowe[4] in the year 2014 presented Distinctive Image Features from ScaleInvariant Keypoints vehicle speed detection is used to estimate the velocity of the moving vehicle using image and video processing techniques.

Carlo Tomasi and Takeo Kanade[5] within the year 2014 bestowed "Detection and chase of purpose options, In general, human will simply scan the character however the pc cannot scan the character simply unless the pc is pre-trained to try and do thus. VLPR deals with car place plate|vehicle plate|registration code} localization and vehicle number recognition.

C. Maduro, K. Batista, P. Peixoto, and J. Batista[6] in the year 2008 presented "Estimation of Vehicle Velocity and Traffic Intensity Using Rectified Images," Traffic control and vehicle owner identification has become major problem in every country. H. Zhiwei, L. Yuanyuan, and Y. Xueyi,[7] in the year 2017 presented Models of Vehicle Speeds Measurement with a Single Camera," which in turn affects the recognition accuracy numerous algorithms are developed for this work.

H. A. Rahim, U. U. Sheikh, R. B. Ahman, and A. S. M. Zain[8] in the year 2010 presented Vehicle Velocity Estimation for Traffic Surveillance System", The paper presented a vehicle speed estimation algorithm based on moving target detection in video surveillance.

Schoepflin T.N. and Dailey D.J [9] within the year 2003 bestowed Dynamic Camera activity of wayside Traffic Management Cameras for Vehicle Speed Estimation,” the automated range plate recognition (ANPR) could be a mass intelligence operation strategy that uses optical character recognition on footage to examine the tags on vehicles.

L. Grammatikopoulos, G. Karras, and E. Petsa [10] within the year 2005 conferred Automatic Estimation of auto Speed from Uncelebrated Video Sequences,” From the arrival of augmented transportation, over dashing of vehicles has become one in all the main causes for accidents and killing several lives.

Ilkwang Lee, Hanseok Ko, and D.K. Han [11] within the year 2002 conferred Multiple Vehicle pursuit supported Regional Estimation in Night- time CCD pictures,”Road safety could be a concern of all authorities. one in all the foremost necessary safety considerations is excessive speed which ends up in accidents, injuries, death, still as harm publicly property.

Kuan-Hui Lee, Yong-Jin Lee, and Jenq-Neng Hwang [12] in the year 2013 presented “Multiple-kernel Based Vehicle. Tracking Using 3-d Deformable Model and License Plate Self-similarity,”This paper discusses 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.

C.N.E. Anagnostopoulos, I.E. Anagnostopoulos, I.D.Psoroulas, V. Loumos, and E. Kayafas,[13] in the year 2014 presented License Plate Recognition From StillImages and Video Sequences: A Survey,”

III.METHODOLOGY

Software: Software needs cope with shaping code resource needs and conditions that require to be put in on a pc to supply optimum functioning of an application.

These needs or conditions square measure usually not enclosed within the code installation package and want to be put in one by one before the code is put in.

Python3, Windows, Tensorflow, OpenCV, Keras.

Hardware: The power of the central process unit (CPU) could be a basic system demand for any software system. Most software system running on x86 design outline process power because the model and also the clock speed of the central processing unit. Several alternative options of a central processing unit that influence its speed and power, like bus speed, cache, and unit are usually unheeded. This definition of power is commonly inaccurate, as AMD Athlon and Intel Pentium CPUs at similar clock speed usually have completely different output speeds.

PC, 8GB RAM, 16GB SD Card, i5 Processor.

Formulae used:

This library is used for calculating the speed of the moving vehicle. The formula used for calculating speed is = ((distance) / (seconds)).

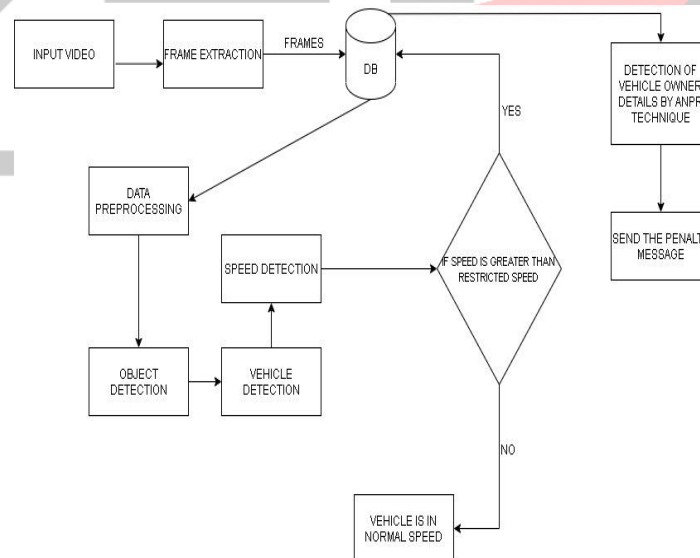


Fig: Proposed Methodology for Vehicle Speed Estimation and License plate Detection by Tracking.

1. BACKGROUND SUBTRACTION

If you have got a picture of background alone, like a picture of the space while not guests, image of the road while not vehicles etc. it's a simple job. Simply reckon the new image from the background. You get the foreground objects alone. However in most of the cases, you'll not have such a picture, therefore we want to extract the background from no matter pictures we've got. It becomes additional sophisticated once there are shadows of the vehicles. Since shadows conjointly move, easy subtraction can mark that conjointly as foreground. This project has enforced 3 such algorithms that are terribly straightforward to use.

2. BACKGROUND SUBTRACTION_MOG

It is a Gaussian Mixture-based Background/Foreground Segmentation Algorithm. It uses a method to model every background pixel by a combination of K Gaussian distributions ($K = 3$ to 5). The weights of the mixture represent the time proportions that those colors keep within the scene. The probable background colors as those that keep longer and a lot of static. Whereas secret writing, we need to create a background object using the perform, cv.create Background Subtractor MOG().

3. OBJECT DETECTION

Object detection may be an engineering associated with pc vision and image process that deals with sleuthing instances of linguistic objects of a particular category (such as humans, buildings, or cars) in digital pictures and videos. Object detection has applications in several areas of computer vision, including image retrieval and video police work.

4. SPEED DETECTION

The speed of the moving vehicle is calculated using time().

Import numpy as np

Import timeit

Import datetime

Import time

This libraries are used to calculate the speed of the moving vehicle. The formula used to calculate the speed is:

Speed=((distance)/(seconds)).

4. IMAGE STORING

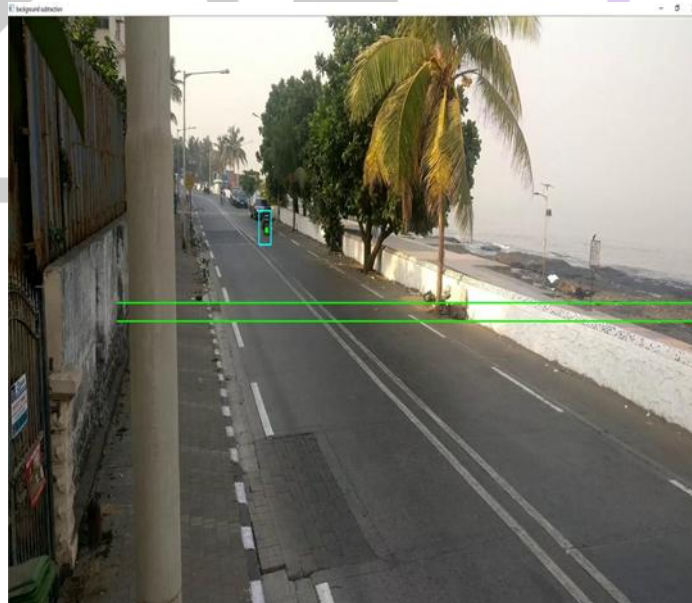
If the vehicle passes a certain limit of range, then the system captures the images and stores it in the folder. The images are stored as per the lanes i.e. Lane_1 and Lane_2 in the OFFENDER folder. The images can be viewed later also by the supervisor or the officer.

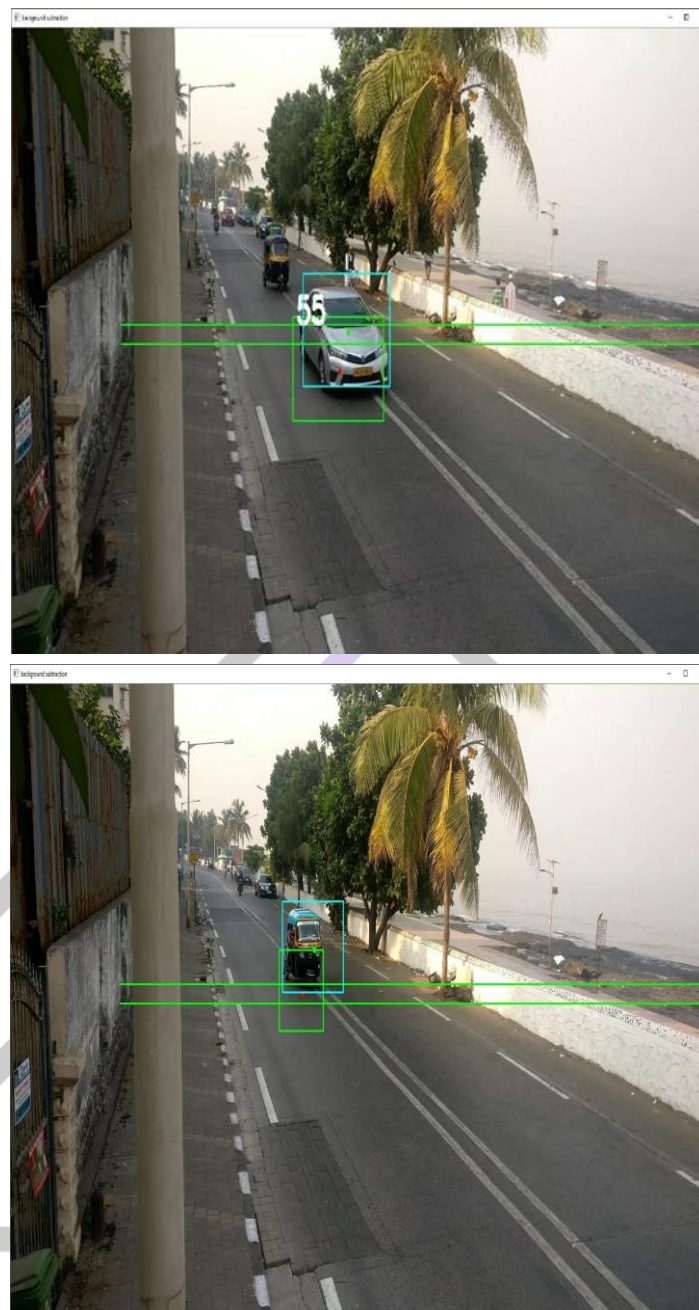
5. MESSAGE SENDING

When the vehicle speed matches or exceeds the threshold value, then the penalty message is sent to the vehicle's owner through mail.

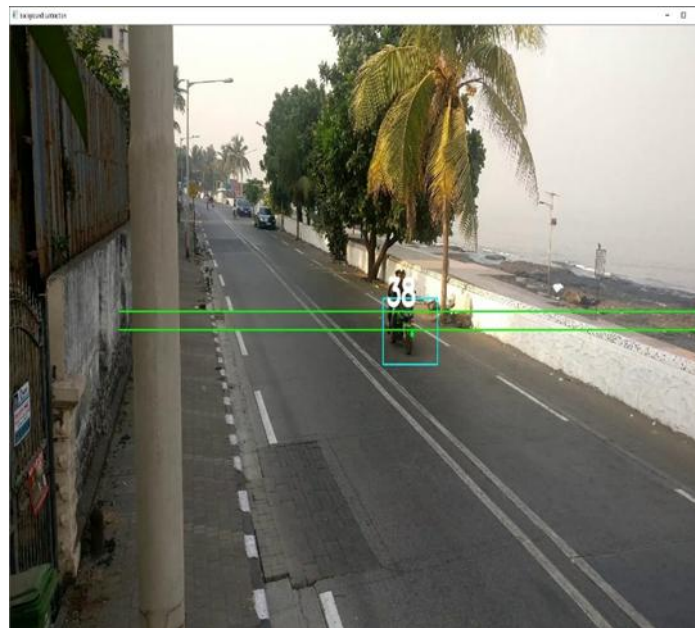
IV. RESULTS

Fig: Here, the camera starts recording and detecting the vehicle moving on the road. The line shown in above fig acts as a line that acts as point of detecting the vehicle as well as the speed of the vehicle passing across it.



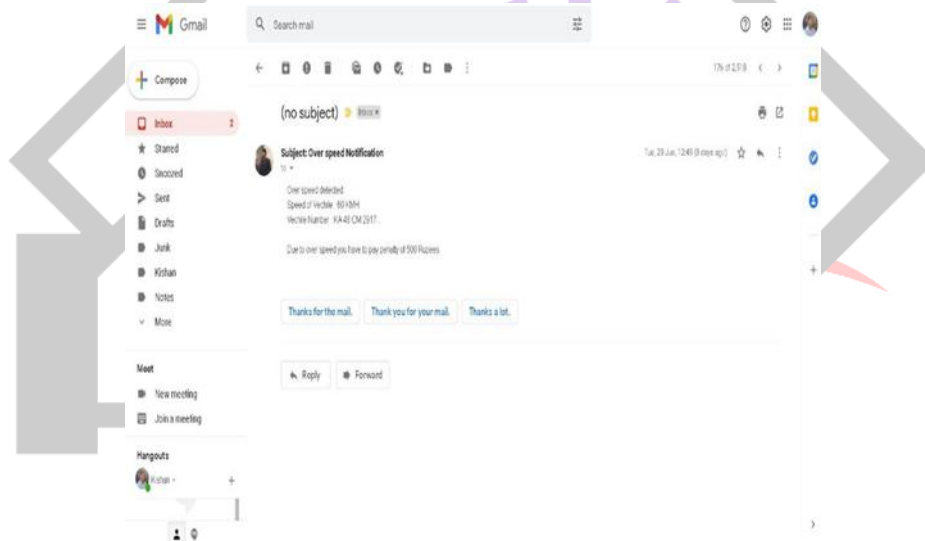


In the above fig the vehicle moving on the road is detected. The rectangle that surrounds the vehicle depicts the object (i.e. vehicle) moving. The rectangle in blue indicates that the vehicle is moving from right lane or right side of the road, and the rectangles with green color indicates the vehicle is moving from left. As the vehicle is moving in between of both lane both rectangles are seen.



In the above fig the rectangle in blue indicates that the vehicle is moving from right lane to right side of the road. Once the vehicle passes the speed limit its speed is detected and displayed. The speed of above vehicle is 38km/h.

In above fig the vehicle is seen moving in between of two lanes. Hence two rectangles are seen. The vehicle is seen overspeeding the actual speed limit. The speed is 55km/h.



The above fig exhibit the penalty message issued to the owner for the interruption of rules.

V. CONCLUSION

The designed speed detection system was capable of unceasingly observance the speed of the approaching vehicle. It worked well for the vehicle. The output was additional correct with no alternative moving objects within the encompassing. the worth of speed of every passing vehicle was showed within the LCD display. The detected speeds were proportional to the bottom truth speeds. The developed system is extremely helpful system to live the low speeds accurately and while not victimization high-ticket instruments. With development of such system, which is so useful to the traffic enforcement to take care of the protection and security of individuals on the road and avoiding the traffic rules to be desecrated. With a straightforward technique of speed detection employing a camera a helpful software system is developed.

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