VEHICLE DETECTION AND SPEED TRACKING SYSTEM

Shashwat tripathi[1], Vivek kumar Singh[2], Shahzad ahmed[3],
Shivam srivastav[4], Mrs. Zainab Kamal Khan[5]

[1]*B. tech 4th Year, Dept. of Computer Science and Engineering, ITM Gorakhpur, UP, India.*
[2]*B. tech4th Year, Dept. of Computer Science and Engineering, ITM Gorakhpur, UP, India.*
[3]*B. tech 4th Year, Dept. of Computer Science and Engineering, ITM Gorakhpur, UP, India.*
[4]*B. tech 4th Year, Dept. of Computer Science and Engineering, ITM Gorakhpur, UP, India.*
[5]*Assistant Professor, Dept. of Computer Science and engineering, ITM Gorakhpur, UP, India.*

ABSTRACT

This paper targets to predict the speed of a vehicle with respect to the data from a recorded video source. Serving as the hypothesis, the paper portrays the various important procedures such as unequivocal Gaussian blend, models, DBSCAN, Kalman channel, Optical stream. The game plan and the delineation of procedures for correspondence of individual area are included in the execution part. The type of vehicles, the nature of driving and the vehicle's position at the time of video capture is taken into consideration.

Keyword:- *Python(Vs code), dlib, opencv.*

1. INTRODUCTION

In the recent years we can see there is a vast increase in the number of vehicles all around the globe. Along with the increase in number of vehicles increases the number of accidents. Therefore, it is important to limit the speed of the vehicles at certain zones or areas. Radar speed measurement tools are commonly used for this purpose which can be inaccurate in certain cases such as in sensing smaller vehicles with weaker echoes. Also it is difficult for these tools to detect vehicles changing in speeds too often or fast. Therefore, there is a need for a better technique to detect the speed of the moving vehicles. Than using expensive sensors such as radars, the vehicles video streaming could be used for this purpose. The video stream of the moving vehicle is given as an input, then it is passed through the filter for detecting its speed.

2. LITERATURE REVIEW

"Vehicle speed detection system," in 2009 IEEE International Conference on Signal and Image Processing Applications[1].This paper presents a flat out response for completing a getting ready module on traffic cameras that is fit for following every vehicle in the camera outline and looking over its speed reliably. A season structure for various vehicle following is used that utilizations Kalman channel and Hungarian Algorithm to pick checks. A speed estimation structure is outlined that is sufficiently liberal to work with camera feed from any edge without game-plan and camera mounted in any event stature of 7m. The system has been attempted PC made approaches in like manner as avowed conditions and speed measures have been gotten with most noteworthy goof of under 3kmph.Research of vehicle speed detection algorithm in video surveillance [2].This paper, demonstrates another Speed Detection Camera System (SDCS) that is appropriate as a radar elective. SDCS uses a few picture getting ready frameworks on video stream in on the web - got from single camera-or pulled back mode, which makes SDCS fit for figuring the speed of moving articles keeping up a central division from the standard radars issues. SDCS offers an en-over the top choice rather than traditional radars with a close precision or far unrivaled. SDCS frameworks can be withdrawn into four one of a kind stages; first stage is Objects exposure sort out. Which uses a flavor figuring subject to joining a flexible establishment subtraction methodology with a three-plot differencing estimation which gets a handle on the affirmed weight of using fundamentally versatile establishment subtraction? The second stage is Objects following, which consolidates three remarkable exercises, Object division, Object venturing, and Object run extraction. Articles following assignment considers the various potential states of the moving thing like; simple after, object has left the scene, object has entered the scene, and object cross by another article, and article leaves and another enters the scene. Third stage is speed check organize, which is settled from the proportion of lodgings eaten up by the thing to pass by the scene. The last stage is Capturing Object's Picture form, which gets the image of things that maltreatment past what many would consider possible. SDCS is recognized and tried in various examinations; it showed to have achieved a pleasing execution. Vehicle speed measurement

technique using various speed detection instrumentation [3].Advanced technology offers us various alternatives for collecting traffic data. However, different devices often result in different accuracy to the true speed of the drivers. Lack of knowledge of accuracy between different devices is often cited as a common problem for both transportation researcher and practitioner. This paper discusses the most accurate traffic data measurement device when compared to the true driving speed of the driver using the V-BOX GPS validated with the dash box of the test vehicle. The paper illustrates and discusses the significant value R^2 of the traffic data using scatter plot, root mean squared error (RMSE), mean absolute error (MAE) and mean absolute percentage error (MAPE). The paper covers two classes of advanced traffic data collection devices which are intrusive (automated traffic classifier) and off road portable speed measurement devices (laser gun, radar gun and manual count). Results showed that automated traffic classifier have the smaller discrepancies or deviations followed by laser gun, manual count and radar gun when comparing to the global positioning system (GPS). It is extremely important to notify which devices have the most accurate data collection as any study can only be as accurate as the data on which it is based. Video size comparison for embedded vehicle speed detection travel time estimation system by using raspberry pi [4].As traffic keeps growing up, the issue with respect to the street mishap in like way developing rapidly. The difficulty occurred because of the fast of vehicles out on the town. This paper proposed a vehicle speed affirmation and travel time estimation structure utilizing Raspberry Pi to review the speed of going vehicles through this framework. The structure is required to perceive the moving vehicles and figure its speed. The structure utilized OpenCV as a picture arranging programming to see and seek after the moving vehicles. Several sorts of getting size of the video are utilized in this structure to check and quantify the presentation of the presented board."Vehicle speed zone utilizing corner unmistakable confirmation", in Proceedings of the 2014 Fifth International Conference on Signal and Image Processing [5].The paper manages the subject of affirmation of vehicle speed dependent on data from video record. In hypothetical part we delineate the most critical methodology, explicitly Gaussian blend models, DBSCAN, Kalman channel, Optical stream. The execution part is contained the assistant plan and the portrayal of procedures for correspondence of individual pieces. The end contains the fundamental of got video records utilizing various vehicles, various natures of driving and the vehicle position at the time of chronicle. By virtue of the improvement that is developed in PC vision and AI, we can discover usage of these frameworks in different areas. One of them is traffic viewing and the heads framework, where the centrality is as of recently making with making urbanization. This paper goes for speed unmistakable verification or estimation of vehicles from video stream. These days the most remarkable approach to manage assess speed is by utilizing the radar hardware, hence it is essential to propose some various considerations like evaluating vehicle speed from video stream. Rather than equipment reliance that is issue with radar frameworks we can utilize picture dealing with, which is commonly subject to programming execution. Vehicle Speed Detection and Identification from a Single Motion Blurred Image [6]. Motion blur is a result of finite acquisition time of practical cameras and the relative motion between the camera and moving objects. Traditionally, the image degradations caused by motion blur are treated as undesirable artifacts and usually have to be removed before further processing. In this work, we propose a novel approach for vehicle speed detection based on a single motion blurred image as opposed to the most commonly used RADAR and LIDAR devices for traffic law enforcement. The motion blur parameters are estimated from a single motion blurred image and the length of motion blur is used for image restoration. The restored image is then used to obtain other parameters for vehicle speed estimation. The images taken with the vehicle's license plates are used for both the assistance of image restoration and the identification of the vehicle. We have established a link between the motion blur information of a 2D image and the speed information of a moving object. Experiments have shown the results of less than 2% error for both local and highway traffic compared to video-based speed estimation methods

3. PROBLEM STATEMENT

Problem statement Tracking a car is a process of finding a moving car using a camera. Capturing a car video sequence from a surveillance camera requires an application to improve performance tracking. This technology increases the number of applications such as traffic control, traffic monitoring, traffic flow, security etc. The estimated cost of using this technology will be much lower. Video and image processing is used for traffic monitoring, analysis and monitoring of traffic conditions in many cities and urban areas. Various speed measurement methods have been proposed in recent years. All methods try to increase the accuracy and reduce the cost of using the hardware. The goal is to build an automated system that can accurately locate and track the speed of any vehicles from online video frames.

Camera Motion: If there is movement in the camera viewing area, such as videos captured by unstable or vibrating cameras, video processing will be a challenge. The result of this situation is it is often represented as a blurring of movement in the video scene that affects both the detection and tracking steps Harder. Motion blurring can be avoided by temporarily removing blurring or balancing a single blurring kernel throughout the picture. The cause of this condition is natural causes such as spirits

Concealment: Due to the similarity of the appearance of other vehicles in the rear (like a gray car traveling on the road in low light), making proper separation and partitioning is a difficult process. This is very important for tracking apps. Hiding especially a challenging problem of different temporary methods. This challenge can be reduced by using mathematical techniques for morphology.

Different Types of Vehicles: As there are different vehicle categories, if the acquisition system is based on classifying cars by their visual features such as headlights and bumpers, some vehicles may be classified as incorrect. This challenge is most common in finding a patrol car.

Congested Traffic Situations: In the context of urban traffic, traffic jams and traffic congestion are two common causes. Car crashes can occur whenever the car is passing behind other vehicles in front of the camera. Closure in both partial or complete forms, may affect the process of calculating the background frame. If the vehicle acquisition system is based on mobility information, congested traffic conditions may significantly affect results.
Powerful Changes: In this case the moving object reveals the rear, such as when a parked car exits the parking lot. In other words some parts of the scene may contain movement but should be considered as a domain. Background removal techniques are generally sensitive to dynamic variables, while the temporary separation method is more compatible with them because more recent frames are also involved in the calculation of moving regions.

Sewage: The presence of rear cracks performs the function of separating vehicles in the rear problem. This type of challenge is especially important for background removal and texture support visual techniques. The most common way to manage clutter in a video frame is to split, methods extracting location information of an image and embedding it with a local-based active model.

Low Light Mode: At night and in other low light conditions such as tunnels, cars cannot be seen with their visible features and only part of them can be seen by the headlights or rear headlights. Therefore some parts that do not produce light or are exposed to light from a great distance will appear black. This lack of physical features can affect detection and tracking processes. Another challenge here is to pair the lights found to be considered as individual vehicles. Binary conversion of an image using a sufficient amount of threshold can deal with such situations. At night videos, car headlights / rear lights and bad lighting that can cause loud noises can lead to a lot of difficulty in finding work.

Moving Speed: The speed of moving vehicles plays an important role in the acquisition function. If an object moves too slowly, the temporary separation method will fail to find the parts of the object that keep the same circuit. On the other hand, a speeding car leaves a ghostly trail behind it in the front yard. Slow movement of objects causes respiratory artifacts to detect movement.

Audio: Video signal is usually loud. Video surveillance retrieval systems should deal with damaged signals affected by various types of sound, such as sensory noise or pressure artifacts. Sound can affect both detection and tracking functions..

4. EXISTING SYSTEM

In the past decades, the field of picture management has grown vastly. This has been taken away by two means: 1) the comprehensive use of imagery in pack applications, joined with 2) updates in the size, speed and cost Manuscripts. The sufficiency of cutting edge PCs and related sign orchestrating headways. Picture managing has found a basic developmentin shrewd, current, space and government applications. Various structures nowadays can be displaced by picture overseeing trade systems that perform better than the past structures. SDCS system is among these structures that can declare the ordinary radars as invalid. This is ideal financially sharp system over current ones. SDCS structure can be joined with Automatic Number Plate Recognition (ANPR) system to shape a full scale radar structure. ANPR structure is a mass recognition methodology that uses optical character affirmation on pictures to research the imprints on vehicles. The makers present the key steps towards structure up the Speed Detection Radar. Here makers present another hypothesis in thing ID system, which is “flexible establishment subtraction” as it proofs that it is not sensitive to startling enlightening changes. Another part is appeared here concerning address following by making “object following blueprints”

5. PROPOSED MODEL

The below shown figure (fig 1) demonstrates the block diagarm of our vehicle speed detection system.

The block diagram below explains that firstly, a video is given as input to the system. The given input video is at firstpreprocessed according to the requirements. From the processed video sample, the vehicle is detected using the filters. This vehicle is then tracked and analyzed in order tofind its speed.

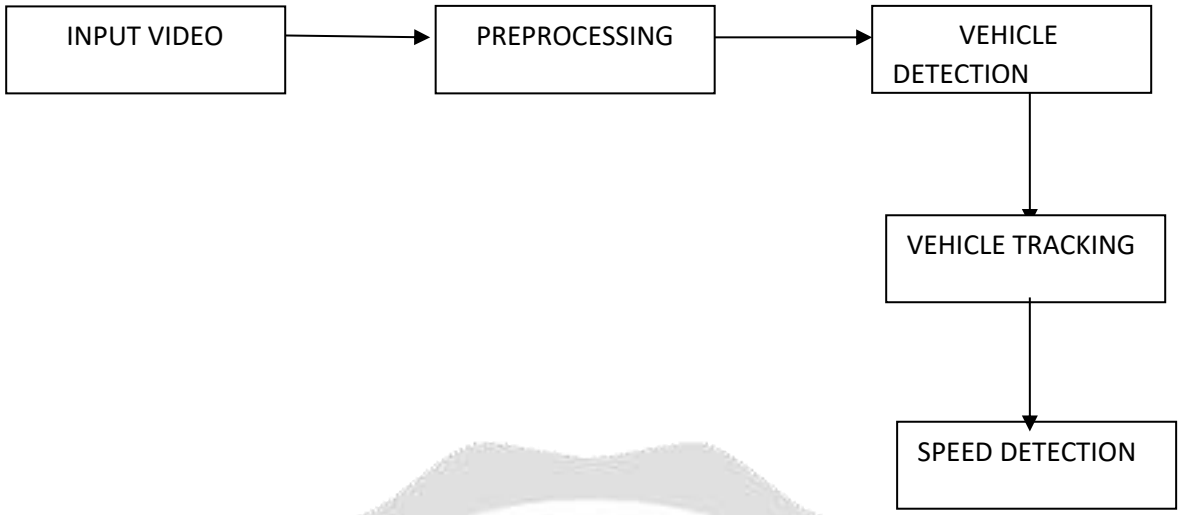

Fig. 1: Block diagram of vehicle speed detection system

6. Conclusion

In this paper, we propose that the Kalman filter algorithm iscapable of estimating the accurate speed of the moving vehicle. Gaussian mix model was collaborated along with thisalgorithm for making accurate depiction of the moving objects. The combination of optical stream and the Kalmanchannel helps in predicting the results even when there is alow picture quality. In our future research, we aim to improve the DBSCAN division in order to recognize each article in gathering of the vehicles andalso use flexible heaps of pixels for perceiving the speed from vertical advancements.

7. Reference

1.O. Smirg, Z. Smekal, M. K. Dutta, and B. Kakani, "Automatic detection of the direction and speed of moving objects in the video," in 2013 Sixth International Conference on Contemporary Computing (IC3), pp. 86–90, Aug 2013.

2.J. x. Wang, "Research of vehicle speed detection algorithm in video surveillance," in 2016 International Conference on Audio, Language and Image Processing (ICALIP), pp. 349–352, July 2016.

3.C. Pornpanomchai and K. Kongkittisan, "Vehicle speed detection system," in 2009 IEEE International Conference on Signal and Image Processing Applications, pp. 135–139, Nov 2009.

4.M. A. Alavianmehr, A. Zahmatkesh, and A. Sodagaran, "Anew vehicle detect method based on gaussian mixture model along with estimate moment velocity using optical flow,"

5.I. Iszaidy, A. Alias, R. Ngadiran, R. B. Ahmad, M. I. Jais, and D. Shuhaizar,"Video size comparison for embedded vehicle speed detection travel time estimation system by using raspberry pi," in 2016 International Conference onRobotics, Automation and Sciences (ICORAS), pp. 1–4, Nov 2016

6.K. V. K. Kumar, P. Chandrakant, S. Kumar, and K. J. Kushal, "Vehicle speed detection using corner detection," in Proceedings of the 2014 Fifth International Conference on Signal and Image Processing, ICSIP '14, (Washington, DC, USA), pp. 253–258, IEEE Computer Society, 2014.

7.H.-Y. Lin, K.-J. Li, and C.-H. Chang, "Vehicle speed detection from a single motion blurred image," Image and Vision Computing, vol. 26, no. 10, pp. 1327 –1337, 2008.

8.C. Stauffer and W. E. L. Grimson, "Adaptive background mixture models for real-time tracking," in Computer Vision and Pattern Recognition, 1999. IEEE Computer Society Conference on. vol. 2, pp. 246–252, IEEE, 1999.

9.A. Burton and J. Radford, Thinking in perspective: critical essays in the study of thought processes. Methuen, 1978.

10. D. H. Warren and E. R. Strelow, Electronic Spatial Sensing for the Blind: Contributions from Perception, Rehabilitation, and Computer Vision, vol. 99. Springer Science & Business Media, 2013.

11. G. Bradski and A. Kaehler, Learning OpenCV: Computer vision with the OpenCV library. " O'Reilly Media, Inc.", 2008.