

Estimation of the Speed of the Vehicle Using MATLAB

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Abstract - The research paper uses image processing to exhibit moving car video sequences and estimates their speeds. In this paper, grayscale is utilized by the MatLAB program to preprocess video images and give a stream of legitimate video footage of traffic. This article's challenge uses a deep studying method that wishes a vast quantity of computation for training. Thus, Authors determined to lessen the scope of the challenge to teach a version that could examine one-of-a-kind site visitors' velocity symptoms and symptoms.

Keywords: Speed Estimation, Bounding Box, Visual Average Speed Computer and Recorder

I. INTRODUCTION

Speeding is one of the most significant internet website vacationer violations. It endangers every person on the road. Consistent with NHTSA [1], in 12 months of 2017, speeding killed 9717 human beings withinside the USA. Some of the effects of over-dashing are lack of automobile manipulation, expanded distance, economic losses, elevated gas consumption, and lack of lives. As crash speeds get excessive, airbags and seat belts might not paint specifically to guard the passengers against the collision, as speeding charges billions of dollars to the united states economy [1]. Notify site tourist's police with the information of an over-dashing car. Once the records are dispatched to the regulatory authority, the use of pressure may additionally be charged for overspeeding. The main aim of the challenges is to remove the employee's wishes via the triumphing structures.

Currently, officers must keep the rushing gun to decide the velocity of the cars. It needs to be noted that these days, the best first-rate five% of violators get dashing tickets. That is because the variety of motors is much greater than police officers. Some towns like San Francisco, Stockton, Gilbert, and so forth have much less than ten officials in step with a 10K [2] population. In this case, taking pictures of all website online traffic' violators could be very tough. Within the proposed device, a dashcam may additionally be positioned in the vehicle to look at the website traveler's pace signs and symptoms and symptoms posted on the road. This pace is compared to the price of the car using the accelerometer present inside the smartphone. If decided

excessively, it will notify the rules enforcement organizations with information like the location, driver, photograph, etc. this could assist in putting off the data efforts required. Additionally, this can also be utilized in remote areas where there do not appear to be any reputable items.

II. RESEARCH METHODOLOGY

Related artwork in over-velocity detection, notably, consists of using devices that may not be established inside the vehicles. Pacing [3] is a not unusual region method in which police officers force at the back of the vehicle and increase up till the velocity of the officer's car fits the pace of the suspect's car and till the space amongst every one of the motors is constant. Then by looking out the speedometer, the officer can determine the intention automobile velocity. But this approach is inclined to human errors. Officers would possibly additionally study incorrectly or seem to be at the reading even as he is accelerating their car. Another such pace detection machine includes using a pace gun located in the course of transferring an automobile and is principally based totally on the radio frequency or laser. A radio wave signal [4] is dispatched after looking ahead to it to be pondered thru the car. Using the signal's timing, the car's pace is detected. This consists of guiding efforts with any person maintaining the gun. VASCAR (Visual Average Speed Computer and Recorder) is a small processor within the officer's car. An officer passes the vehicle at an utterly excessive speed than the velocity of the suspect's auto. The officer could be ready a few miles away, and via doing some calculations, it's feasible to calculate the pace of the suspect's car. This is the shape of a speed trap.

III. WORKING DESIGN

A. Read the Video

After recording the footage inside the Matlab workspace, the video needs to examine the use of (vision. Video File Reader) characteristics which look at the video from the Matlab workspace. The paste function doesn't show the video in any form.

B. Taking Reference Image

We must take a reference image to analyze regular traffic. That image is given below.



Fig. 1 Reference Image of Regular Traffic

C. Converting the Image to Black and White

The standard print is converted to black and white using the `im2bw` function, which converts the image to a binary image.

D. Bounding Box Extraction

We try this with the aid of building a bounding container. This bounding container is used to isolate the region of

hobby withinside the picture and is much like window (or key region) processing.

This may be easily made with the aid of using calling the (Bounding Box) assets of the (region props) characteristic. Feature extraction is used to extract the function and discover the placement of the shifting item frames so that you can envision using characteristics like region props.

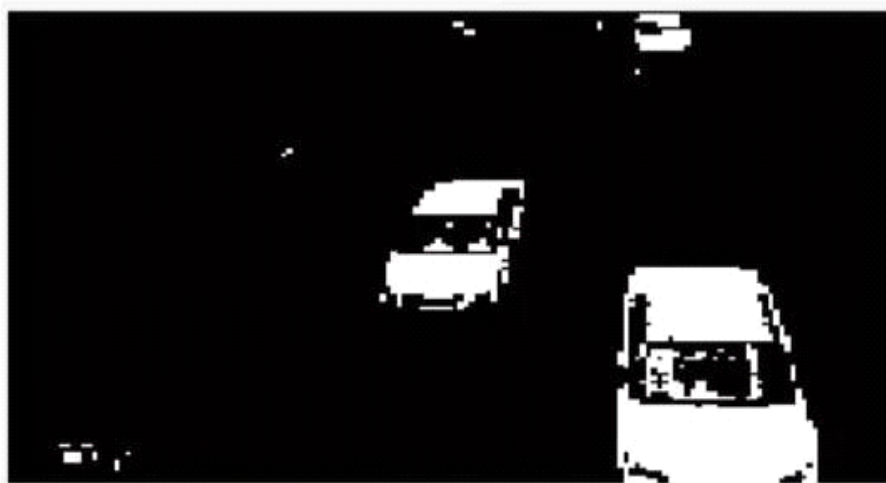


Fig. 2 Extracted Frame

E. Calculate the Displacement

After locating the vicinity of the item, the following step is to calculate the object's displacement in consecutive frames.

The Euclidean distance between (X_1, y_1) and (x_2, y_2) is D . When the car travels a predefined field distance, the range of frames this is essential to travel that distance withinside the picture is calculated, and it far in comparison to a floor

reality that's the number of edges this is essential to the car to journey the equal distance so one can achieve certainly velocity.

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

F. Calculating the Velocity

After locating the displacement of the item, we will multiply it with the whole range of frames to supply overall removal withinside the entire time. Then we will divide it with the total time of the video to provide widespread

displacement protection in one sec. That's not anything, however, the velocity of the item.

IV. WORK METHODOLOGY

Here through the flowchart, it has been explained how the system detects speed vehicles works. The technology inputs and processing methods required to go from raw video frames to moving vehicle detection, tracking, and speed extraction are presented in this section. The essential phases of vehicle Overspeed detection are depicted in the flowchart below. Accordingly, each of the critical steps is described.

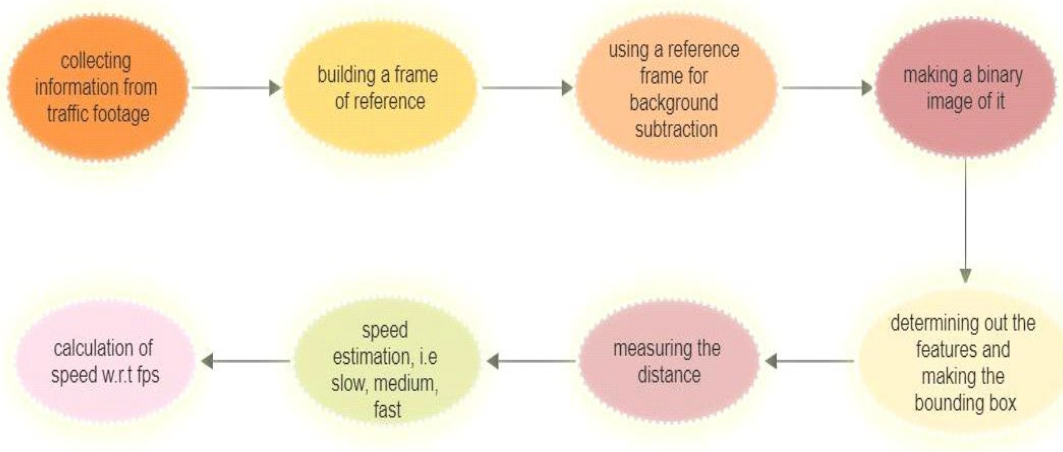


Fig. 3 Flow chart of overspeed detection

A. MATLAB Code

```

1 clear all
2 close all
3 inputvideo=vision.VideoFileReader('way.avi');
4 vid1=vision.VideoPlayer;
5 while~isDone(inputvideo)
6     frame1=step(inputvideo);
7     step(vid1,frame1);
8     pause(0.005);
9 end
10 imwrite(frame1:'C:\Users\Desktop\referenceimahe.jpg','jpg');
11 release(input video);
12 release(vid1);
13 referenceimage=imread('C:\Users\Desktop\referenceimahe.jpg');
14 vid2=vision.videofilereader('way.avi');
15 for i=2:121
16     clc
17     frame=step(vid2);
18     frame2=((im2double(frame))-im2double(referenceimahe));
19 end
20     frame1=im2bw(frame2,0.2);
21     [labelimage]=bwlabel(frame1);
22     stats=regionprops(label image,'basic');
23     BB=stats.BoundingBox;
24     X(i)=BB(1);
25     Y(i)=BB(2);
26     D=((X(i)-X(i-1))^2 +(Y(i)-Y(i-1))^2 )
27     Z(i)=Dist;
28     if(Dist>15 && Dist<20)
29         display('AVERAGE SPEED');
30     else if(Dist<15)
31         display('LOW SPEED');
32     else
33         display('HIGH SPEED');
34     end
35     S=strel('disk',6);
36     frame3=imclose(frame1,S);
37     step(vid1,frame1);
38     pause(0.05);
39 end
40 M=median(Z);
41 Speed=(M)*(120/8)
42 release(vid1)
  
```

V. CONCLUSION

This venture intends to increase a wise pace estimating machine successfully operating in actual time and with an outstanding performance rate with pre-recorded video sequences. The proposed device gives a green and thrilling object-primarily based video retrieval approach. All principles apply to Matlab's use of our written codes with the most effective minimalistic use of in-constructed functions. The speed estimation photograph processing approach is superb and green for pace recognition. We can track" the car and calculate its pace with the use of easy Matlab code. This approach can also be used with actual time application in site visitors control and different

purposes, and it's miles having the excessive scope of research and improvement in the future.

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