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VEHICLE DETECTION AND COUNTING OF A VEHICLE USING OPENCV

Karthik Srivathsa D S*1, Dr. Kamalraj R*2

*1MCA, Jain University, Bengaluru, Karnataka, India.

*2Guide, MCA, Jain University, Bengaluru, Karnataka, India.

ABSTRACT

In this paper the main focus is on detecting of vehicle and counting, particularly in traffic control. Vehicle detecting and also counting are becomes growing important in a area of highway regulators. However, because of the various structure of vehicles, their detections remain challenging which directly influence in accuracy of a vehicle count. This paper address a video-based techniques for vehicle recognition and counting based on OpenCV technologies. The proposed technique uses the background subtraction method to discover forefront objects in video sequel. Several OpenCV techniques, including of an thresholding, the adaptive morphology operations, and hole filling are later applied in the series of detecting moving vehicles more accurately. At last, vehicle counting is done by utilizing virtual identification zones. The outcome of an Experiment shows the accuracy of the proposed counting systems is around 96%.

Keywords: Vehicle detection, Vehicle counting, background subtraction, morphology operations, OpenCV.

I. INTRODUCTION

The traffic issue is a significant issue occurring in numerous urban areas in the world. There are numerous significant reasons for the traffic issue. The quantity of individuals moving into a metropolitan region has developed generously, prompting an emotional expansion in the quantity of vehicles. However, the street limit has become generally lethargic and get lacking. This causes an irregularity between the quantities of vehicles and streets, bringing about street gridlock, particularly in enormous urban areas. An insufficiency of public transportation frameworks likewise causes a similar issue.

Vehicle detecting and counting have a significant influence in numerous system that helps to regulate and control traffic in urban areas. The fundamental goal is to detect and count moving vehicles with clear accuracy and to have the option to do as such on streets, highways and in little paths, etc.

OpenCV-analysis and understanding of images and videos taken by an advanced camera-has acquired more approval and been utilized in numerous fields including industry, medication, robotics, and so on. Computer vision has likewise been applied for addressing traffic and transportation problems.

For instance, a video sequence of streets can be handled and analyzed to identify and count vehicles. Additional data, Such as vehicle speed or traffic density, can likewise be determined by the help of a computer vision. This may directly help in two kind of peoples. Street users and traffic organizations. In the event that street users know the constant traffic data, they can utilize the data to pick the most ideal path for traveling and can keep away from congestion. Then again, traffic organizations can use the traffic data in their traffic control systems, bringing about better traffic to the board.

Problem Statement

The trouble of getting the initial background there is the mistake of continuous background update and the trouble of controlling the update speed in moving vehicle location of traffic video. And with the expanding number of streets and traffic everywhere on the world, traffic observing and control utilizing current advancements has become a convincing necessity.

The Vehicle detection is the key task in this area and counting of a vehicle plays a important role and this two are important applications.

Proposed method

The method proposed in this research paper to detect, count different types of vehicles.

This research paper aims to address an accurate and beneficial in moving vehicle recognition and counting technique that can be utilized in the perplexing traffic environment. The methods like adaptive background subtraction, binarization, and morphological activities are used to detect a moving vehicle, obtain a foreground

area and eliminate noise and shadow in a video. Finally, blob tracking was done to coordinate with vehicles in the current frame and those in the past outline.

This proposed method, firstly, utilize an adaptive background subtraction technology to recognize moving vehicle in a video. Besides, it played out a binarization interaction to obtained foreground area, followed by morphological activities to eliminate noise and shadow. Thirdly, to restrict from an over Segmentation issue, the forefront image got from the last step was incorporated with the edge picture of a similar frame. A head to applying a further process. At that point, vehicles were recognized and counted by utilizing a detector virtually positioned on the streets.

II. METHODOLOGY

This section describes a Methodology. The steps of a proposed methods. The detail of each step will be given in the following subsections.

Foreground Extraction:

The background subtraction method is utilized to initially identify pixels that would have a place with a moving vehicle. Specifically, a background image of the street contains no vehicle, and the present frame in the video is changed over from color (RGB) to gray-scale image. At that point, for every pixel (x, y), the gray intensity of a background image is deducted by that of a current frame. The absolutist outcome is put away into a similar position in another image, which is known as a different image.

Region of Interest Establishing (ROI):

A ROI, which will further processed. The ROI is isolated into zones. Each will be handled contrastingly in the following steps. Also, a further zone, called virtual detection zone, is predefined for counting a vehicle. The virtual recognition zone is situated inside zones. Which is the centerpiece of ROI.

Detection of Vehicle:

In this step, just pixels in the ROI are thought of while the others are erased. The thresholding function is applied to the distinction image to set apart foreground pixels from background pixels dependent on their intensity. On the off chance that the pixel intensity in an image difference is more than the predefined threshold value, it will be set to 255 (white); else, it will be set to 0 (dark). The outcome after a thresholding operation, which is a binary image. Initially, a hole filling operation is applied to eliminate dark pixels encased by white areas. At that point, morphology operations are utilized to eliminate noise and some fail regions in the picture. Specifically, little foreground objects are changed over out of background by morphological erosion functions.

It is noticed that at this progression, the binary image contains both fictitious and missing pixels of a foreground. Thusly, various methods are utilized to eliminate noises and improve foreground objects. Then, an adaptive morphological dilation is applied to recuperate some missing forefront pixels and to associate foreground sections together. It is observed that the foreground objects set off smoother, more clear and more proper for recognition and counting measure.

Vehicle Counting:

After vehicle contours are gotten, the virtual detection zone is utilized to count the number of a vehicles. The centroid of each forefront object is determined and tracked. At the point when the centroid of a vehicle is recognized the first time. The status is set to 0 (it's not yet counted). At that point, its position is tracked. On the off chance that it arrives at the virtual recognition, its status will be set to 1 (counted), showing that it has been counted and won't be counted in the resulting frames. When the vehicles are detected in these zones. It will be counted as per sequential order.

Pseudo code of a proposed method:

Step1: foreground extraction
Step2: Region of Interest
Step3: detection of a vehicle
Step4: counting of a vehicle

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Flowchart of a Vehicle Count:

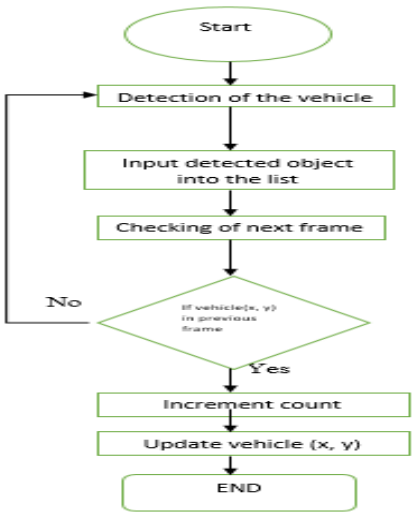

Figure 1: Flowchart for a vehicle counting

In this flowchart after detection of vehicle, vehicle is inputting to the list. Compares with the previous and current frame. If the vehicle is in the previous frame it will be set to 1 else 0. And after Increments the count and Updates vehicle (x, y).

III. RESULTS AND DISCUSSION

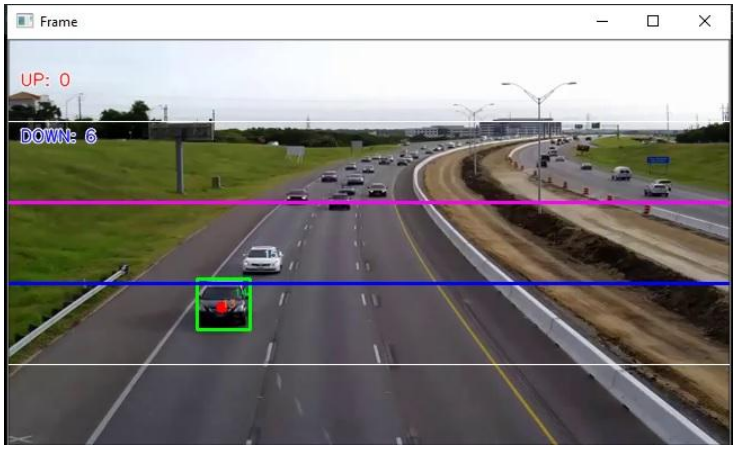

Figure 2: Vehicle detection and Counting of a vehicle

Exploratory outcomes appear in the above fig. The exactness of the proposed vehicle counting technique changed from 95-99%, based on the video input. It recommends that the proposed method could perform very well on each tried video. The 3 lines which are shown in the video is called region of interest. And it is also a part of virtual detection zone. Once the vehicle passes into that zone it will detected and counted as per sequential order. Up and Down is displayed at the top left corner. It is about displaying how many vehicles are reaching into the region is counted as down. And one which leaving is counted as up.

IV. CONCLUSION

In this paper, a methodology dependent on Python Lang has been proposed. Computer vision techniques are utilized to detect the vehicle and counted the number of a vehicles that are passing on a particular street utilizing highway videos as input.

At last, the vehicles were recognized and counted when they passed into the virtual detection zone. Experimented outcomes showed that a precision of the proposed vehicle counting system was 96%.

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