AI IN VEHICLE COUNTING

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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.

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. Open CV 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 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. 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.

2.Existing System

vehicle detection and counting is a challenging task due to many reasons such as: small size of the vehicles, different types and orientations, similarity in visual appearance of vehicles and some other objects (e.g., air conditioning units on the buildings, trash bins, and road marks), and detection time in very high resolution images is another challenge that researchers need to take in consideration. The number of the cars detected has been determined by the estimation of the detected regions. Hyper feature map that combines hierarchical feature maps have been used in an accurate vehicle proposal network (AVPN). Vehicle location and attributes have been extracted by the proposed coupled regional convolution network method which merges an AVPN and a vehicle attribute learning network. Fast and Faster R-CNN have been explored . In order to overcome the limitations in Fast and Faster R-CNN, a new architecture has been proposed. They have improved the detection accuracy of the small-sized objects by using the resolution of the output of the last convolution layer and adapting anchor boxes of RPN as feature map.

2.1. Disadvantages of Existing System:

- unable to detect in poor visual video streams
- there is no vehicle classification

3.Proposed Methodology

The system could be used for detection, recognition and tracking of the vehicles in the video frames and then classify the detected vehicles according to their size in three different classes. The proposed system is based on three modules which are background learning, foreground extraction and vehicle classification as shown in Background subtraction is a classical approach to obtain the foreground image or in other words to detect the moving objects. 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.

3.1 Background Learning Module

This is the first module in the system whose main purpose is to learn about the background in a sense that how it is different from the foreground. Furthermore as proposed system works on a video feed, this module extracts the frames from it and learns about the background. In a traffic scene captured with a static camera installed on the road side, the moving objects can be considered as the foreground and static objects as the background. Image processing algorithms are used to learn about the background using the above mentioned technique.

3.2 Foreground Extraction Module

This module consists of three steps, background subtraction, image enhancement and foreground extraction. Background is subtracted so that foreground objects are visible. This is done usually by static pixels of static objects to binary 0. After background subtraction image enhancement techniques such as noise filtering, dilation and erosion are used to get proper contours of the foreground objects. The final result obtained from this module is the foreground.

Advantages:

- Detection of multiple moving vehicles in a video sequence Tracking of the detected vehicles.
- Identification of Vehicle types.
- Counting the total number of vehicles passing in videos.

4.Objectives

- Detection of multiple moving vehicles in a video sequence.
- Tracking of the detected vehicles.
- Colour identification of Vehicles.
- Counting the total number of vehicles in videos.

5.Modules

5.1.Region of Interest selection:

In the very first frame of the video, I define a ROI by drawing a close line on the image. The goal is to recognize that ROI in a later frame, but that ROI is not a salient vehicle. It is just a part of an vehicle, and it can deform, rotate, translate and even not be fully in the frame.

5.2.Vehicle Detection:

Active strategy to choose a search window for vehicle detection using an image context was proposed a deep CNN framework (Attention Net) to capture the vehicle by sequential actions with top-down attention. Attention Net has achieved satisfactory performance on vehicle detection benchmark, by sequentially refining the bounding boxes. Proposed a sequential search strategy to detect visual vehicles in images, where the detection model was trained by proposed a deep RL framework to select a proper action to capture an vehicle in an image.

5.3.DNN Training:

One of the compelling features of our network is its simplicity: the classifier is simply replaced by a mask generation layer without any smoothness prior or convolution structure. However, it needs to be trained with a huge amount of training data: vehicles of different sizes need to occur at almost every location.

5.4.Vehicle Tracking:

Visual tracking solves the problem of finding the position of the target in a new frame from the current position. The proposed tracker dynamically pursues the target by sequential actions controlled by the AD Nets. The AD Net predicts the action to chase the target moving from the position in the previous frame. The bounding box is moved by the predicted action from the previous position, and then, the next action is sequentially predicted from the moved position. By repeating this process over the test sequence, we solve the vehicle tracking problem. The AD Net is pre-trained by SL as well as RL.
During actual tracking, online adaptation is conducted.

5.5.Location updating

The AD Net is designed to generate actions to find the location and the size of the target vehicle in a new frame. The AD Net learns the policy that selects the optimal actions to track the target from the state of its current position. In the AD Net, the policy network is designed with a CNN , in which the input is an image patch cropped at the position of the previous state and the output is the probability distribution of actions, including translation and scale changes. This action selecting process has fewer searching steps than sliding window or candidate sampling approaches. In addition, since our method can precisely localize the target by selecting actions, post processing, such as bounding box regression, is not necessary

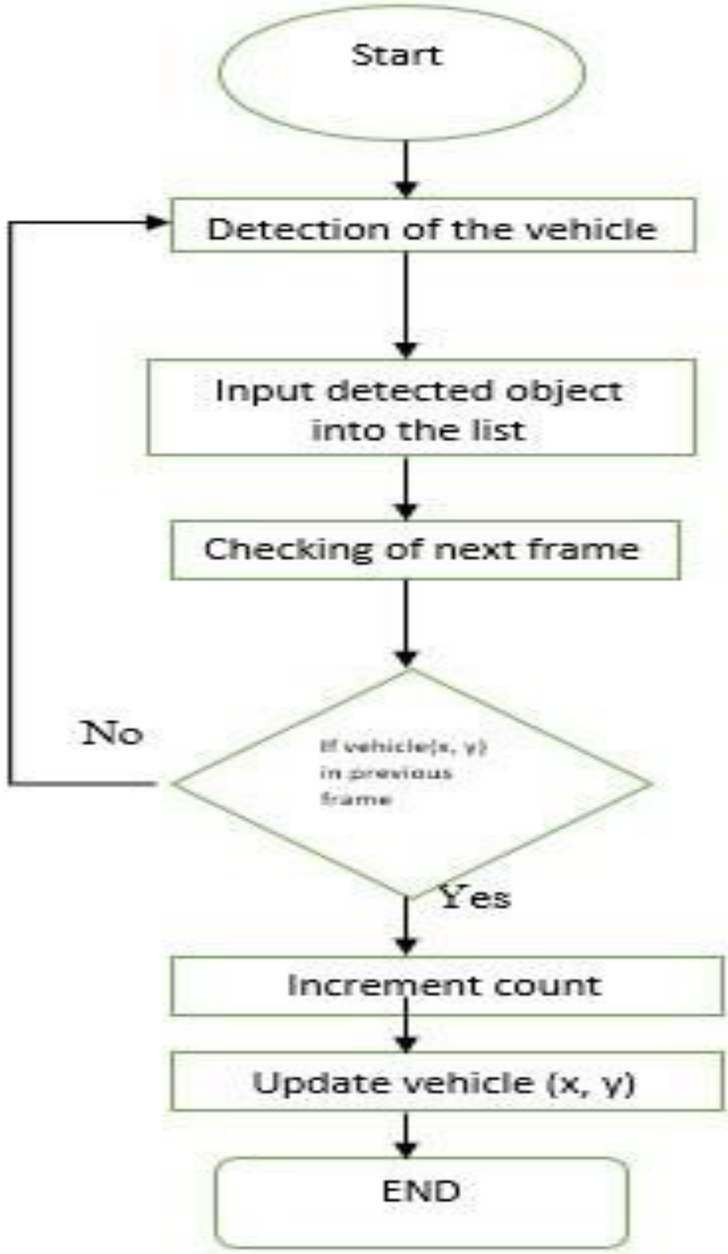
5.6.Vehicle Counting:

In this module detected vehicles will be counted and these counted results will be updated frequents based on vehicle detection, results will be printed streaming video using open cv. 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.

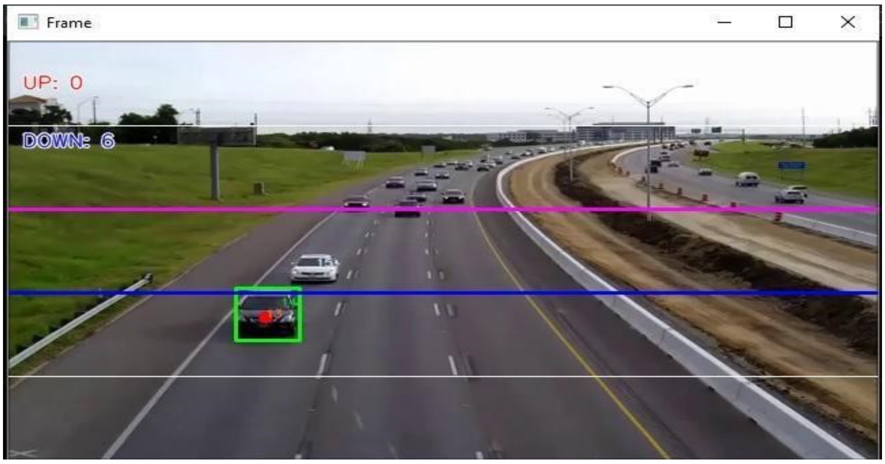
Pseudo code of a proposed method:

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

Flowchart of a Vehicle Count:



RESULTS:



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.

CONCLUSION:

The proposed solution is implemented on python, using the OpenCV bindings. The traffic camera footages from variety of sources are in implementation. A simple interface is developed for the user to select the region of interest to be analyzed and then image processing techniques are applied to calculate vehicle count and classified the vehicles using machine learning algorithms. The user has to define an imaginary line where centroid of the contours intersects for the counting of vehicles hence the accuracy is dependent on the judgment of the human supervisor. The system is not capable of detection of vehicles in the night as it needs the foreground objects to be visible for extraction of contour properties as well as features. The system could also be improved for better accuracy using the more sophisticated image segmentation and artificial intelligence operation.