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DETECTION AND COUNTING OF VEHICLE FROM VIDEO FILE

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Abstract : The result of the increase in vehicle traffic, many problems have appeared. Like traffic accidents, traffic congestion, traffic induced air pollution and so on. Traffic congestion has been a significantly challenging problem. It has widely been realized that increases of preliminary transportation infrastructure, more pavements, and widened road, have not been able to relieve city congestion. As a result, many investigators have paid their attentions on intelligent transportation system (ITS), such as predict the traffic flow on the basis of monitoring the activities at traffic intersections for detecting congestions. To better understand traffic flow, an increasing reliance on traffic surveillance is in a need for better vehicle detection at a wide-area. Vehicle detection and counting is important in computing traffic congestion on highways. The main goal Vehicle detection and counting in traffic video project is to develop methodology for automatic vehicle detection and its counting on highways. A system has been developed to detect and count dynamic vehicles efficiently. Intelligent visual surveillance for road vehicles is a key component for developing autonomous intelligent transportation systems. The entropy mask method does not require any prior knowledge of road feature extraction on static images. Detecting and Tracking vehicles in surveillance video which uses segmentation with initial background subtraction using morphological operator to determine salient regions in a sequence of video frames. Edges are be counting which shows how many areas are of particular size then particular to car areas is locate the points and counting the vehicles in the domain of traffic monitoring over highways.

***IndexTerms* –Traffic Congestion, Traffic video, Vehicle Detection.**

I. INTRODUCTION

Automatic detecting and tracking vehicles in video surveillance data is a very challenging problem in computer vision with important practical applications, such as traffic analysis and security. Video cameras are a relatively inexpensive surveillance tool. Manually reviewing the large amount of data they generate is often impractical. Thus, algorithms for analyzing video which require little or no human input is a good solution. Video surveillance systems are focused on background modeling, moving vehicle classification and tracking. The increasing availability of video sensors and high performance video processing hardware opens up exciting possibilities for tackling many video understanding problems, among which vehicle tracking and target classification are very important.

A vehicle tracking and classification system is described as one that can categorize moving vehicles and further classifies the vehicles into various classes. Traffic management and information systems depend mainly on sensors for estimating the traffic parameters. In addition to vehicle counts, a much larger set of traffic parameters like vehicle classifications, lane changes, etc., can be computed. Vehicle detection and counting uses a single camera mounted usually on a pole or other tall structure, looking down on the traffic scene. The system requires only the camera calibration parameters and direction of traffic for initialization.

Two common themes associated with tracking traffic movement and recognizing accident information from real time video sequences are:

- The video information must be segmented and turned into vehicles.
- The behavior of these vehicles are monitored (they are tracked) for immediate decision making purposes.

II. PROPOSED SYSTEM

The method proposed is to detect, count different types of vehicles. It 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.

2.1 Background Registration

A general detecting approach is to extract salient regions from the given video clip using a learned background modelling technique. This involves subtracting every image from the background scene. The first frame is assumed as initial background and thresholding the resultant difference image to determine the foreground image. A vehicle is a group of pixels that move in a coherent manner, either as a lighter region over a darker background or vice versa. Often the vehicle may be of the same color as the background, or may be some portion of it may be aged with the background, due to which detecting the vehicle becomes difficult. This leads to an erroneous vehicle count.

2.2 Foreground Detection

Detecting information can use to refine the vehicle type and also to correct errors which are caused due to occlusions. After registering the static vehicles the background image is subtracted from the video frames to obtain the foreground dynamic vehicles. Post processing is performed on the foreground dynamic vehicles to reduce the noise interference.

2.3 Region of Interest

Image segmentation steps as follows: The segmentation of vehicle regions of interest. In this step, regions which may contain unknown object have to be detected. Next step focuses on the extraction of suitable features and then extraction of vehicles. The main purpose of feature extraction is to reduce data by means of measuring certain features that distinguish the input patterns.
The final is classification. It assigns a label to a vehicle based on the information provided by its descriptors. The investigation is made on the mathematical morphology operators for segmentation of a gray-scale image.

2.4 **Vehicle Tuning**

The irregular vehicle motion, there always exist some noise regions both in the vehicle and background region .Moreover, the vehicle boundaries are also not very smooth, hence a post processing technique is applied on the foreground image. Filters termed median filters are used, whose response is based on ordering (ranking) the pixels contained in the image area encompassed by the filter. The final output of the vehicle tuning phase is a binary image of the vehicle detected is termed as mask1.

III MODULES DESCRIPTION

3.1 Vehicles Detection

Moving vehicle detection is in video analysis. It can be used in many regions such as video surveillance, traffic monitoring and people tracking. There are three common motion segmentation techniques, which are frame difference, entropy mask and optical flow method. Frame difference method has less computational complexity, and it is easy to implement, but generally does a poor job of extracting the complete shapes of certain types of moving vehicles.

Adaptive background subtraction uses the current frame and the reference image. Difference between the current frame and the reference frame is above the threshold is considered as moving vehicle. Optical flow method can detect the moving vehicle even when the camera moves, but it needs more time for its computational complexity, and it is very sensitive to the noise. The motion area usually appears quite noisy in real images and optical flow estimation involves only local computation. So the optical flow method cannot detect the exact contour of Vehicle detection and counting in traffic video on highway Dept. of CS&E Page 11 the moving vehicle. From the above estimations, it is clear that there are some shortcomings in the traditional moving vehicle detection methods

• Frame difference cannot detect the exact contour of the moving vehicle.

• Optical flow method is sensitive to the noise.

3.2 Vehicle Tracking

Vehicle tracking involves continuously identifying the detected vehicle in video sequence and is done by specifically marking the boundary around the detected vehicle. Vehicle tracking is a challenging problem. Difficulties in tracking vehicles can arise due to abrupt vehicle motion, changing appearance patterns of the vehicle and the scene, non rigid vehicle structures, vehicle to-vehicle and vehicle-to-scene occlusions, and camera motion.
Tracking is usually performed in the context of higher-level applications that require the location and/or shape of the vehicle in every frame. Typically, assumptions are made to constrain the tracking problem in the context of a particular application.

There are three key steps in video analysis- detection of interesting moving vehicle, tracking of such vehicle from frame to frame, and analysis of vehicle tracks to recognize their behaviour. Therefore, the use of vehicle tracking is pertinent in the tasks of Motion-based recognition, that is, human identification based on gait, automatic vehicle detection.

- Automated surveillance, that is, monitoring a scene to detect suspicious activities or Unlikely events.
- Video indexing, that is, automatic annotation and retrieval of the videos in multimedia Databases.
- Human-computer interaction, that is, gesture recognition, eye gaze tracking for data Input to computers, etc.
- Traffic monitoring, that is, real-time gathering of traffic statistics to direct traffic flow.

- Vehicle navigation, that is, video-based path planning and obstacle avoidance capabilities.

Tracking vehicle can be complex due to

- Noise can occur in the images.
- Complexity in vehicle motion.
- Non-rigid or articulated nature of vehicle may arise.
- Partial and full vehicle occlusions can be happen.
- Complexity in vehicle shapes because different vehicles have different shapes.
- Real-time processing requirements also can create a problem.

3.3 Vehicle Counting

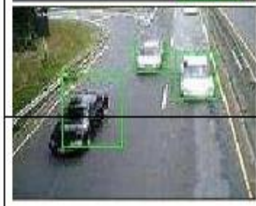
The tracked binary image mask1 forms the input image for counting. This image is scanned from top to bottom for detecting the presence of vehicle. Two variables are maintained that is count that keeps track of the number of vehicles and count register countreg, which contains the information of the registered vehicle. When a new vehicle is encountered it is first checked to see whether it is already registered in the buffer, if the vehicle is not registered then it is assumed to be a new vehicle and count is incremented, otherwise it is treated as a part of an already existing vehicle and the presence of the vehicle is neglected. This concept is applied for the entire image and the final count of vehicle is present in variable count. A fairly good accuracy of count is achieved. Sometimes due to occlusions two vehicles are merged together and treated as a single entity.

IV EXPERIMENTAL RESULTS

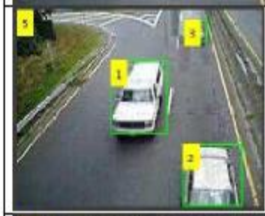
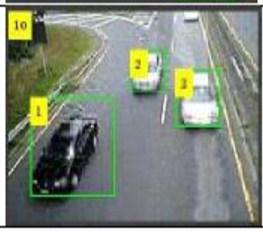
Detection Phase of Moving Cars:

	Input Frame	Expected Result	Output Frame	Remark
1				Test passed
2		Moving vehicle in Clausius image		Test passed
3				Test passed

Tracking Phase of Moving Cars

Test Case	Input Frame	Expected Result	Output Frame	Remark
1				Test passed
2		Moving vehicle tracking.		Test passed
3				Test passed

Counting Phase of Moving cars:

Test Case	Input Frame	Expected Result	Output Frame	Remark
1				Test passed
2		Moving vehicle tracking.		Test passed
3				Test passed

V CONCLUSION

The tests performed with recorded images from the locations, enabled us to determine the applicability of the algorithms in all of them, as far as the environment is not overcrowded. Also, we have determined that for the main entrance, due to the big lighting variations, it is required to have a camera with a high dynamic range, since the installed camera is lacking this feature and the color information becomes scarce in the areas infected by high lighting deviations. A system has been developed to detect and count dynamic vehicles on highways efficiently. The system effectively combines simple domain knowledge about vehicle classes with time domain statistical measures to identify target vehicles in the presence of partial occlusions and ambiguous poses, and the background clutter is effectively rejected. The experimental results show that the accuracy of counting vehicles was 96%, although the vehicle detection was 100% which is attributed towards partial occlusions. The computational complexity of our algorithm is linear in the size of a video frame and the number of vehicles detected. As we have considered traffic on highways there is no question of shadow of any cast such as trees but sometimes due to occlusions two vehicles are merged together and treated as a single entity.

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