

Detection and Tracking of moving vehicles- A review

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Abstract:

Vehicle tracking and detection application plays a significant part in controlling and managing traffic planning. Vehicle detection, tracking and classification can be performed through many techniques like- video compression, traffic surveillance system, advanced video surveillance, vision-based control, medical imaging, hybrid-video and camera system, medical imaging, robotics, augmented reality, human-computer interfaces. Number of methods used for tracking and detecting are: SUSAN, featured tracking algorithms, blob detection, background subtraction, and Gaussian mixture method etc. These all are used for the identification of area accurately. Stream of traffic can be evaluated on the groundwork of region count, predefined knowledge and image features about traffic surveillances. The above mentioned methods work effectively to detect a moving vehicle accurately in diverse heights of noise.

Keywords:

Image processing, video image, vehicle detection, vehicle tracking, traffic controlling and intelligent transport system.

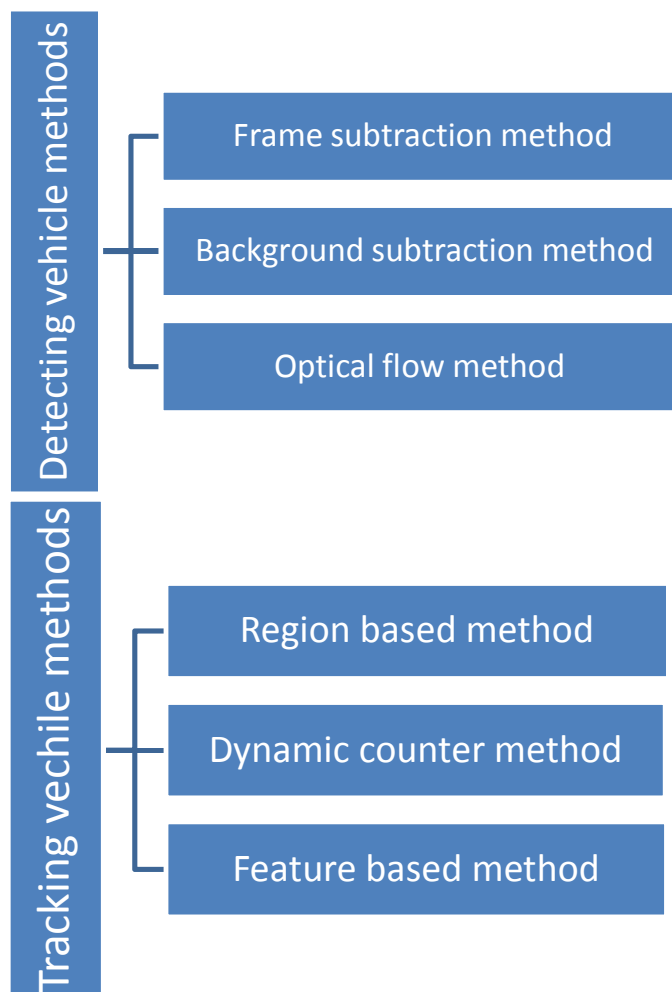
INTRODUCTION

In Today's scenario major problem is accidents in daily life, resulted in death of millions of people every year due to huge increase in traffic. For convenient and fast transportation, number of vehicles on highways, towns, cities, are increasing due to our needs to reach destination rapidly to save more time. This results in the enhancement of ITS (intelligent transport system) to be developed likely to continue in field of the research. The increase of vehicles on highway and road results into further lead to development of system in which vehicle gets information using ITS. The aim of intelligent transport system i.e. ITS is to reduce congestion, increase public safety, transmit information, improved travel, reduce unfavorable environmental impressions etc. A solution to this delinquent is to enrich the substantial use of applications grounded on videos supervision system i.e. Traffic Surveillance. The efficiency of the intelligent transport system relied mainly on comprehensiveness and performance of vehicle technology of detection. Highways carry lot of traffic which considerably attracted attention of intelligence. In the specific case also, even highways with well-structured environment, this automatically camera interpreted surroundings becomes a challenging problem. Driver behavior, lighting, traffic volume and road conditions are some of elements which are tough to predict. Therefore our system

analyzed the entire scene of highway which segments object image from the road surface using color classification which leads to recognition of tracks markings, multiple vehicles and road boundaries. So videos recording itself helps intelligence in reducing daily life accidents and led to happy good living.

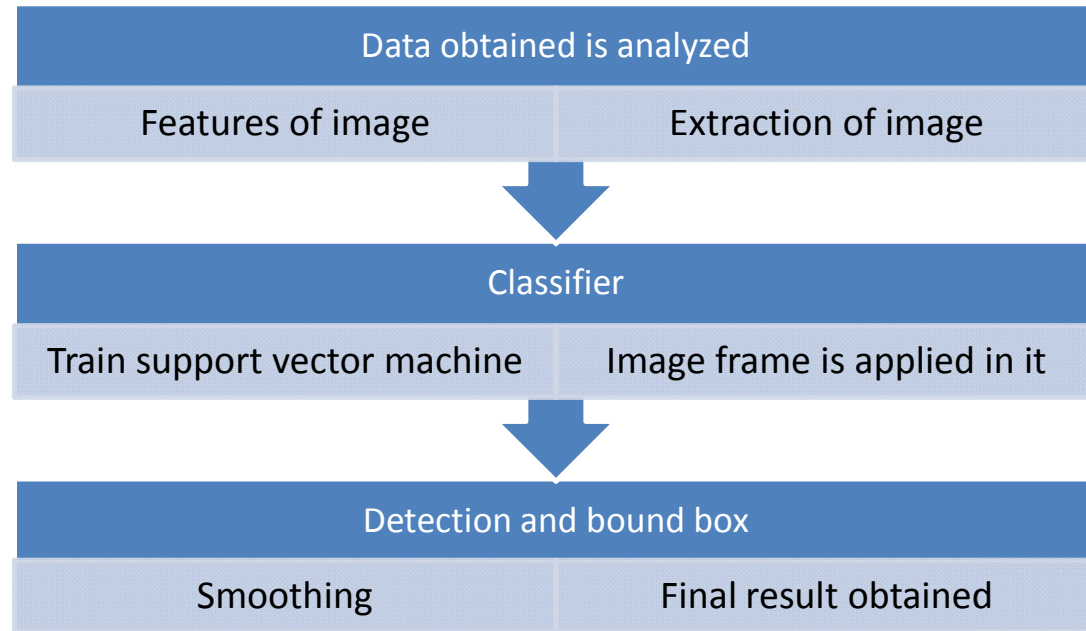
Methods to detect and track vehicle

Automatic detection of moving objects visually is difficult task for long range of business, industrial and home applications. In lots of applications, video cameras are most frequently used sensors which ranging to smart rooms from surveillance for video conferencing. Detecting moving entity from background to uninterrupted video image is what moving target detection deeply means. Methods like dynamic optimization threshold are one of the methods used to obtain moving objects more completely. This are the methods which effectively eliminate the light changes impact. Vehicle detection is also composed of candidates and block division selection, background estimation, SVM-based classification, Feature extraction, shape representation. Many more methods like Gaussian mixture model and blob method of detection are also used to detect and track moving vehicles.



Process carried out as:

First we obtained data and it is analyzed using Hog extraction and features of image. Further classifier are used to train a support vector machine and implement of image frame (if done in classifiers). Detection and bound box of moving vehicles is generated using heat-map. Then elimination of false or not required positives part of video and smoothing of video takes place. Finally results are obtained using different methods.

**Related work**

Many researchers have done significant work in the field of detection and tracking of moving vehicles. Some of the work is described in this paper:

- Prof. SuvarnaNandyal et.al[1] proposed a traffic assessment and vehicle detection using images in which enhancement of images was done by resizing. Canny i.e. edge descriptors was applied on vehicle to get counter edges. The pairwise geometrical histogram and edge features used in vehicle type model. The PGH (pairwise geometrical histogram) is shape descriptor used to apply on irregular shapes and on polygon shapes. These kind of features were well trained with NN (neural network).
- Jun Zhang et.al[2] proposed detection of moving target accurately by subtracting background methods and SUSAN which works in two steps. In this, rough target area obtained in which colored background was subtracted. Then feedback leads to background estimation. Further Susan method was used to modified and to get accurate target edges.
- Nicolas Saunier et.al[3] proposed a system for vehicles using featured based on tracking algorithms in which vehicles are in intersections. Since there is more variability of traffic in intersections so research was concentrated on highways. From the entrance to the exit of vehicle view, it rarely tracked. Algorithm was able to accommodate this tricky cause and gave solutions by disruption of tracks.

- Margritbetke et.al[4] proposed a system to detect and track real time number of vehicles through another moving vehicle. This developed system analyzed videos captured from forward installed camera in car which was driving on highway. This system used number of combinations of edge, motion and color information to recognize tracking of lane marking, other various vehicles on road and road boundaries using recursive filter. Using temporal differencing, car can be detected.
- Abhishek kumarchauhan et.al[5]proposeda study for video surveillance using detection and tracking of moving object. The video surveillance system design was directed upon automatic identification of moving objects. This system comprises of data processing in three phases: firstly moving object recognition, secondly moving object extraction and thirdly tracking and taking decisions about actions. It also comprises an application of video surveillance.
- A.Chiranjeevi et.al[6] proposed a system consist of hybrid algorithm for tracking and detecting of vehicles. The purpose was to reduce congestion on highways by traffic control and management. The efficient and novel hybrid algorithm was setup on image processing for vehicle detection by using ariel cameras. The aim to detect vehicle even in congestion or traffic through data obtained from videos frames. Their unique algorithm had also used blob detection methods and Gaussian mixture model. Some morphological operations were applied to remove noises and to correctly detect moving objects.
- Premkumarbhaskar et.al [7] proposed a unique system to detect and track vehicle using image processing with help of blob detection method and Gaussian mixture model. Objects were detected using foreground detector and binary functions performed to define region which is rectangular in shape around objects.
- MsJyoti J. Jadhav et.al [8] proposed a detection and tracking of moving objects for video surveillance. It is widely used in airport security system, intelligent transportation, videos surveillance applications. They used background subtraction method by setting threshold T value and also used optimization threshold method for complete moving objects. This methods was also helpful in reducing the effect of light changes.
- S. P. Patilet.al [9] proposed a review on moving vehicle detection which is important process for ITS. Also classified varioustechniques into number of categories as per their features and principles. Methods were like weather condition, shadow effects, jamming situations on the vehicles.
- A. P. Shukla et.al [10] proposed review on tracking of moving object through vehicle detection. Vehicle tracking and detection plays significant role for civilian as well as military. They discussed about motion model by using technique for On-road vehicle tracking through detecting systems. The traffic image consists of three major parts i.e. analysis of traffic, secondly detection of moving vehicle, thirdly approaches of vehicle tracking.
- Y. Ramadevi et.al [11] proposed object recognition and segmentation using techniques like edge detection method. Includes Laplacian of Guassian (LoG),Canny, Sobel, Prewitt, Roberts used for expectation-maximization (EM) algorithm, segmenting the image, genetic algorithms and OSTU to reveal synergy between object recognition and segmented images.

CONCLUSION

This paper work signifies that SUSAN method detects additional information of an edges than supplementary methods like sobel detector edge method and canny detected method. Feature centered tracking course can track limited feature and more composite traffic with abundant exit and entrance regions. The vehicle detection in a mixed traffic condition of high, medium and low traffic is precisely estimated and counting algorithm is nearly accurate. Real-time hard vision system is capable to run in physical time with low-cost and simple hardware.

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