

# A Survey on Vehicle Tracking with Various Techniques

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**Abstract-** Vehicle tracking is a challenging and important research area of image processing. It is broadly used in computer vision and video image. This paper detects and tracks vehicle for safety and traffic surveillance system. The conception of vehicle tracking is built upon the vehicle segmentation method. It represents various method for tracking vehicle, many researchers have been worked on the vehicle tracking algorithm. In this paper we propose kalman filter and corner detection method to track each vehicle, these methods show accurate and low error estimation result comparing with all the methods and the result depends on the quality of vehicle detection.

**Index Terms—** Vehicle tracking, Vehicle segmentation, Video image, Kalman filter, Corner detection, etc.

## I. INTRODUCTION

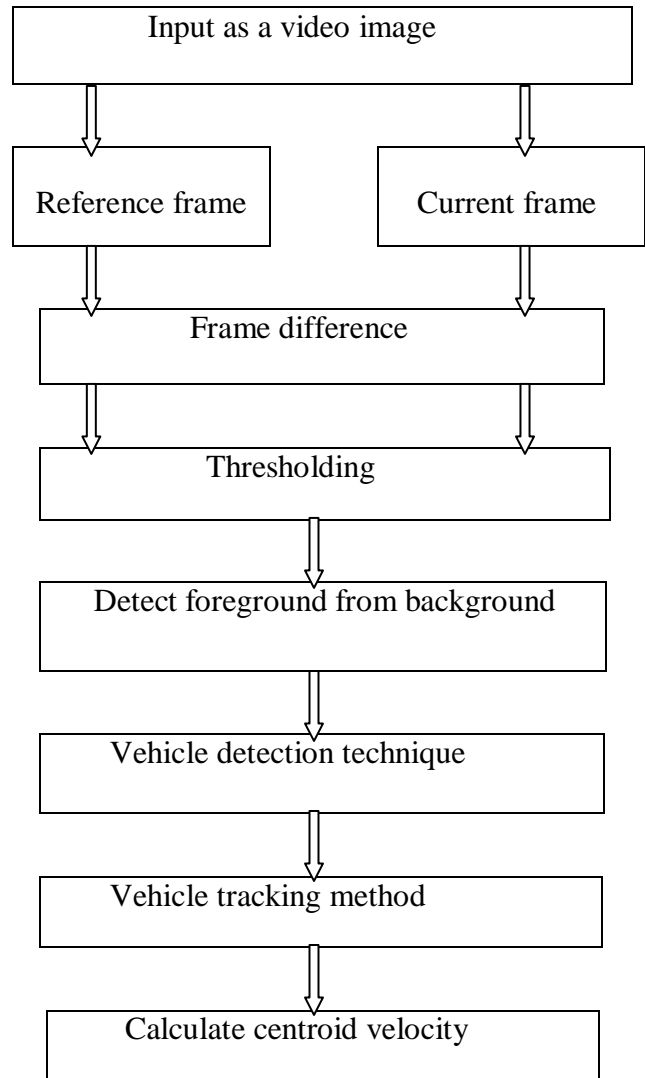
Vehicle tracking is the process of locating a moving vehicle using a camera. Capture vehicle in video sequence of surveillance camera is demanding application to improve tracking performance. This technology increasing the number of applications such as traffic control, security etc, it is better and less costly.

In recent years many researchers have worked on video cameras which are considered as a sensor device for capturing and recognizing moving vehicle. Video based systems can capture a large variety of information which is less expensive to install and maintain cameras [4]. It is not easy for a single moving camera to quickly capture information. The main difficulty in vehicle video the variation of environment [5], and the headlights are important features for initializing and tracking vehicle at night time [6]. It is capable of detecting vehicles and measures traffic parameters like speed, count, incidents etc.

*Manuscript received Feb, 2016.*

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**Fig1: Vehicle Tracking System.**

## II. LITERATURE REVIEW

**Hsu-Yung Cheng [1]**, In this paper, the video based systems are important as compared to traditional system it can capture a large variety of information. Vehicle tracking system is to deal with day time and night time traffic surveillance system, vehicles are treated at different conditions. Headlights are important features for tracking vehicle it need to be located and initialize vehicles. An

algorithm based computation is developed to pair the headlights and initialize vehicles. The main purpose of this paper to apply a specialized system state transition model of Kalman filter for the traffic surveillance cameras. Vehicles are detected through background modeling using Gaussian Mixture Model [10]. It is difficult to segment out the vehicles at night, foreground image that can be detected the use of headlights, auxiliary lights and reflections of lights of vehicles. The experimental result shows that the proposed method is more efficient and reliable with the specialized state transition model, the prediction can be made error free and more accurately for track vehicles in both daytime and nighttime surveillance videos.

**Amirali Jazayeri [2]**, The study of this paper the detection and tracking vehicles at real-time in car video analysis for safety, autodiving and target tracing. This paper locates target vehicles in video under different environment conditions. The extracted geometry features from the video are continuously track vehicles. The hidden Markov model (HMM) is used to separate target vehicles from the background and track them, this paper has investigated videos of day and night on different types of road, the problem is to identify vehicles in changing environment, illumination and the variations of vehicles such as color, type and shape and also on cloudy day and occlusions between vehicles, it can be made real time feature extraction in video frame by using corner detection and line segment detection for reliable vehicle detection, corner points, horizontal line segments and intensity during the motion of vehicles and background scenes. The experimental result shows the effectiveness for the implementation and computation in real time which is easy for real vehicle-borne video.

**Lei Xie [3]**, During the study of this paper the vehicle tracking is an important in video based intelligent transportation systems (ITS). THE proposed algorithm includes object region extraction and vehicle tracking by using vehicle segmentation method in real-time method. This paper propose a three step predict method based on Kalman filter to track each vehicle. So the experimental results show that a new algorithm is robust and real-time and the correct rate of vehicle tracking is higher than 85% , independent of environmental conditions. It is more effective in real world videos.

**R.Ramani [4]**, In this paper the locking system installed in the vehicle for vehicle tracking to track the vehicle's place and locking engine motor. The proposed technology identified the place of vehicle using Global positioning system (GPS) and Global system mobile (GSM). These systems work on any occlusions, theft is happening on the

parking and driving insecurity places, These technologies constantly watch the moving vehicle and report the status. The responsible person send SMS to the microcontroller when the theft identified, Microcontroller issues the control signal to stop the engine motor, After that all the doors locked. It needs to open the doors the authorized person send password to controller to restart the vehicle and open the door. The GPS/GSM based systems are one of the most important technologies designed for users in transport business, It provides real-time information such as speed, location and expected arrival time of the user in moving vehicle. The wide usage of GPS/GSM system on the many applications by millions of people throughout the world. The experimental result shows that these system used in car, ambulance, police vehicles and fleets so the existing technology support tracking the vehicle place and status. This is more reliable, secured, low cost, burglary and theft prevention and also useful for communication process.

**Raad Ahmed Hadi [5]**, This paper presents vehicle detection and tracking applications are important area in military and civilian such as in urban traffic planning, management and highway traffic surveillance control. The vehicle detection method used for vehicle tracking on road for counts, average speed of each vehicle, vehicle categorizing element and traffic analysis. this paper aims a concise overview of image processing methods, analysis and implemented under various environment changes. For developing traffic surveillance systems the processing methods classified under three categories to solve the occlusions. The proposed technology focuses in vehicle detection, vehicle tracking and classification with shadow and partial occlusion in traffic video. Transportation planning and traffic application extract the useful information for traffic analysis and traffic flow control such as vehicle's: velocity, count, speed, flow, classification, objectives and traffic density, traffic lane changes etc. Several vehicle tracking methods have been proposed by different researchers for different problem such as region based tracking method, contour tracking methods, 3D Model-based tracking methods, color and pattern-based methods. In video image vehicles locate the position, estimate the motion of blobs and follow the movements between two consecutive frames. The experimental result presents that the proposed line-based method uses line group for remove all undesirable shades accurately in minimal error.

**Jie Xia [6]**, During the study of this paper the tracking target to be calibrated manually and can track single target at a time. This paper proposes a vehicle tracking is based on double difference method and CAMShift (continuously

adaptive mean-shift) algorithm. By using a multi-tracker CAMShift algorithm moving vehicles in traffic video can automatically improve and achieve multi-target tracking. Effectively tracking interested target in video sequences is an important problem in computer vision area it can contain more information as compared static single frame images. The real time detection and multi-moving vehicle tracking is the base of intelligent monitoring system, It is use to detect and track moving vehicles in traffic video surveillance and mark it for different operations such as classification and identification. Real-time detection and tracking of moving vehicles locate vehicle quickly and accurate without subtraction foreground by background image from current video frame, because the background often dynamically changes with light and environment, so it needs to maintain and update the background model. So this paper proposes multi-vehicle detection and tracking methods, The moving vehicles contain in video sequences and whose motion detects by using double-difference method for improve frame-difference method and commonly used for motion detection [11], Then detected moving vehicles target as region of interest and referred to as ROI and finally use a CAMShift multi-tracker to multi-vehicle tracking and for noise removal. The experimental result shows on the basis of this paper real-time multi-vehicles tracking in traffic video have good scalability.

### III. OBSERVATION

The study of various papers analyze the existing problem of vehicle tracking in real world, but it can be beneficial for future research work, try to apply tracking in real condition with noise removal problem. According to this problem better method and algorithm will be adapt for remove all the problem.

### IV. CONCLUSION

The various papers and methods have been studied for vehicle tracking. As compared other methods the Kalman filter is useful in real time vehicle tracking application. It is effective, low error and shows more accurate result in the field of surveillance and monitoring system.

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