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A REVIEW ON VEHICLE DETECTION FOR COMPLEX TRAFFIC CONDITIONS

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Abstract: In modern automobile technology and with different numbers of fuel options available vehicles have became an essential part of our life. It has become a need now a days and also a part of personal passion. This is leading to increasing number of vehicles on the road. With the conditions of road and driving sense and traffic rules disciplines followed in, we need to necessarily have a system for certain study purpose and monitoring of the traffic. In digital image and video processing we are having techniques to do processing and drawing some inferences from it. Some of techniques are as SURF features selection and processing Part Based modeling approach. With the help of it we are having a approach of multiple vehicle detection in real time frame of urban vehicular traffic for four wheelers. Our approach is mainly on real time feeds from congested urban traffic for vehicles detection. Different color models are there in image processing some of which such as RGB, HSV gives some features for selection and processing.

Keywords: Speeded Up Robust Feature (SURF), Part Based Modeling, Color Model

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INTRODUCTION

With rapid number of growth in on road vehicles and with advancement in automobile technology urban traffic has become very much crowded. This gives rise to the need of efficient and intelligent traffic management. Also to minimize number of road accidents and to obey traffic rules. In intelligent traffic management system and intelligent driver assisted system requires real time vehicle detection methods. On road vehicle detection technique is very much important in intelligent and efficient traffic management.

For the study and research purpose we have considered the urban local traffic conditions our datasets contains real time feeds of the vehicular traffic. Our Approach mainly consists of firstly detecting the region of interest from given frame containing vehicles then with help of the segmentation and the different color schemes such as RGB and the HSV model analysis of the color values is done. Then with help of binarizing image we get color maps of different feature values of the vehicles. Then with the help of SURF feature and Part based modeling approach we will be moving towards the multiple vehicle detection from a given frame of the real time vehicular traffic.

Real time traffic contains many unwanted regions and many occlusions so discarding them and to only extract the features for the vehicles detection which are of our interest. Also given a frame from real time traffic video may contains different energy levels from which the threshold value is calculated then from that threshold value we will be taking out the energy levels which are more than threshold value. After this frames are binarizedto get region around the selected feature of vehicle.

Review of Literature

With the different approaches on to vehicle detection, number of techniques has beenreviewed and studied from the literature of different research papers. Various techniques such as lane detection, region of interest, background subtraction etc. Literature survey has been done on number of research papers for the objective to be achieved of multiple vehicle detection. For this literature some papers which we have reviewed can be given in brief—

Sun Shujuan, XuZhize, Wang Xingang, Huang Guan, Wu Wenqi, Xu De1,had given paper on "Real-time Vehicle Detection using Haar-SURF Mixed Features andGentle AdaBoost Classifier". In this paper on road vehicle detection system is given more importance for various application of intelligent traffic. In this paper real time vehicle detection algorithm in which cascade classifier and Gentle AdaBoost classifier with Haar-SURF mixed features. Firstly, lane detection

is employed to reduce the search space to a ROI then the cascade classifier is applied to generate some candidates. Finally, the single decision classifier evaluates the candidates and provides the target vehicle.

Jun-Wei Hsieh, *Li-Chih Chen, and Duan-Yu Chen* had given paper on "Symmetrical SURF and Its Applications to Vehicle Detection and Vehicle Make and Model Recognition". In this paper Speeded-Up Robust Features (SURF) is a robust and useful feature detector for various vision-based applications but it is unable to detect symmetrical objects. In this paper a new symmetrical SURF descriptor to enrich the power of SURF to detect all possible symmetrical matching pairs through a mirroring transformation. Model Make recognition technique is used to increase the practicability of this method.

Jisu Kim, JeonghyunBaek and Euntai Kim had given paper on "On-road precise vehicle detection system using ROI estimation". This paper proposes a new on-road vehicle detection system. Appearance of vehicles in image has various ratios because of its many kinds of models such as sedan, SUV and truck. For this reason, using ROI with fixed ratio can cause the degradation for detecting vehicles of various models. The proposed method estimates the ratio of vehicle ROI and extracted feature based evaluated ratio. It shows robust detection performance for various vehicle models because it extracts the feature from compact ROI with exact vehicle size. Histogram of oriented histogram (HOG) feature and support vector machine (SVM) are used for the vehicle detection system.

Ye Li, Bin Tian, Bo Li, Gang Xiong, Fenghua Zhu, Kunfeng Wang had given paper on "Vehicle Detection with a Part-based Model for Complex Traffic Conditions". In this paper a vehicle detection method based on a part-based model which can deal with the occlusion problem Method includes two steps: constructing the part-based model and detecting vehicles from traffic images. In the first step, a vehicle is divided into two parts representing an easily-occluded region around license plate and a commonly-visible region around vehicle window. Each part has low intra-class difference and is modeled by hybrid image template (HIT) with multiple types of feature descriptors. These two parts constitute our part-based model which is beneficial to vehicle detection with occlusion because the occlusion of one part has no impact on the detection of the other part.

Problem Definition And Objective

The main aim is to detect multiple available vehicles in a given frame from the complex traffic. For that the videos are taken from local real complex traffic conditions. The camera mounting for that purpose needed from front view. This helps in feature extraction of the vehicles.

Different techniques are there for feature based image processing out of which we will be working with part based modeling technique.

Our detection mainly concentrates on four wheelers from traffic conditions. Various monitoring and traffic management can be helped through such vehicle detection.
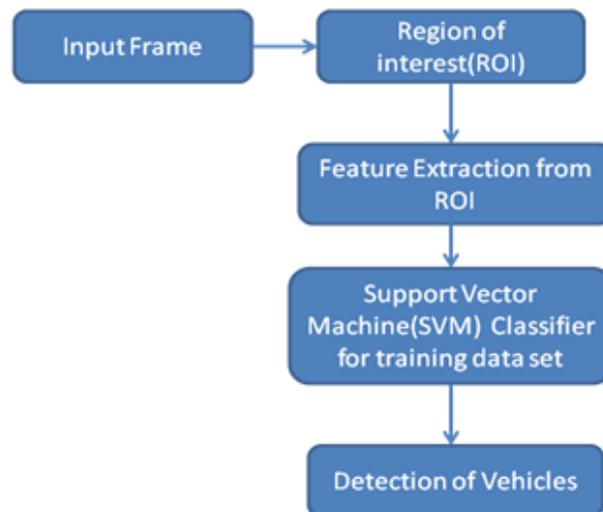
Proposed Approach:

Fig. Block diagram for vehicle detection approach

1) From a given real time feed of congested vehicular traffic we will try to extract frame which will be containing maximum number of vehicles.

2) Region of interest will be drawn from a given frame. From which we will be converting the given frame into RGB color model and after that into HSV model from that we have found out that the saturation value for the part feature of windshield of a car in range of less than 1. So segmentation is done of that feature part. Binarized image gives a color model with certain color for the windshield glass of the vehicles.

3) From this above segmentation features will be drawn with method and parts based model method. Feature matching will be done to get the detection of vehicles.

CONCLUSION:

Literature review about the available method and challenges in vehicle detection are studied. With that we have arrived with our approach with which we are working to get the efficient

results. Methods available are giving certain percentage of efficiencies. With our present work done and results we are expecting to get more efficient results or best nearer results with our approach.

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