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Detecting Cars In Traffic Using Cascade Haar With KLP

Kiruthika R, Mythili S

PG Scholar, Dept of CSE, United Institute of Technology, TamilNadu, India.

Asst Professor, Dept of CSE, United Institute of Technology, TamilNadu, India

ABSTRACT: Detection of vehicle in traffic provides the details about vehicle and gives better understanding about traffic. Traffic planners can obtain detailed information on the numbers and types of vehicles using a section of road. This allows them to adjust maintenance schedules and lets enforcement authorities know where and when to monitor for overweight vehicles without carrying out expensive manual operations on every road. Detection of vehicles in images represents an important step towards achieving automated roadway monitoring capabilities. The challenge lies in being able to reliably and quickly detect multiple small objects of interest against a cluttered background which usually consists of road signs, tress and buildings. To this end present a proof of concept Traffic monitoring application. The application counts the number of cars passing in either direction. Car detection is done using a boosted cascade of Haar features and is combined with the pyramidal KLT tracker to achieve a fast monitoring system.

KEYWORDS: Video processing, object detection, ada boost algorithm, machine vision

I. INTRODUCTION

In developing countries vehicle ownership rates rarely exceed 200 cars per 1,000 population. India's vehicle fleet had the second largest growth rate after china in 2010, with 8.9%. The fleet went from 19.1 million in 2009, to 20.8 million units in 2010. Transport in the republic of India is an important part of the nation's economy. Since the economic liberalization of the 1990s, development of infrastructure within the country has progressed at a rapid space, and today there is a wide variety of modes of transport by land water and air. In the interim, public transport remains the primary mode of transport for most of the population, and India's public transport systems are among the most heavily used system in the world, transporting 8224 million passengers and over 969 million tons of documents. This information exists in the form of descriptive data formats which include service reports about repair information, manufacturing quality documentation, customer help desk notes and product reviews and opinions.

One of the most important applications of Intelligent Transport Systems(ITS) is to analyze various traffic activities and to construct a traffic_ monitoring system. Such analyses are very important for traffic control, signal control, traffic prediction, production of traffic guidance, data mining, and so on. We believe that image sensors are more useful in those detailed analyses than spot sensors, because image sensors are able to collect more rich information. Therefore, we employed image sensors for our automated statistic acquisition system[1]. The type of vehicle is very important for traffic analysis. When that information is available, a much more detailed analysis can be expected; this, in turn, leads to a much more useful application.

Automated Traffic Data Collection and surveying can be a great tool in site selection, engineering, and more. A robust and real time implementation of the. above is a challenge however, especially in cases of high occlusion and a cluttered background.

Luo-Wei Tsai *et al*. [1] present vehicle detection approach for detecting vehicles for static images based on color and edge. Based on color of vehicle important vehicle is extracted from background. Then three important features including corner, edge maps and coefficient of wavelet transform are calculated for detected vehicle and feed them into cascade multi-channel classifier for verifying all possible candidates quickly.

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II. RELATED WORK

On-road vehicle detection is an important problem with application to driver assistance systems and autonomous, self-guided vehicles. The focus of this paper is on the problem of feature extraction and classification for rear-view vehicle detection[3]. Specifically, we propose using Gabor filters for vehicle feature extraction and Support Vector Machines (SVMs) for vehicle detection. Gabor filters provide a mechanism for obtaining some degree of invariance to intensity due to global illumination, selectivity in scale, and selectivity in orientation. Basically, they are orientation and scale trunable edge and line detectors.

Vehicles do contain strong edges and lines at different orientation and scales, thus, the statistics of these features (e.g., mean, standard deviation, and skewness) could be very powerful for vehicle detection[4]. To provide robustness, these statistics are not extracted from the whole image but rather are collected from several sub images obtained by sub diving the original image into sub windows. These features are then used to train a SVM classifier. Extensive experimentation and comparisons using real data, different features (e.g., based on Principal Components Analysis (PCA)), and different classifiers (e.g., Neural Networks (NNs)) demonstrate the superiority of the proposed approach which has achieved an average accuracy of 94.81% on completely novel test images.

The main task of traffic monitoring applications is to identify and track the moving targets. Thresholding an image resulting from a background difference operation is a common way to detect moving pixels and represents the starting point for all of the subsequent operations[5]. The two most basic operations in mathematical morphology are dilation and erosion. These operations can be considered as morphological non-linear filters.

The existing method block consists of a query image, vehicle detection, feature extraction, N-cut clustering detection, and orientations. The feature extraction consists of edge, vehicle color, edge orientation[6]. The vehicle color and edge distributions are extracted for clustering vehicles into different orientations. N-cut algorithm is used for clustering vehicles into eight orientations such as left, right, rear, rear left, rear right, front left, front right. The algorithm can learn important eigenvectors from a set of training samples. Then, given a vehicle image, we construct its vehicle descriptor at first and then project it on the found Eigen-space[8]. On this space, different vehicle orientations can be well identified and analyzed.

III. PROPOSED WORK

The proposed system includes detection of cars in either direction. Tracking includes not oly detection of cars used to detect bike using same algorithm. The algorithm for detecting cars in traffic is proposed.The algorithm is scalable and robust against noise

Tracking have used pyramidal KLT algorithm for tracking. We have combined detections by the Haar Cascade classifier with Pyramidal KLT to improve the count results. The heuristic algorithm used for combining the results. The feature points for an object are re-calculated after an object is matched with a detection so as to remove lost feature points. The Harris Corner Detector is used for choosing salient points in a region of interest. An object is said to be matched with an object if a THRESHOLD percentage of its points are contained in the detection window. Moreover, in order to reduce false counts, an object which is not matched with detection in MAXFRAMES number of frames is ignored in the finalcount. When a RIGHTTHRESHOLD percentage of points associated with an object go out of the window the object is counted.

Implementation of algorithm for detection and tracking a vehicle is as follow:
Point Being Tracked=Object List={}
Classifier=CAR CLASSIFIER
while(read New(Image))
Detection Vector=detect cars using classifier
For each detection in Detection Vector
Detection Matched=0
Find salient features for this detection and store it in PT

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For each object in object List
If object point lie in Detection. Window
[1] Delete all points of that object from
Point Being Tracked List
[2] Add the list PT as feature of this object
[3] Detection_ Matched=1
If (!Detection_ Matched) //we have found something new
1) Create new object
2) Add the list PT as feature of this object
System Architecture Design

The system architecture of proposed system shown in fig 1.1.The background image is subtracted from foreground image using threshold values. Using efficient algorithm counting the objects crossing in video.

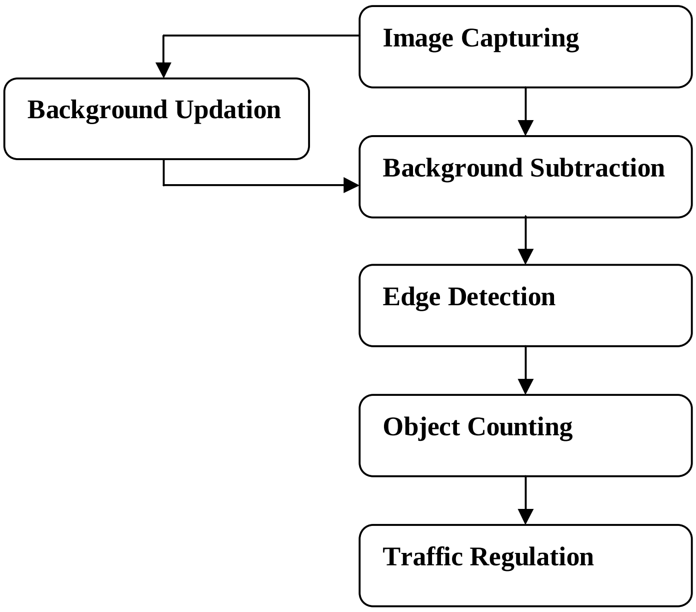

Fig 1.1 System Architecture Design

IV.PSEUDO CODE

There are some parameters in the algorithm which can be tuned to get desired results. The chosen values and its meaning is given below:

Step 1: *A. Threshold :*How many feature points of an object (%) mustBe contained in a detection for it to be treated as same object.

Step 2: *B. Count threshold:*Number of feature points of an object (%) to have crossed the boundary for it to be considered as passed.

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Step 3: *C. Left Window and Right Window:* These define the left and right boundaries of the scene of observation.

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V.SIMULATION RESULTS

Detection of vehicles in traffic signal is improved using cascade algorithm. It consists of HAAR features and undergone edge detection techniques.

TABLE I

Type	Detection (in a representative set of 276 images)
True Positive	143
True Negative	68
False Positive	05

VI. CONCLUSION AND FUTURE WORK

In traffic signal the moving vehicles is detected using tracking algorithm,edge detection techniques is applied and car feature is extracted.Using threshold value the background is separated from car and classified using classification techniques.

The detection results can be further improved by training the classifier on larger set of positives and negatives.The direction of flow can be further used to improve tracking results as sudden changes in flow can be classified as cases of occlusion and such points can be ignored in the tracking algorithm.

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