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Review on Vehicle Detection and Tracking for High Sensitive Area and E-mail Reporting by using HAAR Cascade Classifier

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Abstract – *Now a day so many applications came for Safety/security purpose. This paper presents a real-time vision framework that detects and tracks the vehicles from stationary camera for High sensitive area where vehicle entry is strictly prohibited for safety/Security purpose. The framework consists of three main stages. Vehicles are first detected using Haar-like features in framework. Then In the second stage, trained model is built to dynamically keep track of the detected vehicles till vehicle is present in that area. This model is also used in the third phase of data association to fuse the detection and tracking results by to sending E-mail to respective faculty with stored image. The practical value of the proposed framework is demonstrated in real-life experiments that for High sensitive area where vehicle entry is prohibited.*

Key Words: Vehicle detection and tracking, HAAR cascade classifier, E-Mail reporting, Python language

1. INTRODUCTION

With the rising requirement of detection-based security and industrial applications mainly high sensitive area and in the automotive field, the vehicle detection and tracking in a fast and reliable manner has been attracting much scope and concern. Such high sensitive area like Mantralaya, Mumbai share market in this area vehicle entry is strictly prohibited but still some vehicles are not following instruction and keep entering in prohibited area so need to detect and track that vehicles and by storing their images and data we can punish them. Here to get the proof that vehicle really entered in this high sensitive area we introduce new proposed system as E-mail reporting to concern faculty with images.

When we are thinking about high sensitive area from Maharashtra 1st comes in our mind is Mantralaya in Mumbai. At least 2,500 citizens visit Mantralaya daily, while the number goes up to 4,000 on the day of the cabinet meeting, when all ministers attend their office in the state government headquarters. Entering Mantralaya in Mumbai, considered to be the headquarters of the government, may now get more difficult for common man, as the home department plans to tighten the internal security by controlling access points for visitors and vehicle monitoring system. The home department has chalked out a plan to beef up security, in association with the public works and general administration departments, on the directives of chief minister Devendra Fadnavis immediately after a farmer alleged he was hit by a police on duty in Mantralaya four months ago. So, then security of Mantralaya increased. Included restricting vehicle entries inside the building. But still people will not following instruction for that we can use this Vehicle detection and tracking system those Vehicle enters in Matralaya area.

Most interesting part of this HAAR Cascade classifier we can detect multiple vehicle at time so that we can know how many vehicles entered in high sensitive area. And which will helpful to the concern faculty to track how many vehicles entered and by tracing the image they can punish the Vehicle member.

In this study, the image and video processing techniques are implemented to detect and track the vehicle by stationary cameras. The proposed method is based to detect vehicle entered in high sensitive area and making E-MAIL reporting. These are identifying that Vehicle entered in high sensitive area where Vehicle are not allowed to go. To classify the vehicles in traffic it is needed to use a classifier on video records. We use Haar Cascade classifier that takes wide place in the literature.

2. LITERATURE SURVEY

By using HAAR cascade classifier there are so many studies in literature, in [1] Detection of faces in an image taken from stationary camera it is depend on HAAR cascade classifier. In [2] Car detection is performed by using panoramic car images and the system achieves good rates of accuracy. In [3] image processing techniques are applied to detect vehicles that changes lanes hazardously and uses different lanes from its lane to go according to its classified vehicle type.

Here we can find the driver is using wrong lane or correct lane, so this application is use for to prevent the accident on road by changing lane by driver.

Figure 1: BIT Vehicle database

In this system used BIT Vehicle database to detect the vehicle and train the classifier. Figure1 shows the types of Vehicle it means we can detect the 6 types of Vehicle including Bus, Microbus, Minivan, Sedan, SUV, and Trucks. Apart from these 6 types of Vehicle this system cannot detect another Vehicle. So propped system can identify any type of vehicle by using HAAR Cascade classifier.

3. PROPOSED SYSTEM

In proposed system we are detecting and tracking the vehicle for high sensitive area where Vehicle entry is prohibited, and we can give alert my E-mail reporting. Where we can identify any Vehicle, which is entered in High sensitive area where Vehicle entry is not allowed. After detection of the vehicle it tracks in the form several frames and after capturing right images with respect to trained model it is sending through E-mail to concern faculty as an alert.

3.1 Techniques used in proposed system:

In this proposed system we use OpenCV (Open Computer Vision) which is developed from Intel and which act as library from where we can take and store the data. This Open CV can run on Windows, Mac OS X. It has C, C++, Java and Python interfaces. Here we use Python language as Programming language. For detecting and tracking the Vehicle we use HAAR Cascade Classifier.

3.2 Algorithm for Proposed system:

Figure2 shows the block diagram of Proposed system. By using this system, we can detect and track the vehicle for High sensitive area and using SMPT client we can report the give information about vehicle detection and tracking through E-Mail.

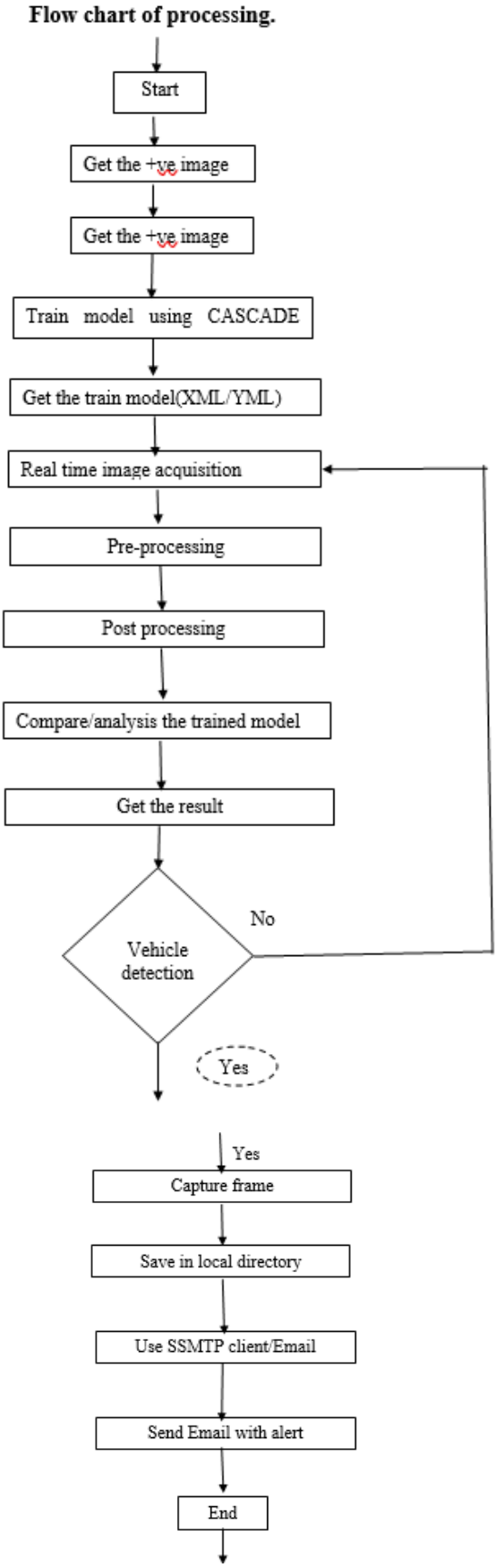

Figure 2: Block diagram of proposed system

3.3 HAAR Cascade Classifier:

Here we are using classifier as HAAR Cascade to detect and track the vehicle. First, we need to train the classifier with positive and negative images where positive image contains wanted data and negative image contain false data. Here only positive images give the target, or we can say result which we want. This classifier's speed of finding the objects in the image depends on training method of the classifier and the number of positive and negative images.

In target there are many features, Figure 3 shows the different features of classifier and these features are place where they are collected contains the wanted target in the image. By using many positive and negative images facilitates the detection of the target in the image.

Algorithm for HAAR Cascade classifier:

1. Haar feature selection
2. Creating Integral Images
3. Classifier taring
4. Cascading classifier

There are the steps which includes the working of HAAR Cascade classifier. It is well known for being able to detect the faces and body parts in an image, but cab be trained to identify any object.

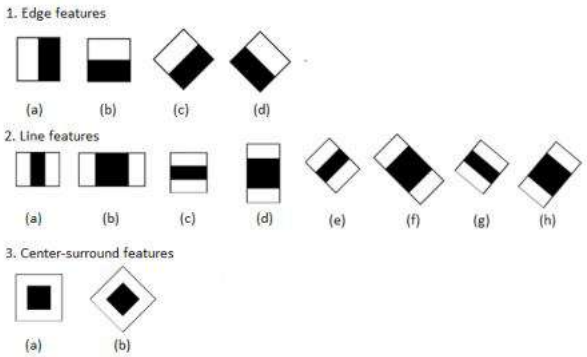

Figure 3: Features of the classifier

3.4 Training the Classifier:

Following fig 4 is the block diagram of training the model. We are giving positive ang negative images to classifier.

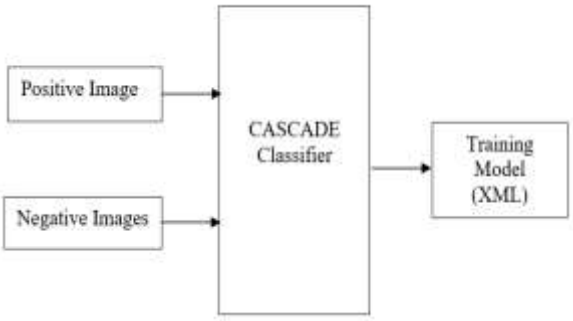

Figure 4: Positive images

Here we are training the classifier by positive and negative images. By features of classifier we can get some positive images as shown in fig 5 and some negative images as shown in fig 6. Then after the training of model we are testing to get the positive images are those images that contain the object (e.g. vehicle front or back images), and negatives are those ones which do not contain the object.

After getting the both images need to crop and mark positive images in the form of data file or we can say vector file. To crop the positive images, we will use Image clipper or Object marker. From one of them we can get the cropping and marking of images. The Object marker is simpler and faster, and the Image clipper is a bit more versatile but more time consuming to work. Then it will be creating a vector of positive images

Figure 5: Positive images

Figure 6: Negative images

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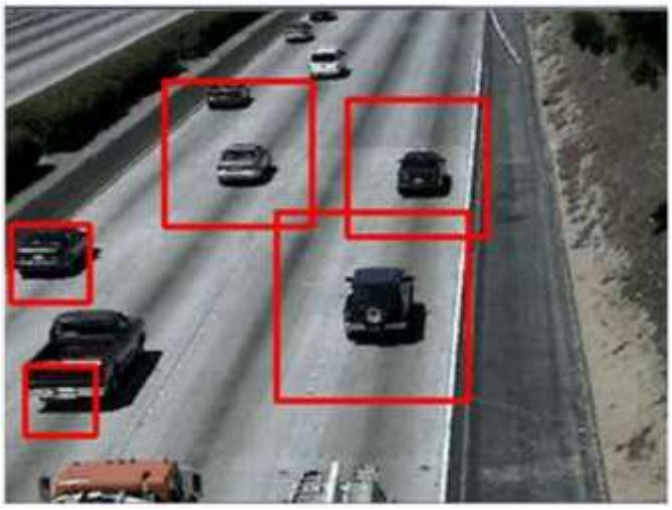

Figure 7: Detected Vehicle

4. CONCLUSION:

This system detecting and tracking the vehicle for high sensitive area where vehicle entry is not allowed for security purpose by using the HAAR Cascade classifier. Where we are detecting the positive images of the object by this classifier and Having more number of positive and negative images will normally cause a more accurate classifier and this Cascade classifier having many features to collect the positive and negative images and hence we are getting more accuracy. So that we can detect the Vehicle and track as shown in fig 7. By using SSMTP program we send E-mail to current faculty with captured image.

5. REFERENCES:

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