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PROJECT

Vehicle Detection and Tracking

A part of the Self Driving Car Engineer Nanodegree Program

PROJECT REVIEW | CODE REVIEW | NOTES

Meets Specifications

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Dear Udacian,
You did a good job for a first submission of this project. Please Keep up the good Work

Writeup / README

The writeup / README should include a statement and supporting figures / images that explain how each rubric item was addressed, and specifically where in the code each step was handled.

Awesome, your writeup contains elements that explain how each rubric item has been addressed.

Histogram of Oriented Gradients (HOG)

Explanation given for methods used to extract HOG features, including which color space was chosen, which HOG parameters (orientations, pixels_per_cell, cells_per_block), and why.

Great job here. You have successfully experimented and chosen the best parameters in other to successfully extract HOG features.

The HOG features extracted from the training data have been used to train a classifier, could be SVM, Decision Tree or other. Features should be scaled to zero mean and unit variance before training the classifier.

Great job extracting the HOG features from the training data. It is also very good that you thought of scaling your feature vector using the scaler method provided within the course just before passing it to train your SVM classifier.

Sliding Window Search

A sliding window approach has been implemented, where overlapping tiles in each test image are classified as vehicle or non-vehicle. Some justification has been given for the particular implementation chosen.

Great implementation of the sliding windows with a custom vector grid to search on. You have an awesome idea here with focused search. Well done

However, there's one thing I want to note here.

```
y_start_stop = [300, 600]
```

When setting up a fixed value for your custom region of Interest, what do you think will happen if the image sizes or video sizes were to change? You have even correctly pointed out the fact that the images in the project are larger than the lessons.

Some discussion is given around how you improved the reliability of the classifier i.e., fewer false positives and more reliable car detections (this could be things like choice of feature vector, thresholding the decision function, hard negative mining etc.)

Great attempt here in trying to optimize the reliability of your classifier by using undistortion and also all the hog channels combined together.

Video Implementation

The sliding-window search plus classifier has been used to search for and identify vehicles in the videos provided. Video output has been generated with detected vehicle positions drawn (bounding boxes, circles, cubes, etc.) on each frame of video.

Great job including a video that contains the implementation of the sliding-window search plus classification in your submission.

A method, such as requiring that a detection be found at or near the same position in several subsequent frames, (could be a heat map showing the location of repeat detections) is implemented as a means of rejecting false positives, and this demonstrably reduces the number of false positives. Same or similar method used to draw bounding boxes (or circles, cubes, etc.) around high-confidence detections where multiple overlapping detections occur.

Excellent job here using heatmaps to show the location of multiple detection's coupled with the use of the label function to show and help draw labeled boxes in order to draw the bounding boxes as accurately as possible and reduce false positives.

Discussion

Discussion includes some consideration of problems/issues faced, what could be improved about their algorithm/pipeline, and what hypothetical cases would cause their pipeline to fail.

Great job in identifying the possible improvements of your pipeline and also noting the points where it is susceptible to fail. There are also things like changes in illumination will make detection a bit difficult with your current pipeline

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