UDACITY

PROJECT

Vehicle Detection and Tracking

A part of the Self-Driving Car Engineer Program

PROJECT REVIEW

CODE REVIEW

NOTES

SHARE YOUR ACCOMPLISHMENT!

Meets Specifications

Dear udacious Learner
Congratulations!!! You outputted a visual display of the video provided with a correct detection of vehicle positions drawn with bounding box. I am very impressed by your first submission. You made it!!. Good luck in the rest of your Self Driving Car Nanodegree Program!

Writeup / README

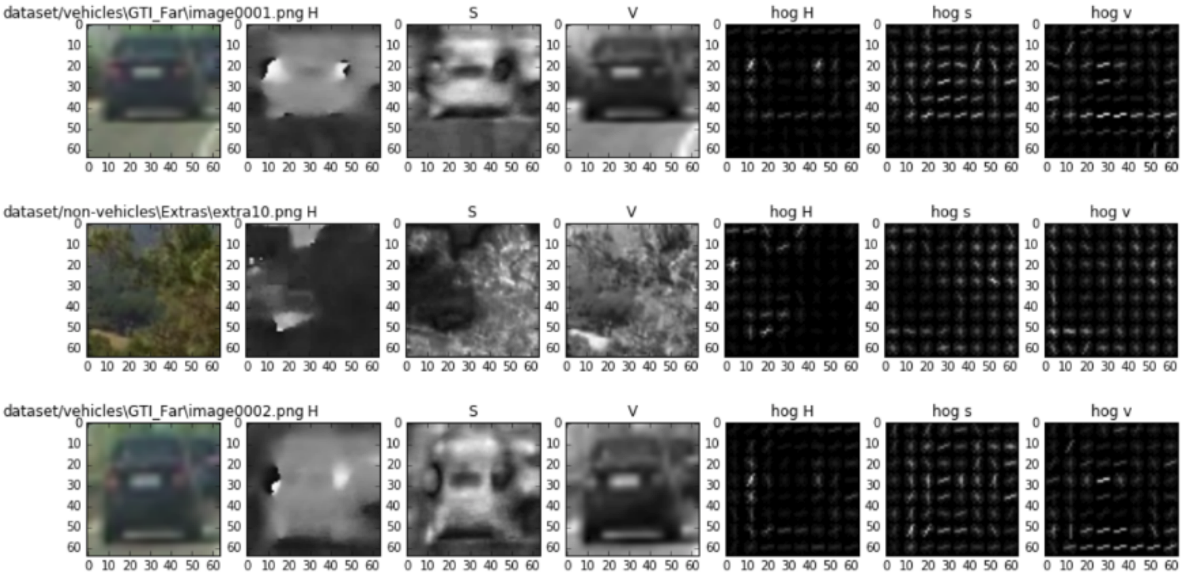
The writeup / README should include a statement and supporting figures / images that explain how each rubric item was addressed, and specifically where in the code each step was handled.

- It describes each implementation step to arrive at a successful result.
- It describes what techniques were used to detect and track the vehicle.
- It outlines a problem faced during implementation of the solution, and how this problem was 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.

Nice job, solution has correctly used skimage.features.hog() function to extract the HOG features. Solution has also explained the choices of parameters chosen. `orientations=9, pixels_per_cell=(8, 8) and cells_per_block=(2, 2)`. Well done!


dataset/vehicles\GTI_Far\image0001.png
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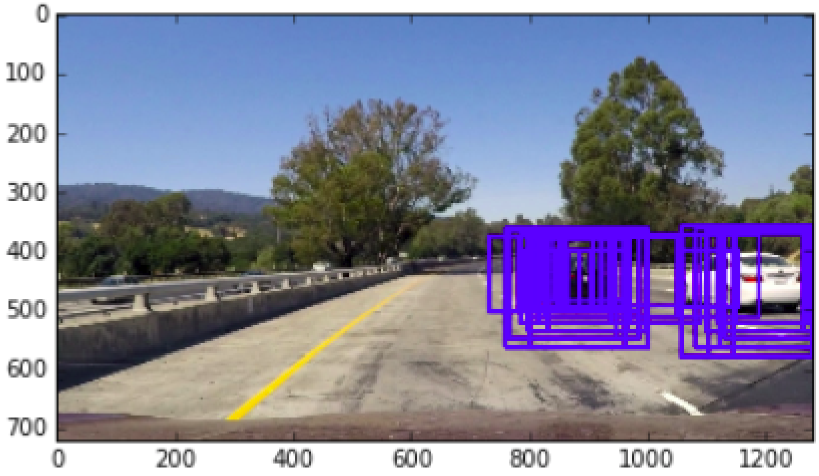
The HOG features extracted from the training data have been used to train a classifier, could be SVM, Decision Tree or other. Features should be scaled to zero mean and unit variance before training the classifier.

The writeup contents a great justification of the `extract_features()` method used. I can read here that and the selected combination provided over a constant 98% accuracy which in conjunction with a robust tracking pipeline it provides solid vehicle detection.

Sliding Window Search

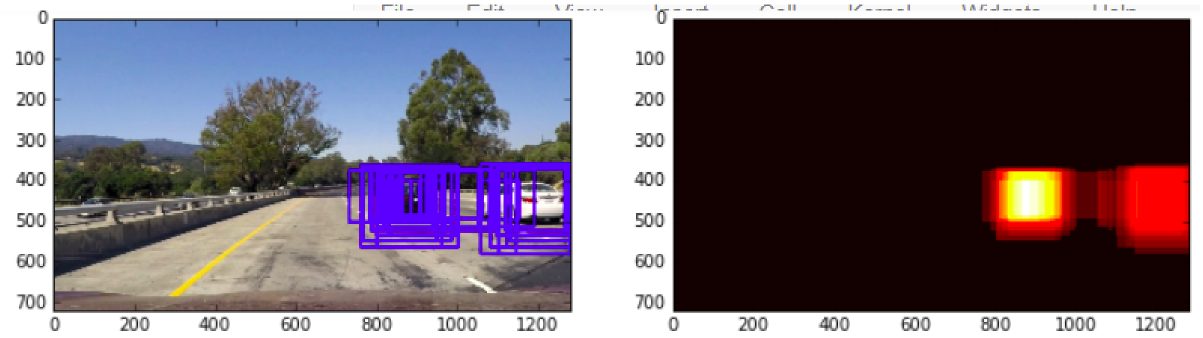
A sliding window approach has been implemented, where overlapping tiles in each test image are classified as vehicle or non-vehicle. Some justification has been given for the particular implementation chosen.

The sliding window approach has been implemented, and solution has completely explained the reason behind choosing your parameters.



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 job in implementing heat map to improve the reliability of classifier and the writeup perfectly describes this explicitly.



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.

A new video with a correct detection of vehicle positions drawn with bounding box was generated.

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.

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.

A great discussion on the shortcomings of the pipeline was stated and what could be done to improve the current pipeline was mentioned. Well done.

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