Approach taken

Apply SVM classifier to HOG features. My algorithm uses sliding window technique to divided each frame of the clip into smaller image, and then apply classifier to each divided segment of frame. Segments “Hot Boxes” which classifier detect as a car are marked on original by boxes. These boxes are drawn on each frame of the clips.

To avoid jitteriness on box appearing and disappearing, hot boxes history is maintained to certain length (very short length). Instead of showing “hot boxes” of given frame only, I added “hot boxes” of previous frames too (just few frames not all previous frames). This technique gives relatively smooth “hot boxes” on screen.

We also added small binary bird-eye projection on top left screen for “Heat Map”

About Preprocessing and training and Classifier: our classifier was SVM. We used sample picture of car and non-car to train our model. As preprocess steps, we normalized images and shuffled images to ovoid over fitting. After normalizing & shuffling we spitted input set into train and validation sets on 80/20 ratio. See tasks 2 to 4.

Before frame of clip is processed we apply the distortion correction to the raw image frame. Calibration data (mtx,dis) is the same what we used in 4 assignment. This data is loaded from file for processing. See “pipeline\_video” function for distortion correction.

After distortion correction, we normalize image. See “pipeline\_image” function

After normalization, we split frame image to small segments (Sliding window technique). “slide\_window” function does this task. See “pipeline\_image” function where this function is called.

Next step is to search these segments for car through classifier and image feature extraction. “search\_windows” function does this task. See “pipeline\_image” function where this function is called.

For feature extraction we extract spatial features , histogram features and HOG features see “single\_img\_features” function for that.

Test Accuracy of our SVC is 0.98564189.

For Better Training we created Additional data for augmenting exiting images see section "Image Augment Functions" this is copied from my project 3