



Project 4

(Due date: 03/11/2020)

1. Write a program to implement the Histogram of Orientated Gradients (HOG) Algorithm for pedestrian detection. The dataset used to evaluate the descriptor is “*NICTA Pedestrian Dataset*,” where it contains both the training set and the testing set. The training set contains 1000 positives samples (images contain pedestrians) and 2000 negatives samples (images do not contain pedestrians). The testing set includes 500 positive samples and 500 negative samples. **Resize all images to 64×128 and use the following set of parameters:**
 - Cell size [8 8]
 - Block size [16 16]
 - Gradient operators: $G_x = [-1 \ 0 \ 1]$ and $G_y = [-1 \ 0 \ 1]^T$
 - Number of orientation bins = 9
2. Write a program to train and test the linear Support Vector Machine (SVM) classifier for pedestrian detection using the extracted features from part 1.
 - a) Train the SVM classifier with HOG features of the training set (use built-in function/library (e.g. *from sklearn.svm import SVC*)).
 - b) Classify the HOG features of the testing images (both positive and negatives samples) using the trained SVM model (use built-in function/library).
 - c) Compute the accuracy, false positive rate, and the miss rate.
3. Repeat the experiment in part 2 for training the SVM classifier with different set of kernel functions (e. g. *rbf*, *polynomial*, etc.).

Notes:

- The project should be implemented in Python.
- The program outline with flow chart and equations used, implementation results with sample data sets and the obtained results should be submitted through Blackboard for evaluation.
- The program codes along with the dataset used for testing and validation should be submitted through Blackboard for evaluation.
- Late submissions will not be accepted.