CptS 570 Machine Learning
Homework 4 - Programming assignment

Due Date - Tuesday midnight, November 30, 2019

1. Policy gradient for CartPole environment. You will train a policy network on the Cartpole environment (https://gym.openai.com/envs/CartPole-v1/) discussed in the demo. The network architecture of the policy network with three linear layers is given below:

First Fully connected layer (nn.Linear in PyTorch) - input features - 4, output features - 24

Second Fully connected layer (nn.Linear in PyTorch) - input features - 24, output features - 36

Third Fully connected layer (nn.Linear in PyTorch) - input features - 36, output features - 2.

This only requires replacing the neural network part of the code discussed in the demo. Please plot the total reward per episode as a function of episode number (X axis - episode number and Y axis - total reward corresponding to that episode).

2. Automatic hyper-parameter tuning via Bayesian Optimization. For this homework, you need to use BO software to perform hyper-parameter search for Bagging and Boosting classifiers: two hyper-parameters (size of ensemble and depth of decision tree).

You will employ Bayesian Optimization (BO) software to automate the search for the best hyper-parameters by running it for 50 iterations. Plot the number of BO iterations on x axis and performance of the best hyper-parameters at any point of time (performance of the corresponding trained classifier on the validation data) on y-axis. Please use Fashion MNIST dataset for this task. You can use a smaller sized dataset if compute power is a hurdle.

Please follow all the instructions regarding code submission as mentioned in previous homeworks.