Project 1

Problem 1

We want to solve the following LS-SVM problem in R or Python or both using the dataset "pb2.txt":

1. Use the large scale algorithm (Hestenes-Stiefel algorithm) discussed in Suykens et al. (1999), available on class webcourse, to solve the LS-SVM problem. Provide the training and prediction codes.

2. Write a code for updating the QR decomposition after adding one row to the training set. (qr.update on class webcourse)

3. Our next challenge is to solve the LSSVM using matrix inversion and apply it to incremental/decremental LSSVM. Use the code from question 2 on QR update to solve the incremental LSSVM problem. (increment.lssvm on class webcourse.)

Problem 2

Use your favorite search engine (google, yahoo, bing, ...) to find details about support vector regression (SVR). Write a code similar to the SVM discussed in class ("svmtrain.r" and "svmpredict.r") to solve the SVR problem. The dataset to be used is the Boston Housing Dataset. This data can be obtained from R:

https://stat.ethz.ch/R-manual/R-devel/library/MASS/html/Boston.html

Also, this dataset can be downloaded from UCI Machine Learning Repository. This dataset contains 506 cases concerning housing in Boston Mass Area. There are 14 attributes, in which housing values is output response, y, and the other 13 factors affecting the housing values are treated as input

variables. To construct the SVR and evaluate its performance, randomly selected 300 cases from the dataset are used as training data, and the others are used as testing data.