Learning from Data

Lab Task 3

Banknote Authentication Problem

Posted on December 27, 2022

Due on January 1, 2023

Develop computer program coded by python that detects the genuine banknote using Support Vector Machine (SVM) using scikit-learn.

The online data set of banknote authentication that will be used for your programming task is available at:

http://archive.ics.uci.edu/ml/datasets/banknote+authentication#

Report should include the following:

(i) Hard Margins SVM and Soft margins SVM implementations

(ii) For both methods implemented in (i), experimental Design and analysis of the results, to evaluate the performance of your perceptron network,

- Run 50 epochs of training on the training set.
- After each epoch, compute the network error (proportion of misclassifications) on the test set
- Then draw a chart with a horizontal axis titled “Epoch” ranging from 1 to 50, and a vertical axis titled “Error (%).” Then add a line graph showing the network error for the test set across epochs 1 to 50.

(iii) (Bonus) Draw ROC curve for the above experiments and recommend the best SVM architecture in (i). (Give explanation)