Learning from Data

Banknote Authentication Problem

Posted on December 15, 2021

Due on Jan 1, 2022

Total marks 20 marks

Develop computer programs coded by python that detects the genuine banknote using:

(a) SVM with hard margins coded by Scikit
(b) SVM with soft margins coded by Scikit

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

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

Codes (a, b) above involve three main steps:

(i) Preprocessing of the data set (2 marks)
(ii) ML structure design: In your design you should indicate the structure of the designed SVM. (4 marks)
(iii) Experimental Design and analysis of the results: To evaluate the performance of classifiers in a, b above, apply 5-fold cross validation. After each training, construct the confusion matrix on the test set. Then, compute the accuracy, TPR (sensitivity), FPR (false alarm rate), specificity, precision. (10 marks)
(iv) Compare between the two models in a, b above using ROC curve. (4 marks)