TOPICS IN MACHINE LEARNING
SEMSESTER PROJECT (20 grade points) : SPRING 2018

Instructions

1. You will be provided a labeled dataset typically with a small sample size
   a) Eg. https://physionet.org/physiobank/database/afpdb/
2. Your goal is to perform a binary classification of the dataset
   a) Implement the following classification algorithms
      i. Binary SVM (use fitcsvm in matlab)
      ii. LMS
      iii. KLMS
      iv. MCC
      v. MEE
      vi. PNN (use matlab NN toolbox)
   b) Compare the performances of the above algorithms using confusion matrices and if possible ROC curves
   c) Improve the classification performance above the given benchmark with proper selection of hyper-parameters
   d) If possible improve the feature extraction process to improve classification performance over and above the performance in point c) (Bonus points 5)
3. Write a detailed report on the project with the following contents
   a) A concise introduction to the given problem
   b) Literature review on the problem
   c) Methodology for the classification (classification algorithm itself need not be described in detail, a concise description is enough)
   d) Implementation of each classifier
   e) Analysis and discussion with comparison of results
   f) References
4. Due date is April 15th, 2018.
   a) Report should be in IEEE format single column with citations and references
   b) Plots and any other illustrations must be centered in the document
   c) The project can be done by teams of 2 students.
   d) Project presentations will be held after the semester end exams.
   e) You can also propose to work on a dataset such as digital image database of Olivia Toralba.

*Any modifications, clarifications and extensions will be communicated later.