The last assignment of the course is a programming project on Linear Classification.

Steps are same as the first project (Linear Regression Project), that are as follows;

Look through UCI Repository or Kaggle datasets and choose a classification-related dataset. More small and easy-challenge data for learning objectives would be prefered.

Take a family of basis functions. They would be either of polynomials (uni-variated or multi-variated polynomials), or Guassian radial basis, or Multiquadratic radial basis, or so on. This family must be graded by one hyper-parameter, at least. For example, polynomials are graded by the polynomial degree, and so on.

This time, you can also consider some features that are obtained using suitable feature extraction algorithms, instead of using the basis functions that are of mathematical analysis conventions. In particular, if your data are of images, videos, or text.

Implement four Linear Classification methods;

The Ieast square classification.

Fisher's Linear discrimination method.

Linear Perceptron.

Logistic Regression.

For each method, use 80% of data for training and compute Recall, Precision and F1-score, in case that your chosen problem is a binary classification, and compute the Confusion Matrix, and recall and precission on prediction for each class, if your problem is k-class classification, upon the remaining 20% of data.

Prepare a summary, either by a table or a plot, that reports the F1-score for each method versus the hyper-parameter that is responsible for basis functions or features complexity.

👉🏼 All your implementations must be done without use of any high-level library of ML or Deep Learning functions.

In reply to this assignment, you upload all the data and codes that you use for training and evaluation of your model/models. Alternatively, you can, instead, provide an accessible URL to the data and your codes via internet.