Homework# 7 - Due day 23:59PM 24th Dec

- 15 points Use PCA to project all your data **X_train.csv** onto 2D space
- 15 points Use LDA to project all your data **X_train.csv** onto 2D space
- 15 points RatioCut and NormalizedCut (similarity matrix based on the kernels you have used in homework#5: linear, RBF, and linear+RBF) to perform clustering on X_train.csv
- 20 points Visualization:
  - use different colors to show clusters obtained by RatioCut and NormalizedCut in 2D space (PCA projection), 3 figures in total
  - use different colors to draw samples with different digit class in 2D space (PCA projection), with all the data samples are shown by “dots”, the “support vectors” that you obtained from homework#5 should be shown with different symbols, e.g. square, triangle, cross. 4 figures in total (linear, polynomial, RBF, linear+RBF)
  - use different colors to draw samples with different digit class in 2D space (LDA projection)

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- att_faces dataset contains in total 400 images (40 distinct subjects, 10 images per subject). You should use PCA to show the first 25 eigenfaces, and randomly pick 10 images to show their reconstruction (please refer to the lecture slides).

15 points

Submit a **report in pdf** format for showing your
code with detailed explanations, giving
detailed discussion on experiments as well as your observations.

20 points