Assignment - 3
CS 416: Statistical Pattern Recognition Lab
Course Instructor : Prof. Prabuchandran
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Date: 9 Feb 2021

INSTRUCTIONS: This is a group assignment. You have to give clear and detailed plots and solution to each of the questions. **Send one single pdf file containing solutions to all problems in the google form link before 20th Feb, 11.30 am. Only one member of the team has to submit the assignment. Use the link** `https://forms.gle/ApFjTKR33U2dEQYh6` **to sumbit your assignment. Name your pdf with** *rollno*1_*rollno*2_*rollno*3**.** For example 190010005_190010006_190010007.*pdf*. Late submissions will not be graded. Students can discuss but must write their solutions based on their understanding independently. Do not use web resources or answers from your peers to obtain solutions. If anyone is involved in malpractice of any sort, then suitable disciplinary action will be taken.

1. See Chapter 9, Section 9.3.3 in Pattern Recognition and Machine Learning book by Christopher Bishop for a mixture of Bernoulli distributions. Use EM algorithm to obtain results as in Figure 9.10. Run K-Means algorithm on same dataset and compare the results.

2. Sample data from univariate and multivariate Gaussian Mixture Models and verify whether EM algorithm is able to retrieve the mixture densities in each of the case.

3. Run K-Means and Parzen Window/Kernel density estimation on dataset generated in question 2 and compare the results with EM algorithm. Try different window sizes and different kernels for Kernel density estimation. Compare it with histogram based density estimation.

Note: Marks for this assignment will depend on the analysis performed and how results are compared in each of the questions. Add GitHub link to the code for each question.