

# Pattern Classification and Machine Learning

## FEN3202

### Discussion Agenda and Exercises for Lecture 10

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#### I. DISCUSSION AGENDA

1) Mixture Models and EM (Chapter 9 of the text book).

Discussion Points: Comments on Latent variables, clustering

K-means clustering (section 9.1), distortion measure, equation 9.1, non-convex cost, iterative optimization framework, E and M steps, equation 9.2-9.4, Figure 9.1.

Mixtures of Gaussians (section 9.2), concept of discrete latent variables, equation 9.7-9.13, responsibility, ancestral sampling and Figure 9.5.

Maximum likelihood (section 9.2.1), equation 9.14, concept of singularity (Gaussian mixture versus Gaussian), Figure 9.7

EM for Gaussian mixtures (section 9.2.2), equation 9.16-9.22, Figure 9.8, EM algorithm in nutshell (equation 9.23-9.28)

#### II. ASSIGNMENT

1) Exercise 9.1 and 9.3