2413, Machine Learning, Tutorial 9
Universität Bern

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Expectation Maximization (EM-Algorithm)

1. Explain the differences between the Mixtures of Gaussian model (MoG) and the Gaussian Discriminant Analysis model (GDA).

2. Derive the update rule for Σ_l in the Maximization step (M-step) of the EM algorithm for the Mixture of Gaussian model.

Factor Analysis

3. Assume that $x^{(1)}, x^{(2)}, \ldots, x^{(m)}$ are sampled i.i.d. from a distribution described by the factor analysis model

$$z \sim \mathcal{N}(0, I) \tag{1}$$
$$\epsilon \sim \mathcal{N}(0, \Psi) \tag{2}$$
$$x = \mu + \Lambda z + \epsilon. \tag{3}$$

What is the optimal μ? Use Maximum-Likelihood estimation.