Expectation Maximization

1 Why

I am doing a homework on this.

2 Definition

Let Z and X be non-empty finite sets. We want to model a distribution $p^\theta : Z \times X \to \mathsf{R}$. We parameterize a family of distributions by a parameter θ. We have a dataset $(x^1, \ldots, x^n)$. Given a parameter θ^0, we want to solve

$$\begin{array}{rl} \textbf{find} & \theta \\ \textbf{to maximize} & \displaystyle\sum_{k=1}^{n} \mathbf{E}_{p^{\theta^0}_{z|x}(z,x^k)} \left[\log p^\theta(z,x)\right] \end{array}$$

2.1 Binary Gaussian Mixture Example

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