16/10/19

EE501: Representation Learning

- Review Sparse AE
- Variational AE (VAE)
  - motivation
  - Variational inference
- Motivation for VAE: Generative modeling
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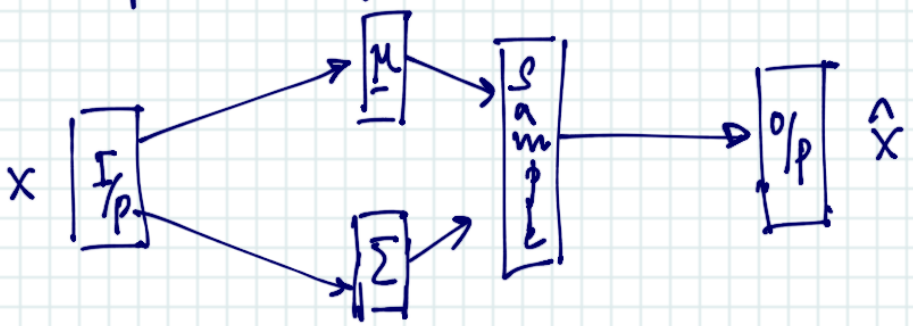

- Variational inference:

Recall: $KL(p(z) \| q(z)) = \sum_{z \in Z} p(z) \cdot \log\left[\frac{p(z)}{q(z)}\right]$

Now: $P(Z|X) = \frac{P(X,Z)}{P(X)} = \frac{P(X|Z) \cdot P(Z)}{\sum_Z P(X,Z)}$.

Challenge: computing marginal is costly.

∴ Let us approximate $P(Z|X)$ with $Q(Z)$ to avoid the computational difficulties

$KL(Q(Z) \| P(Z|X)) = \sum_Z Q(Z) \cdot \log \frac{Q(Z)}{P(Z|X)}$