SVKM'S NMIMS Deemed to be UNIVERSITY

Variational Auto-Encoders

M.Tech. Data Science, Second Year, NMIMS

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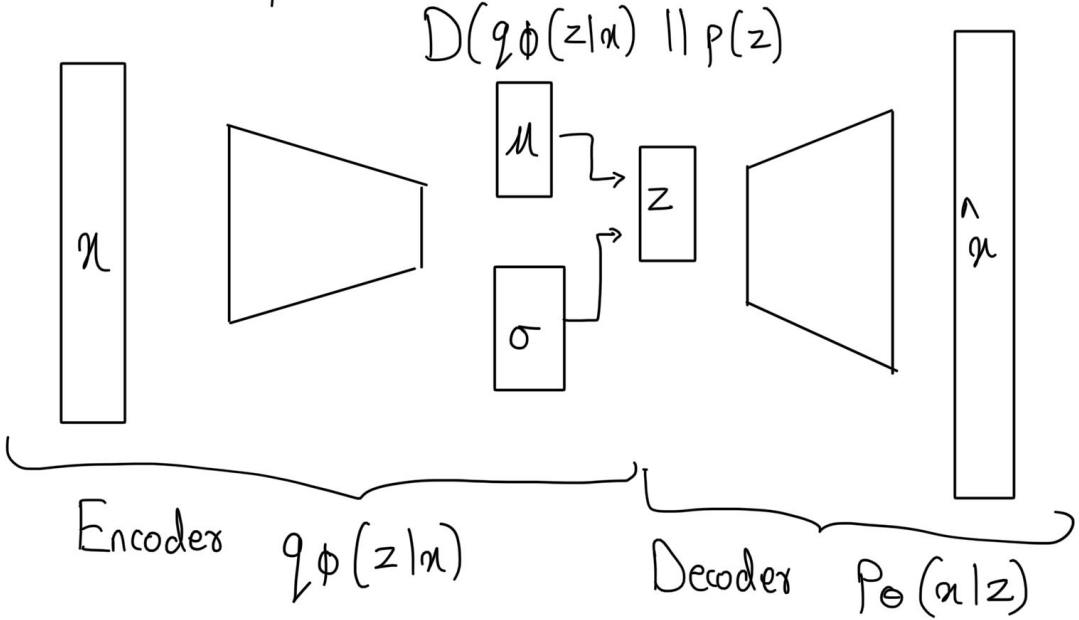
Variational Auto Encoders (VAEs)

→ VAEs are probabilistic twist on auto encoders



$\mathcal{L}(\phi, \theta, x)$ = reconstruction loss + regularization term

$$D(q_\phi(z|x) \;||\; p(z))$$

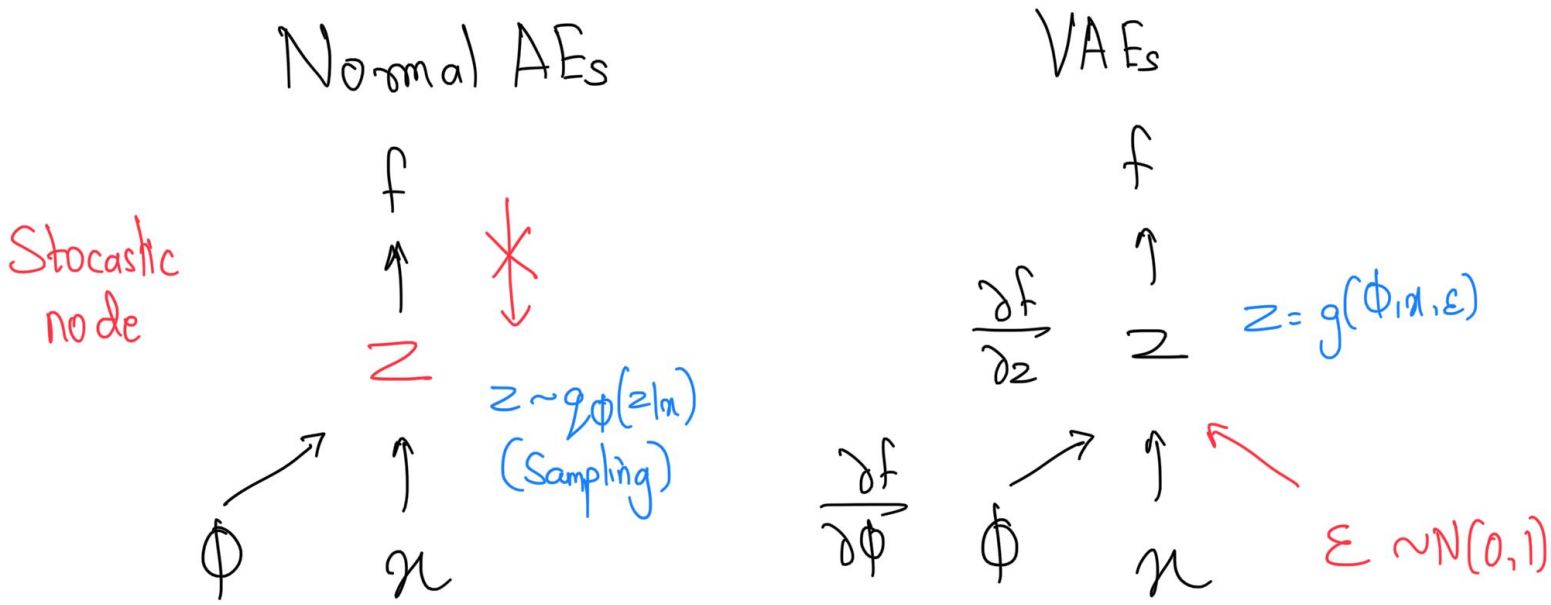
Inferred latent distribution

Fixed prior on latent distribution

$$= -\frac{1}{2} \sum_{j=0}^{k-1} (\sigma_j + \mu_j^2 - 1 - \log \sigma_j)$$

KL-divergence between two gaussians

Backpropagation in VAEs



Use cases

- Image Generation using normal distribution
- Image changing latent spaces
- Image Denoising
- Image Resconstruction