Laboratory

Variational AutoEncoder

Deep Learning for Artificial Intelligence (DLAI)

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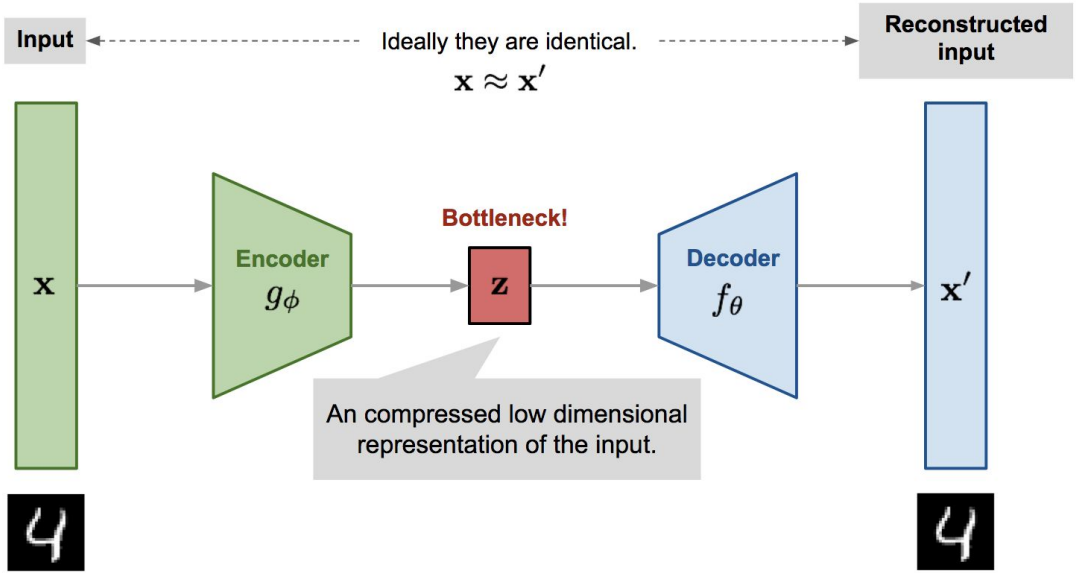
AutoEncoder



Source: Lilian Weng, "From Autoencoder to Beta-VAE" (2018)

Generative Model

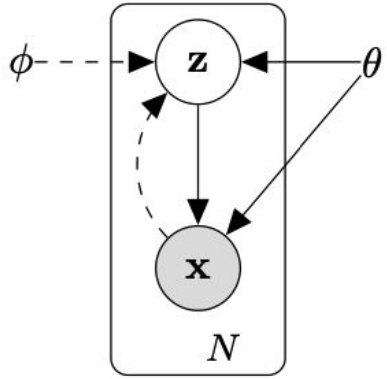
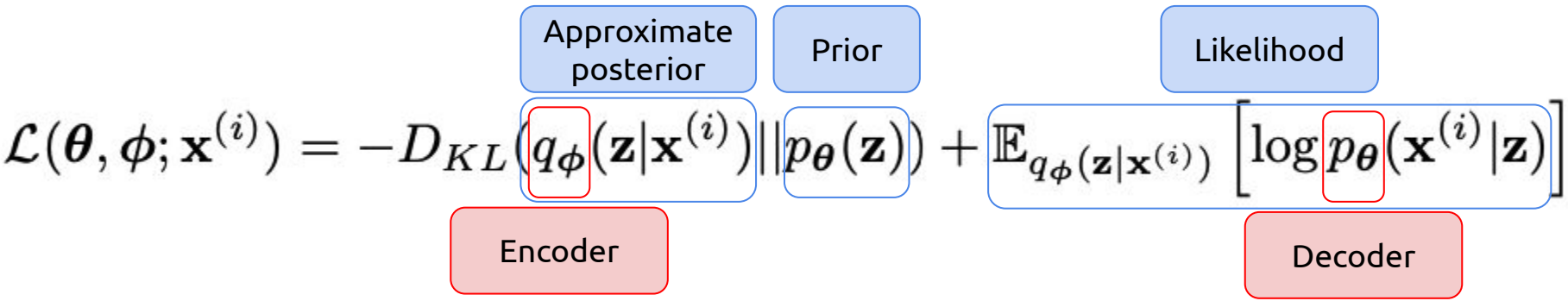
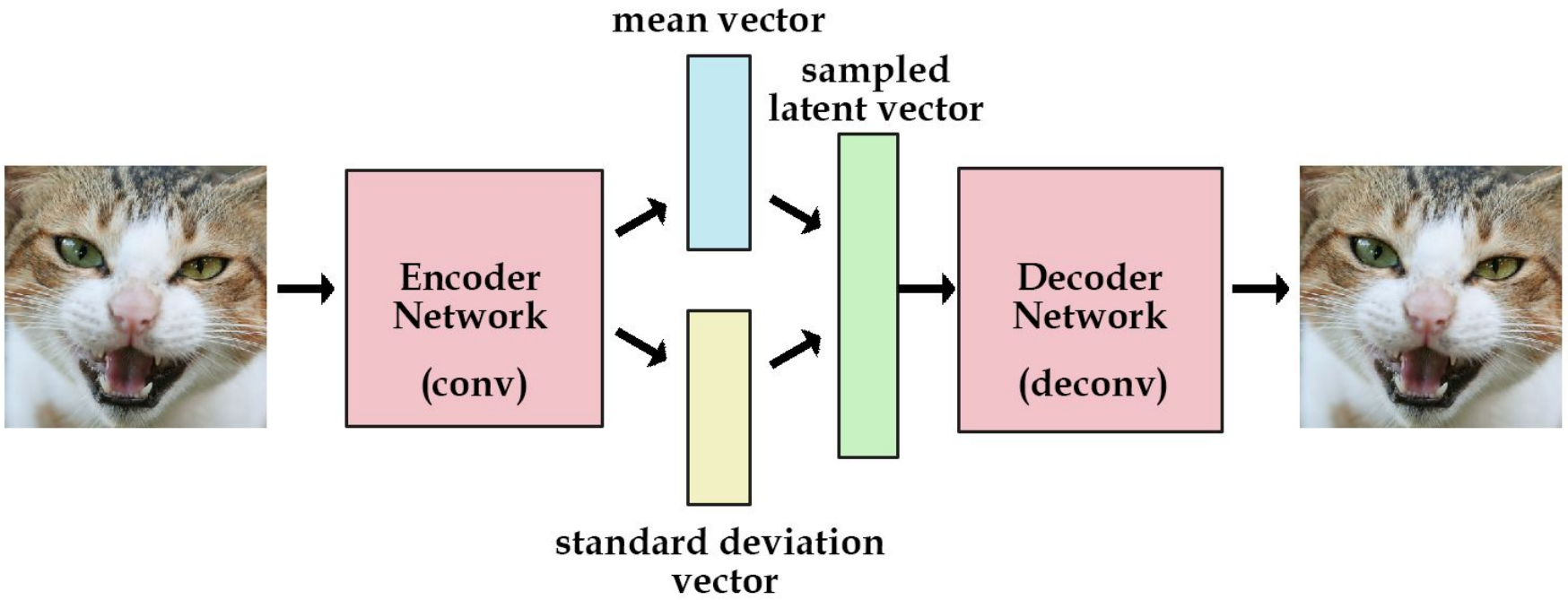


Figure 1: The type of directed graphical model under consideration. Solid lines denote the generative model $p_{\boldsymbol{\theta}}(\mathbf{z})p_{\boldsymbol{\theta}}(\mathbf{x}|\mathbf{z})$, dashed lines denote the variational approximation $q_{\boldsymbol{\phi}}(\mathbf{z}|\mathbf{x})$ to the intractable posterior $p_{\boldsymbol{\theta}}(\mathbf{z}|\mathbf{x})$. The variational parameters $\boldsymbol{\phi}$ are learned jointly with the generative model parameters $\boldsymbol{\theta}$.

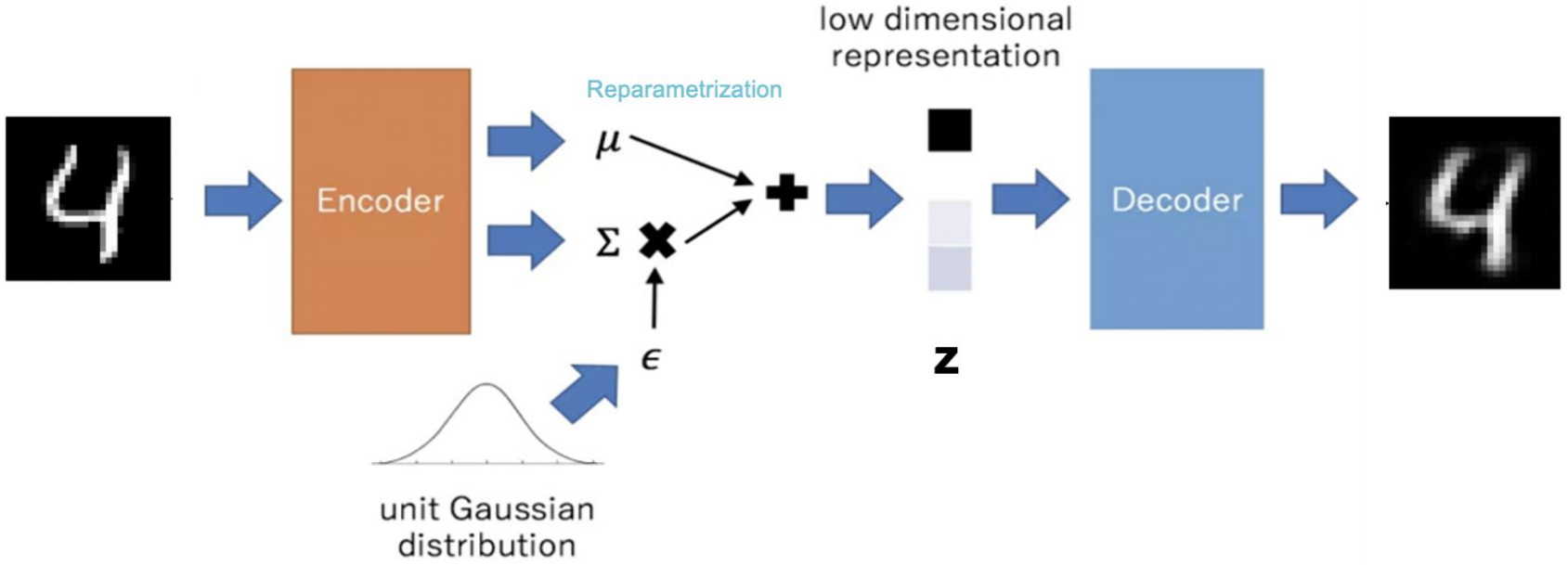
Variational inference



Variational AutoEncoder



Reparametrization trick



Task: Synthetic Image generation

MNIST dataset:

- Database of handwritten digits.
- 10 classes (digits 0-9).
- Training set of 60K samples.
- Testing set of 10K samples.

Kick off the lab

1. Launch a web browser (Chrome recommended).
2. Login with your @estudiantat.upc.edu GSuite account.
3. Create a copy the notebook of this lab to your Gdrive.
4. (Right) Click on the file and choose Open File with “Google Colaboratory”