

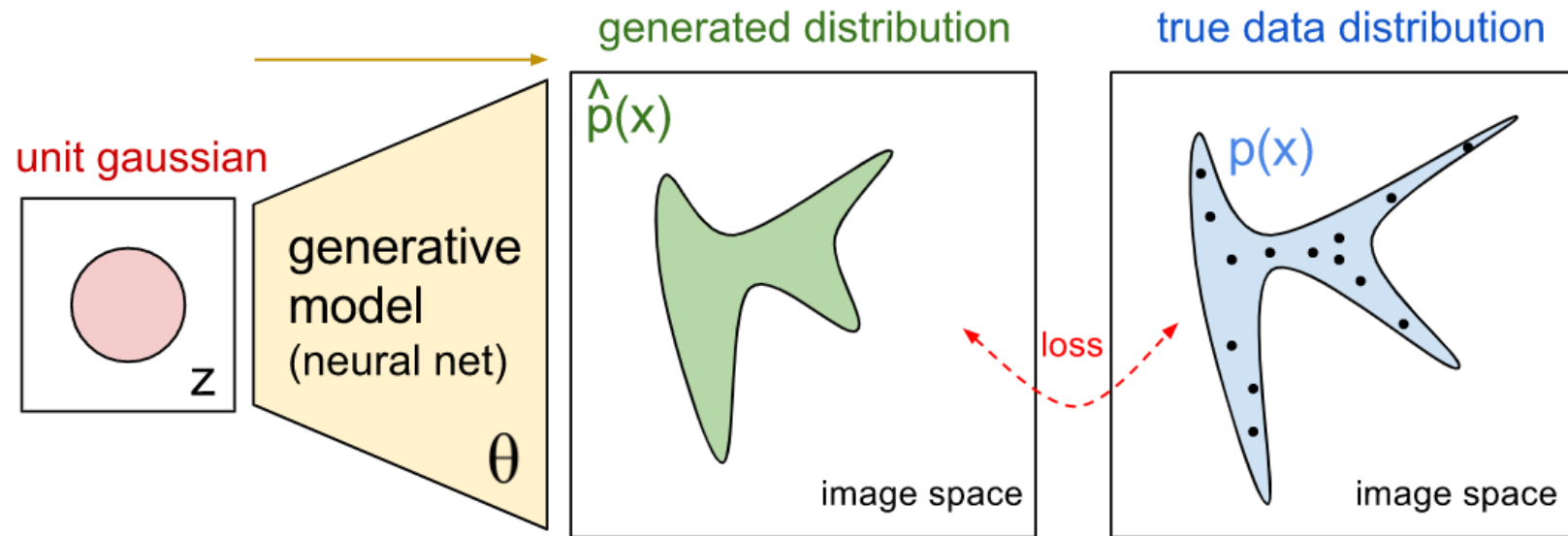
Generative models

JI XIA



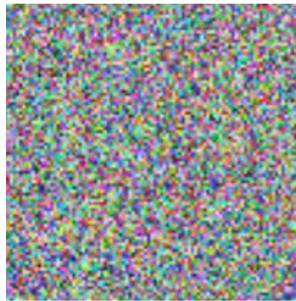
"What I cannot create,
I do not understand."

What is generative model?

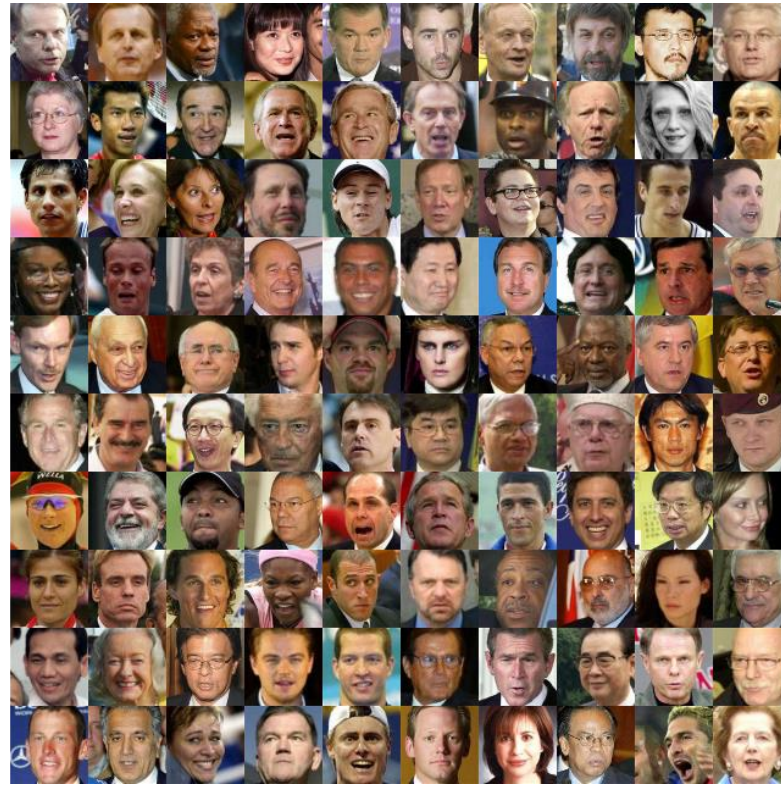


Applications of generative model

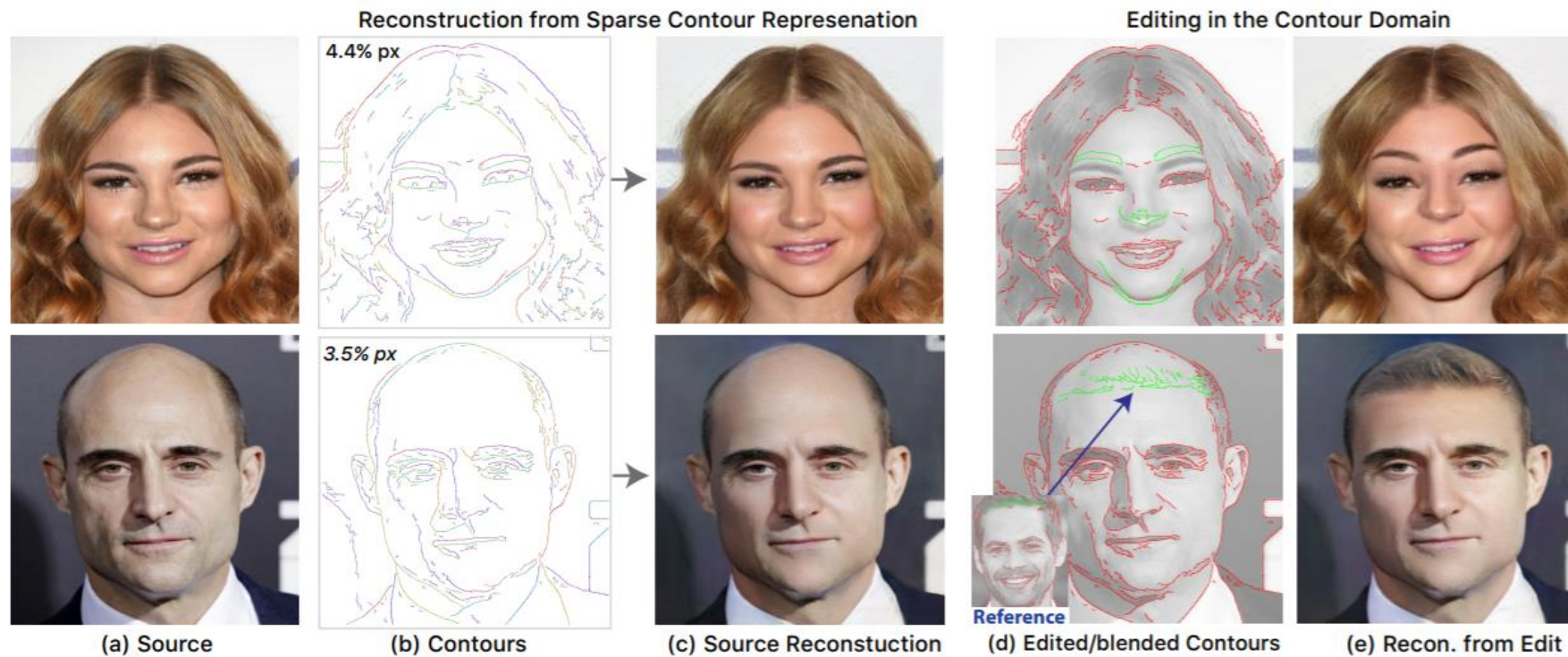
Noise $\sim N(0,1)$



Generative
Model



Applications of generative model

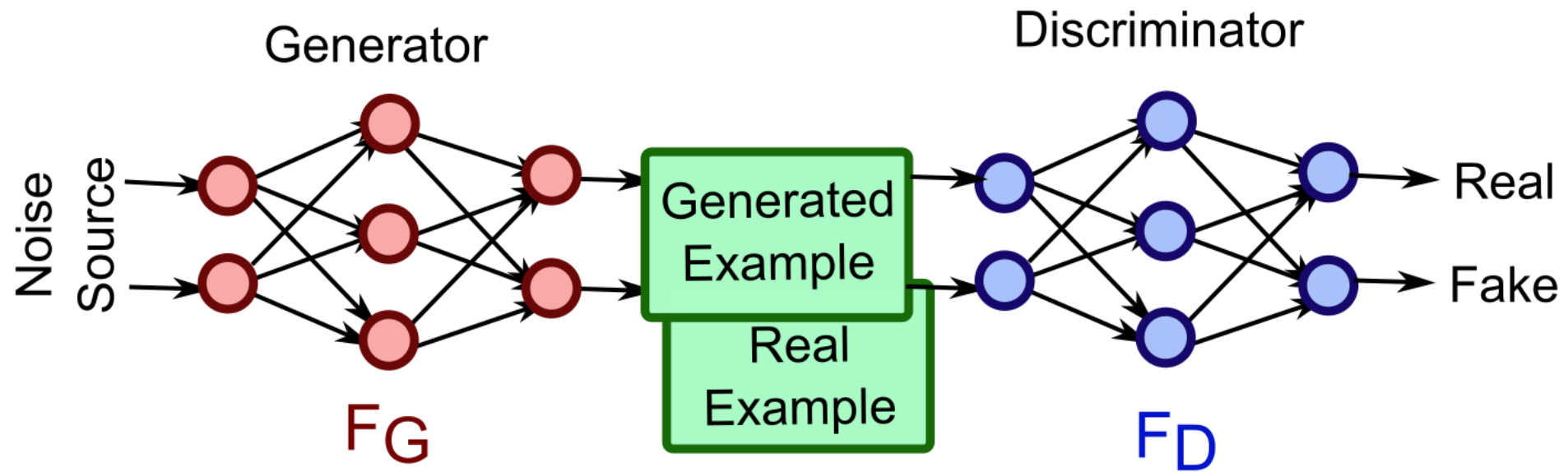


“Sparse, Smart Contours to Represent and Edit Images” CVPR 2018

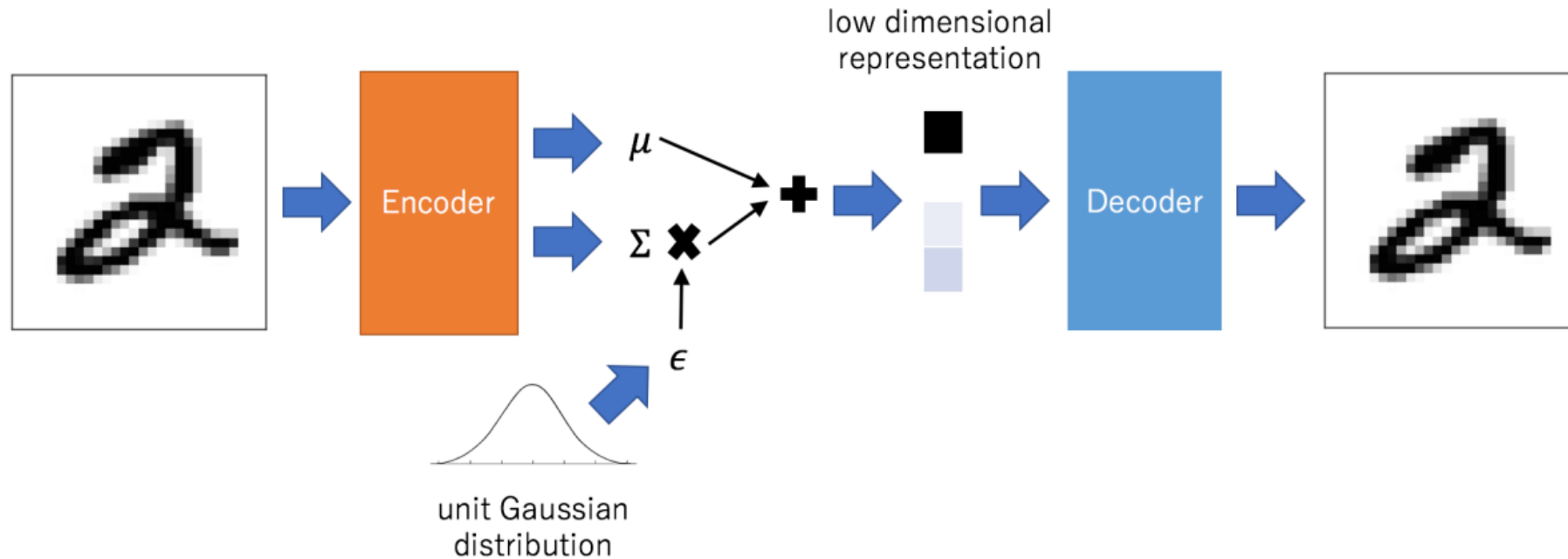
Two popular methods for generative model

1. Generative adversarial network
2. Variational autoencoder

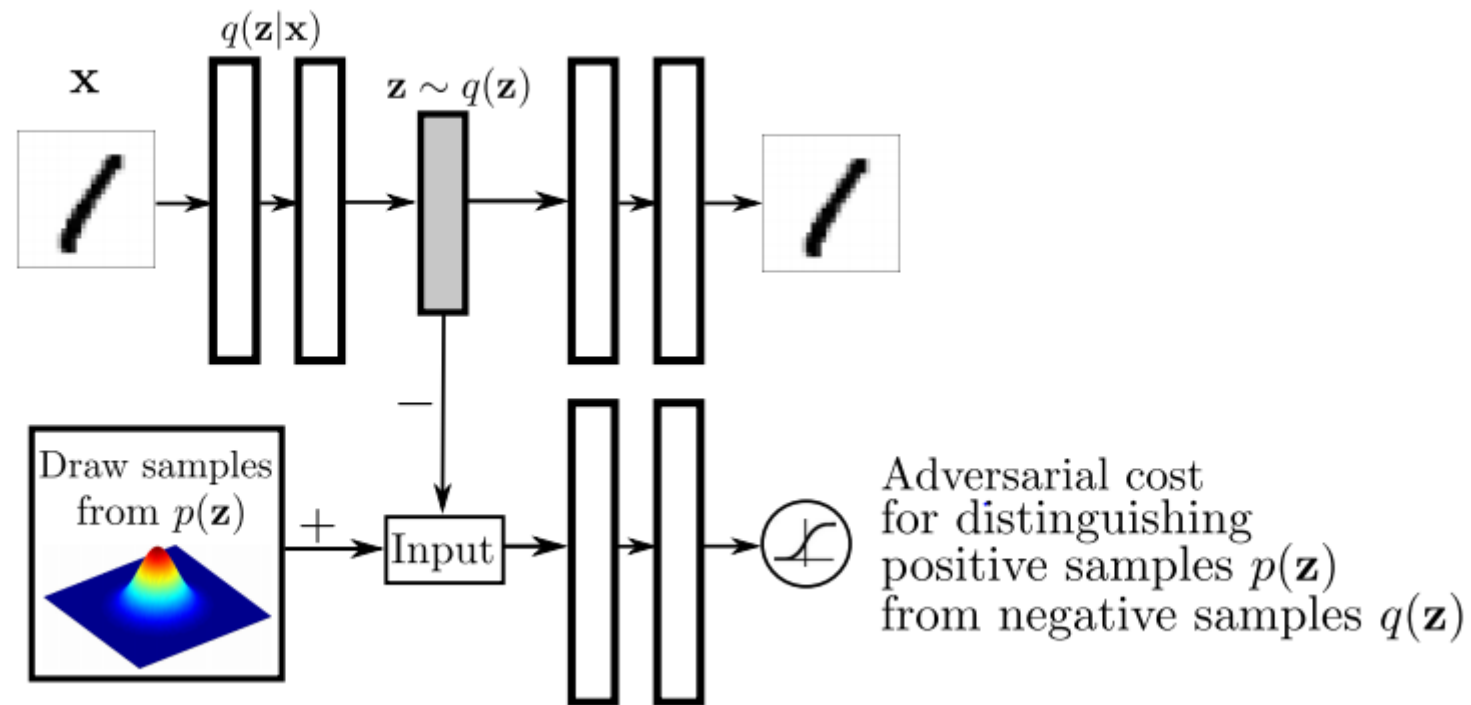
Generative adversarial network (GAN)



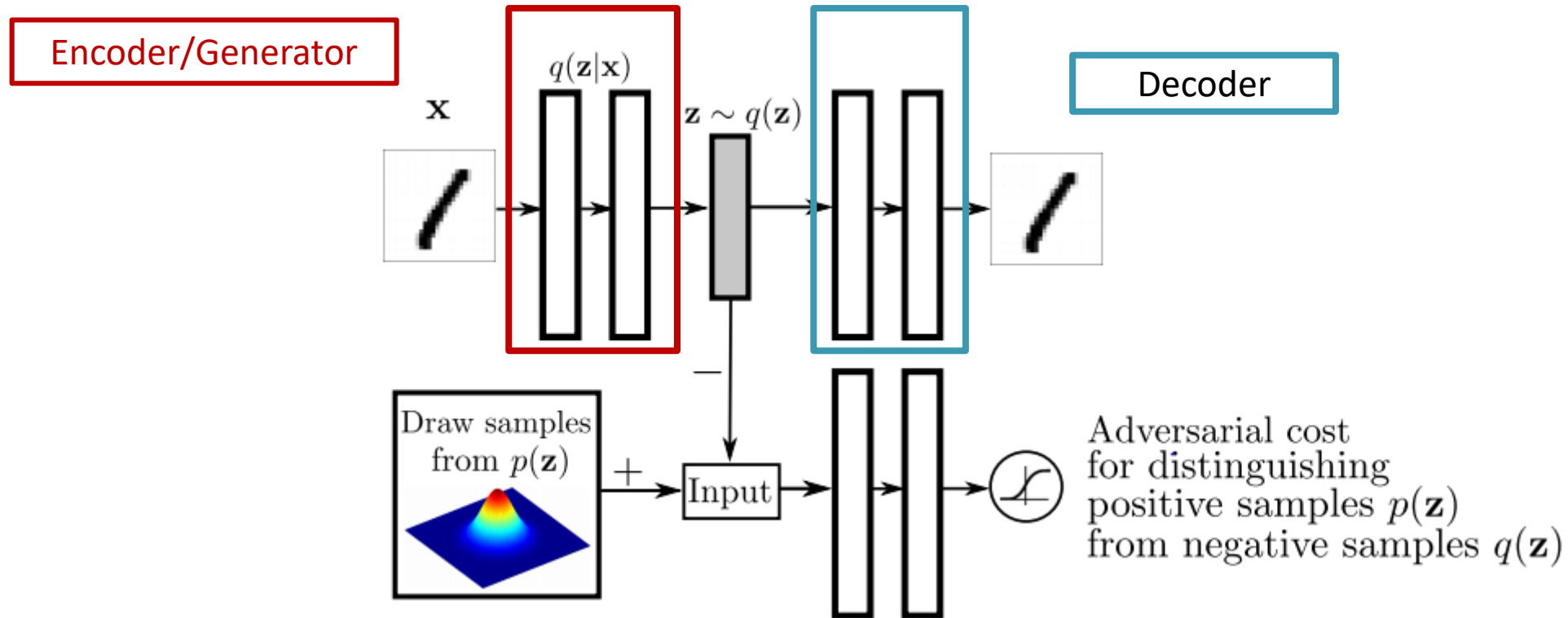
Variational autoencoder (VAE)



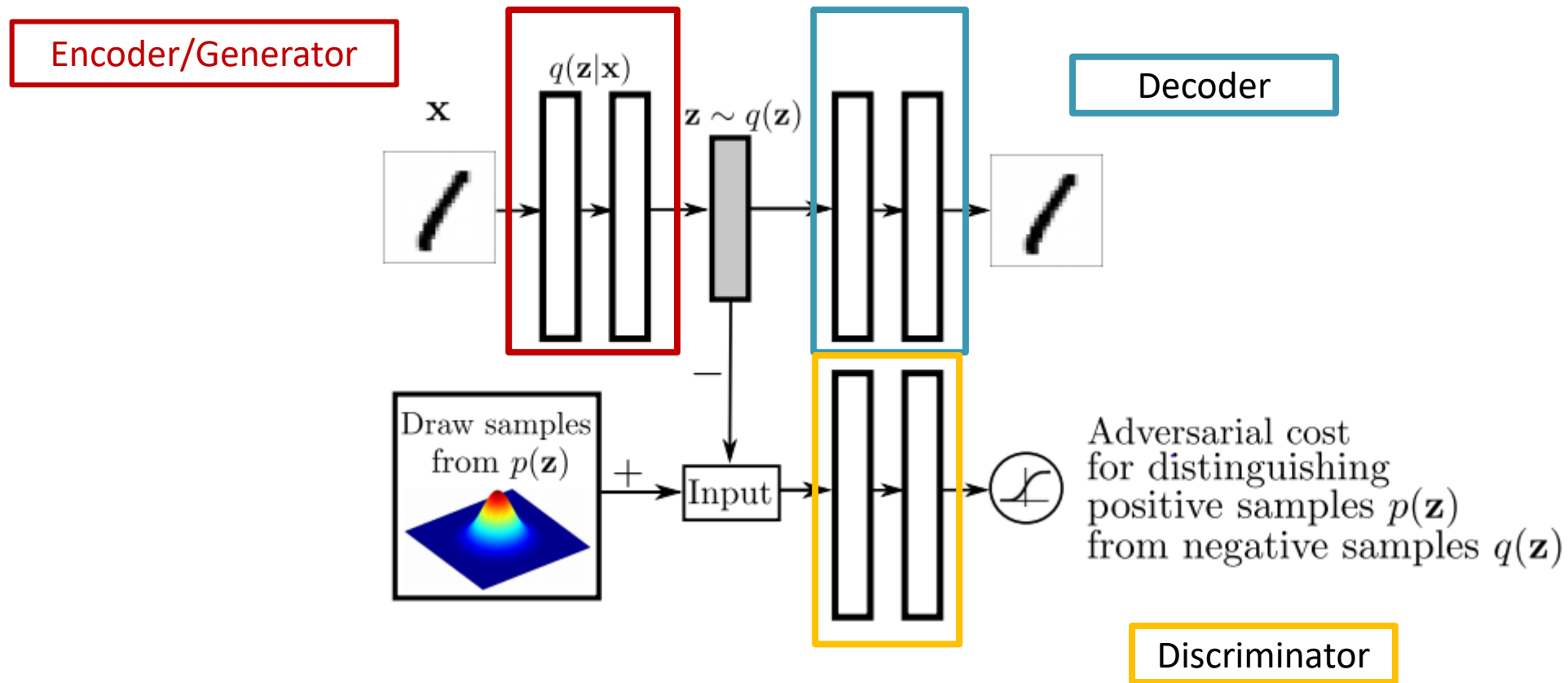
Adversarial variational autoencoder (AAE)



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Adversarial variational autoencoder (AAE)



Advantage of AAE

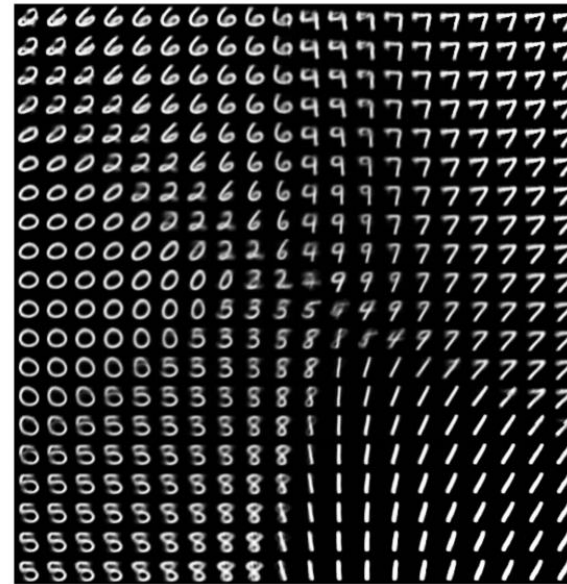
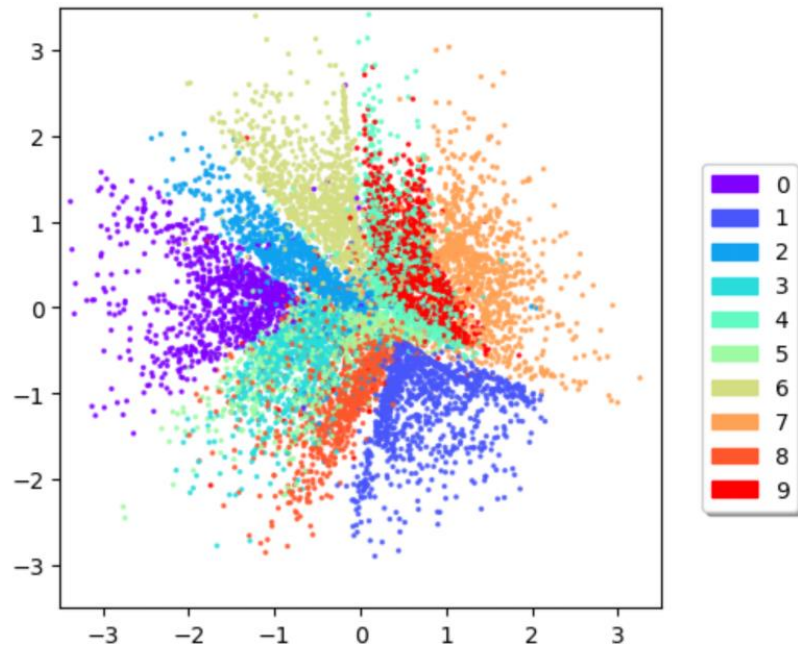
AAE outperforms VAE.

Because it's matching latent variables distribution to designed distribution using adversarial training instead of minimizing KL divergence.

AAE outperforms GAN.

Because it's imposing a low-dimensional distribution (on latent variables) instead of high-dimensional distribution (on images).

Task: Using AAE to generate handwritten digits.



Let's look at
the code
now.

Folder Organization

- **experiment: main function**
- src
 - dataflow: import dataset
 - helper: some functions that helps training or visualizing
 - models
 - **aae: define AAE class**
 - **modules: encoder; decoder; discriminator; training function**
 - layers: functions used in layers of neural networks