lect 16 Generative Model (GAN)

If we have 64×64 gray images (example), we think of each image a point in real world of $B^{64 \times 64}$, we may care the distribution of these points

Application

→ semi-supervised.
  You know something, but not everything., use the model to

  Refine the original one

→ Convert one to another

  Say horse → zebra

Models:

1.1 Explicit Density Model

$$\max_{\theta} P_{model}(x; \theta)$$

⎤ → (Fully Visible
⎥   One example, tractable pixelRNN.
⎥   Sequentially generate next pixel based
⎥   on previous.
⎦   Can be used to predict the right half from
     left, ...

Example: Wavenet

1.2. Auto encoder.

for compression   codeword

$$P(x) = \int P(x \mid z; \theta) P(z) \, dz$$
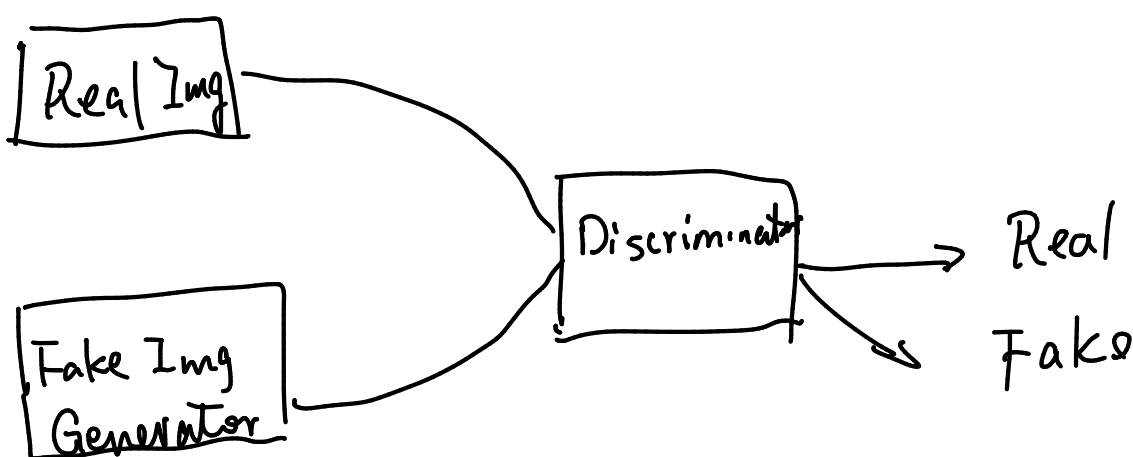
↑ original pixel

2 Implicit Density Network.

Provide something fully generated by network.

Generative Adversarial Network

→ make artificial image   (Generator)

→ tell artificial from real (Discriminator)

→ Use Discriminator to train Generator,

→ Use Generator to train Discriminator

model collapse.

The system could only produce one cluster of images that works perfect, not the whole.