Generative Adversarial Method

01 July 2025   13:19
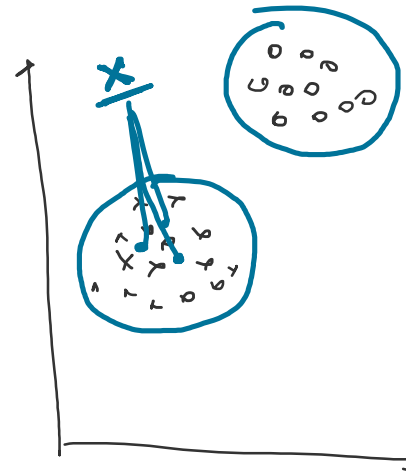
2014   Ian Good fellow)

$P(X)$
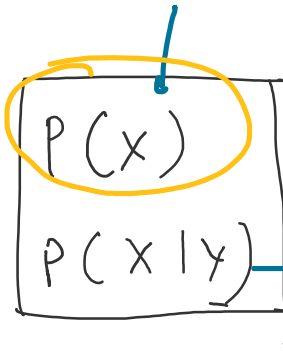
$P(X|Y)$ → ∀ class y

Learn distribution of

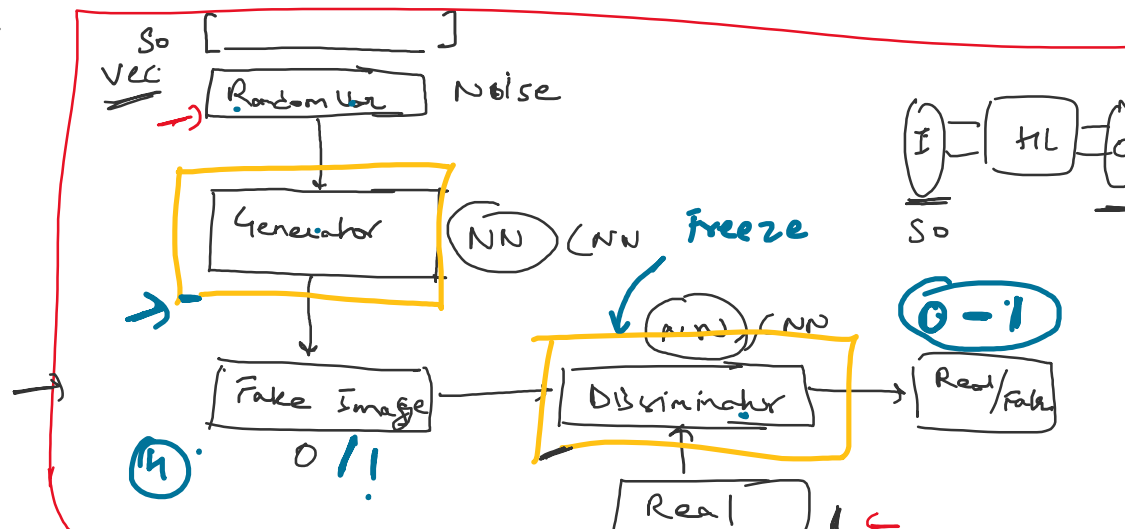GAN → Generative Adverserial Networks   Chatgpt → G...

① Generator → Generates a Fake

② Discriminator → Helps to discriminate b/w Fake & Real

min max playe...

Fake Notes

Generator

Police

Discriminator

Model :

So Vec

Random Var   Noise

Generator   NN (NN   Freeze

Fake Image   (NN) (NN

$0 / 1$

Discriminator   Real/Fake

Real

I — HL — ...
So

$0 - 1$
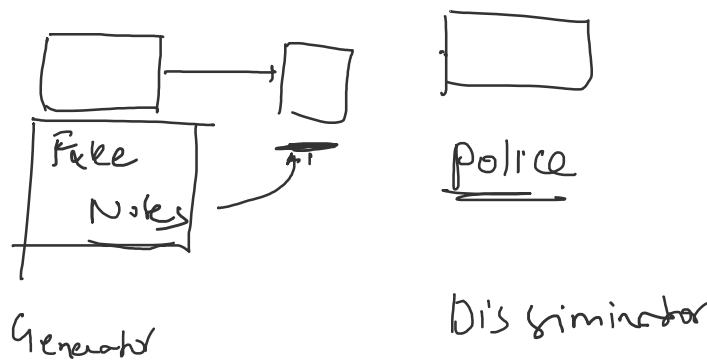
GAN

Training of GANs

① Random var : $R^n \rightarrow 10$ $z \sim P(z)$

② Generate Fake Image using Generator by giving it R.V.

③ Train Your Discriminator by using Fake & Real image
                                          0   1

④ Train You Generator by ① Freeze Your Discriminator
                                       ② Label You Fake Images as
                                            1 and train You GAN

⑤ Repeat all the steps for some epoch

Obj f^n

$$\min_{\theta_g} \max_{\theta_d} \left[E_{x \sim P_{data}} \log D_\theta(x) + E_{z \sim P(z)} \log \left(1 - D_\theta \right. \right.$$

DCGANs $\rightarrow$ Deep Convolutional GAN

Discriminator $\rightarrow$ Convolutional Neural Network

Generator $\rightarrow$ CNN   Convolution Transpose

down Sampling : **Convolution**

Upsampling : Convolution Transpose

Up Sampling →   Max Pooling

$$\begin{array}{|c|c|} \hline 1 & 2 \\ \hline 3 & 4 \\ \hline \end{array} = \begin{array}{|c|c|c|c|} \hline 1 & 1 & 2 & 2 \\ \hline 1 & 1 & 2 & 2 \\ \hline 3 & 3 & 4 & 4 \\ \hline 3 & 3 & 4 & 4 \\ \hline \end{array} =$$

Cifar $32 \times 32 \rightarrow 224 \times 224$

Transfer learning

Convolution Transpose

$$\begin{array}{|c|c|} \hline 1 & 2 \\ \hline 0 & 3 \\ \hline \end{array} * \begin{array}{|c|c|} \hline 1 & 3 \\ \hline 2 & 1 \\ \hline \end{array} = $$

Input Image   Kernel

$$\begin{array}{|c|c|} \hline 1 & 3 \\ \hline 2 & 1 \\ \hline \end{array} \quad \begin{array}{|c|c|} \hline 2 & 6 \\ \hline 4 & 2 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 0 & 0 \\ \hline 0 & 0 \\ \hline \end{array} \quad \begin{array}{|c|c|} \hline 3 & 9 \\ \hline 6 & 3 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline 1 & 0 & 2 \\ \hline 0 & 3 & 1 \\ \hline 2 & 0 & 1 \\ \hline \end{array} * \begin{array}{|c|c|} \hline 0 & 2 \\ \hline 1 & 1 \\ \hline \end{array} =$$

img   Kernel

Stride = 1

4×4

$$\begin{array}{|c|c|c|c|} \hline 0 & 2 & 0 & 4 \\ \hline 1 & 1 & 8 & 4 \\ \hline 0 & 7 & 4 & 3 \\ \hline 2 & 2 & 1 & 1 \\ \hline \end{array}$$

Stride = 2

6×6

0 2 0 0 0
1 1 0 0 2