Generative Models ⟹
Use unsupervised learning approach

In generative model
There are samples & data i.e. X (Input variable) } doesn't have output variable Y

~~Supervised~~ ~~Learning~~

GAN: (Generative Adversarial Model)

⇓

Deep Learning based generative model used for unsupervised learning

} In short, its a system where two competing networks compete with each other to create or generate variations in the data

2014 - 1st paper
DC-GAN
Deep Convolutional General adversarial network

GAN Architecture uses 2 models

① Generator - Generator network that take a sample and
② Discriminator generates a sample of data

⇓

Discriminator network decides whether the data is generated or taken from the real sample using binary classification problem with the help of Sigmoid function that gives output in range 0 to 1.

We use neural networks as ~~artificial~~ intelligence algorithm.

$$V(D,G) = E_{x \sim P_{data}(x)}[\log D(x)] + E_{z \sim P_z(z)}[\log(1 - D(G(z)))]$$

G = Generator x = sample from real data
D = Discriminator z = sample from generator

$P_{data}(x)$ = Distribution of real data $D(x)$ = Discriminator network
$P(data(z)$ = Distributor of generator $G(z)$ = Generator network

GAN Application

⇒ Prediction of next frame in a video. (surveillance video)

⇒ Text to image Generation (from caption it would generate image)

⇒ Image to Image Translation

⇒ Enhanced the resolution (Super resolution GAN)

⇒ Int [CSAIL] [SR GAN]

is working on

Interactive image generation

Minor details + Better Quality

Challenges

⇒ Problem of stability between generator & discriminator

⇒ Problem to determine positioning of the objects

⇒ Problem in understanding perspective 2D → 3D

⇒ Problem in understanding Global objects .. Trees flowers

New GANs are overcoming these challenges

WHITE BOX CARTOONIZATION