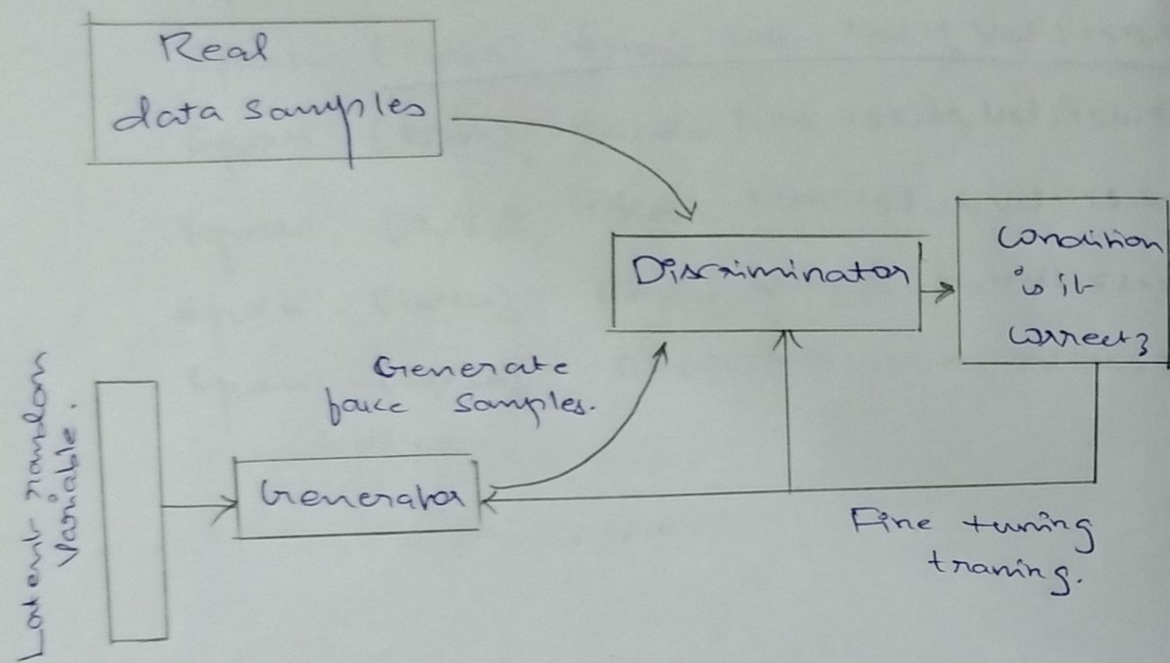
Architecture of GAN:-



25/10/25

Lab 12: Implement a deep Convolutional GAN to generate complex color image.

Aim:-

To implement a deep convolutional Generative adversiarial network GAN DCGAN that can generate complex color images.

Pseudo code:-

* Import Libraries
  torch, matplotlib
* Load dataset:-
  use label dataset.
  Normalize images
* Define Generator Network.
* Define Discriminator network
  Input: Real or fake image.
* Initialize both networks and
  → Adam optimizer
* Training Loop.
* Visualize
  → display generated color images
  → Compare evolution across epochs.

Output:-

	Loss
Epoch 1:-	D : 0.6353
	G : 1.1434
Epoch 2:-	D : 0.3006
	G : 2.2320
Epoch 3:-	D : 0.1758
	G : 2.0664
Epoch 4:-	D : 0.1036
	G : 3.1348
Epoch 5:-	D : 0.0258
	G : 3.8800
Epoch 6:-	D : 0.0158
	G : 4.4911

Observation :-

* During the initial epoch generate images are random noise with no structure.
* As training process, the generator learn color pattern, textures and shapes resolve being real image.
* The discriminator loss oscillat b/w G and D,
* After sufficient training, DCGA produce vivid, realistic and colorful synthetic images.
* The quality of generated image depend on dataset complexing, network auth and training stability.

Result :-

Successfully implemented a DCGAN capable of generating complex, realistic color images.