

12.) Implement A Deep
convolutional GAN TO Generate
Complex Color Images

Aim :-

To implement a Deep convolutional GAN to generate complex color images

Objective

* Build a generator to create RGB images from random noise

* Build a discriminator to distinguish real and fake images

* Train both network adversarially using image data

* Generate and evaluate realistic color images

PSEUDOCODE:-

Initialize hyperparameters
($\text{lr} = 0.0002$, $\text{nz} = 100$, $\text{batch} = 128$,
 $\text{epochs} = 200$).

Load and normalize dataset to $[-1, 1]$.

Define Generation:

Input: $z \in \mathbb{R}^{100}$

Layers: Transposed conv \rightarrow batch Norm \rightarrow
ReLU $\rightarrow \dots \rightarrow$ Tanh

Output: $3 \times 64 \times 64$ image

Define Discrimination

Input: $3 \times 64 \times 64$ image

Layers: Conv \rightarrow batch Norm \rightarrow Leaky
ReLU $\rightarrow \dots \rightarrow$ Sigmoid

Output: Real / Fake probability

For each epoch

1. Train Discrimination on real and fake images
2. Train Generator to fool discrimination
3. update weights with adam optimizer
4. Save sample images periodically

Observation:

* Initially produces noisy images quality improves over epochs

* Final outputs show realistic color images resembling training data.

Result:-

Therefore the implementation of a deep convolutional GAN to generate complex color images is successfully completed.