Git Hub Link: https://github.com/AbyadEnan/CPSC-8430-Deep-Learning/tree/main/hw3

Objective:

The objective of this project is to get ourselves acquainted with Generative Adversarial Network (GAN). GAN is an unsupervised network for training generator-discriminator pair on a dataset. For our work, we used CIFAR10 dataset, an image dataset, where we utilized DCGAN, WGAN and ACGAN techniques to create fake images.

What is GAN?

Basically, Generative Adversarial Network (GAN) is a Deep Learning Technique where two neural networks are under competition in improving their prediction accuracy. The concept is depicted in the picture as follows:
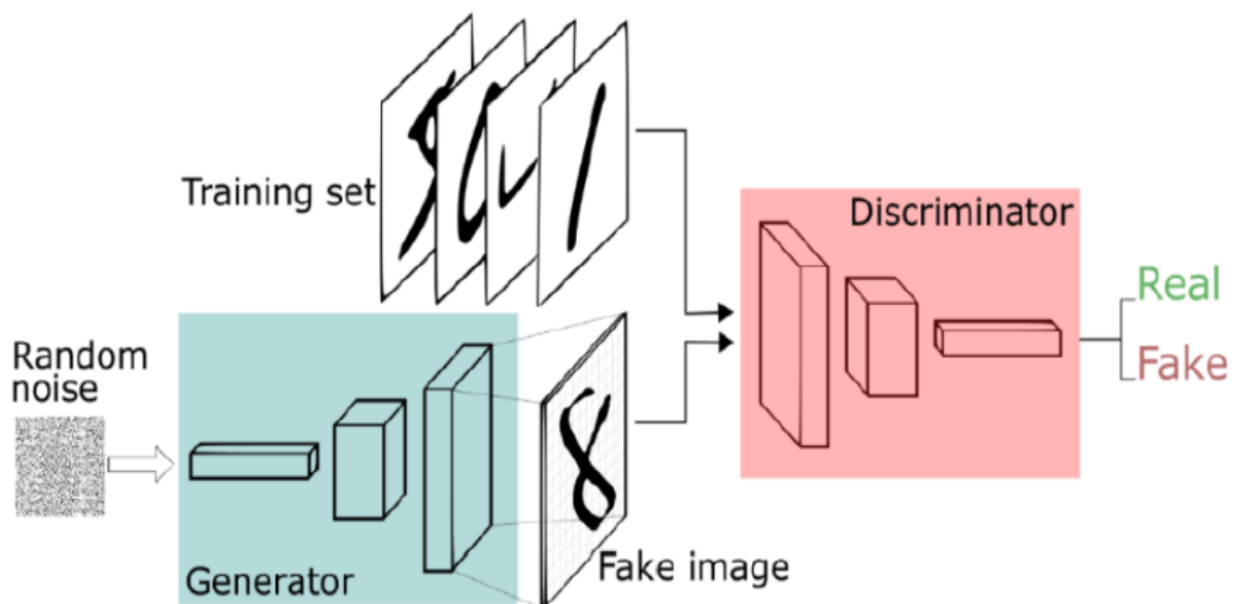

Figure: GAN

Dataset:

CIFAR10 Dataset (60,000 two dimensional colorful images, each with a dimension of 32×32 where number of classes is 10). Data set link is as follows:

https://www.cs.toronto.edu/~kriz/cifar.html

Tools:

- Python 3.9.12
- Pytorch 1.11.0
- Cuda toolkit 11.3.1

Results:

- **DCGAN:**

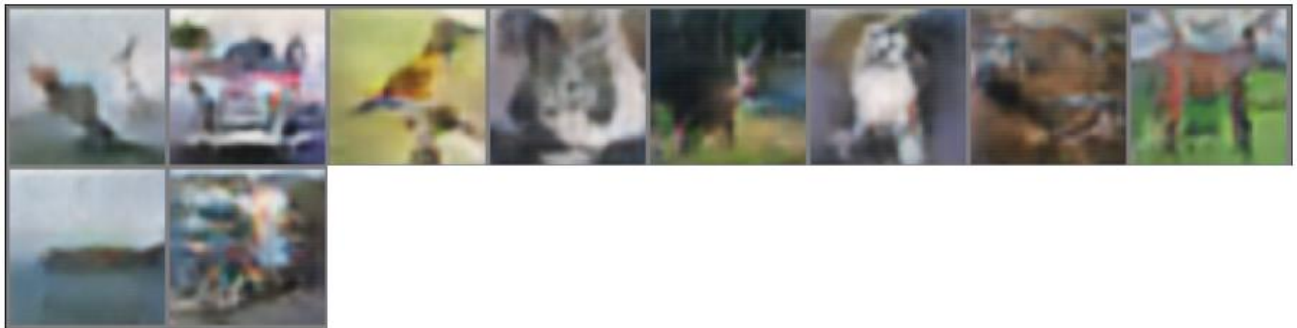 Best 10 images generated by DCGAN is as follows:

- **WGAN:**

  Best 10 images generated by WGAN is as follows:

- **ACGAN:**

  Best 10 images generated by DCGAN is as follows:

Performance Comparison:

Performance is assessed using PID where we see that DCGAN has the best PID score.

Model	PID Score
DCGAN	36.21
WGAN	43.53
ACGAN	51.73