VIVEKANAND EDUCATION SOCIETY'S INSTITUTE OF TECHNOLOGY

Hashu Advani Memorial Complex, Collector's Colony, R C Marg, Chembur, Mumbai-400074

Department of Artificial Intelligence and Data Science

Subject: AAI lab **Class:** D16AD **Semester:** 8

Roll No.: 60	Name: Subrato Daya Shankar Tapaswi	
Exp. No.: 4	Title: To build and train Basic GAN	
DOP:		DOS:
GRADE	A	SIGNATURE: 2023

Subrata-60-D16AD

AAI - Experiment 4

Aim: To build and train a Generative Multi-layer Network Model using approximate dataset (Basic GAN)

Theory: General Adversarial Networks (GAN) are a class of Deep learning models introduced by Ian Goodfellow and his colleagues in 2014. GANs consist of 2 neural networks, a generator and a discriminator, which are trained simultaneously through an adversarial process.

- **Generator:** Takes random noise as input and learns to generate synthetic data samples. It typically consists of multiple layers, often implemented as a deconvolutional neural network, that transform the input noise into data samples that resemble the training data.

- **Discriminator:** It acts as a binary classifier, distinguishing b/w real data samples from the training set and fake data samples generated by generator. It learns to assign high probabilities to real samples and low probabilities to fake sample.

- **Adversarial Training:** During training, the generator aims to provide data samples that are indistinguishable from real samples.
  - While discriminator aims to accurately differentiate between real and fake samples.
  - This adversarial process leads to a competition between the two networks, driving the generator to improve its ability to generate realistic samples.

• Loss Function: The training objectives of GANs involves minimizing a loss f^{n} that balances the objectives of the greater generator & discriminator. Generator seeks to minimize the probability of the discriminator correctly classifying fake samples, while discriminator seeks to maximize its ability to distinguish between real & fake samples.

• Convergence: Ideally, the training process of GANs leads to a Nash eq^{m}, where the generator produces samples that are indistinguishable from real data and the discriminator is unable to differentiate between real and fake samples.

* Conclusion: The experiment focused on training and building Basic GAN using an apt. dataset. Further experimentation and research are needed to overcome limitation of GANs and unlock their full potential in the field of generative modelling.