



Deep Learning Intern Assignment

Submit By: 26th March, 2023

Assignment Task: Design and Implement a Generative Adversarial Network (GAN) to Generate New Images

Objective: To build and deploy a deep learning model that generates new images of a specific category, such as "paintings", "cars", or "animals", using a Generative Adversarial Network (GAN).

Requirements:

Dataset: Collect or use an existing dataset with images of the chosen category. The dataset should contain at least 1000 images.

Data Preprocessing: Perform necessary preprocessing, such as resizing, normalization, and data augmentation to improve model performance.

Model Design: Design a GAN architecture using a deep learning framework like TensorFlow or PyTorch. Include a brief description of the generator and discriminator model architectures, the number of layers, and the rationale for choosing the specific architecture.

Model Training: Train the GAN using the prepared dataset. Document the training process, including the choice of loss function, optimizer, and learning rate, along with the reasoning behind these choices. Provide a plot of the generator and discriminator losses over time.

Model Evaluation: Evaluate the quality of the generated images using quantitative metrics such as the Frechet Inception Distance (FID) and Inception Score (IS). Additionally, provide a qualitative evaluation by visually inspecting a sample of generated images.

Model Deployment: Briefly explain how you would deploy the trained GAN to a cloud-based service (e.g., AWS, Google Cloud, or Microsoft Azure) to enable real-time image generation through an API.

Code: Provide well-documented and organized code, preferably in a Jupyter Notebook or a GitHub repository.

**Deliverables:**

1. A detailed report outlining the steps taken, along with the rationale behind design choices, GAN architecture, and hyperparameters.
2. A Jupyter Notebook or a link to a GitHub repository containing the code used for the assignment.
3. Performance metrics (FID and IS) for the trained GAN.
4. A sample of generated images and a qualitative evaluation of their quality.
5. A brief explanation of how to deploy the GAN to a cloud-based service.