Assignment L7

Exploring GAN Discriminator Architectures with Fashion-MNIST

In this assignment, you will examine the effectiveness of different discriminator architectures in Generative Adversarial Networks (GANs). You will design and implement two GANs with identical generators but different discriminators—one using CNNs and the other a non-CNN architecture—and compare their performance using the Fashion-MNIST dataset.

Background: The discriminator in a GAN plays a crucial role in guiding the generator. This assignment focuses on understanding how different discriminator architectures influence the GAN's performance.

Tasks for Submission:

1. Design a common GAN generator for the Fashion-MNIST dataset.

2. Implement two discriminator architectures:

   - A CNN-based discriminator.
   - A non-CNN-based discriminator (e.g., fully connected layers).

3. Train both GAN models on the Fashion-MNIST dataset.

4. Compare the performance in terms of image quality, training stability, and computational efficiency.

5. Analyze the impact of discriminator architecture on GAN performance.

Submission Format: Include the following in your submission:

- Source code for both GAN models.

- A detailed report with:

  - Descriptions of the generator and discriminator architectures.
  - A comparative analysis of the models' training and performance.
  - Visual examples of generated images.
  - A critical assessment of each architecture's strengths and weaknesses.

Additional Instructions:

- Ensure that your code is well-commented and follows best practices.

- Your report should be clear, well-structured, and include relevant visualizations.