Image Generator with Generative Adversarial Networks (GANs) using CNNs

Description:

This project explores the application of Generative Adversarial Networks (GANs) in conjunction with Convolutional Neural Networks (CNNs) to generate novel fashion images. By leveraging a TensorFlow fashion dataset for training, the goal is to construct a model that can produce realistic and diverse images of clothing items.

Tools and Technologies:

- **Programming Language:** Python (widely used in deep learning)
- **Deep Learning Library:** TensorFlow (popular for its performance, flexibility)
- **Dataset:** TensorFlow Fashion MNIST dataset (contains 70,000 grayscale images of 10 different clothing categories)
- **Network Architectures:**
  - Generator: Progressively up samples noise vectors into images using CNNs.
  - Discriminator: Distinguishes real vs. generated images with CNNs.

Methodology:

The project uses a GAN with two CNNs:

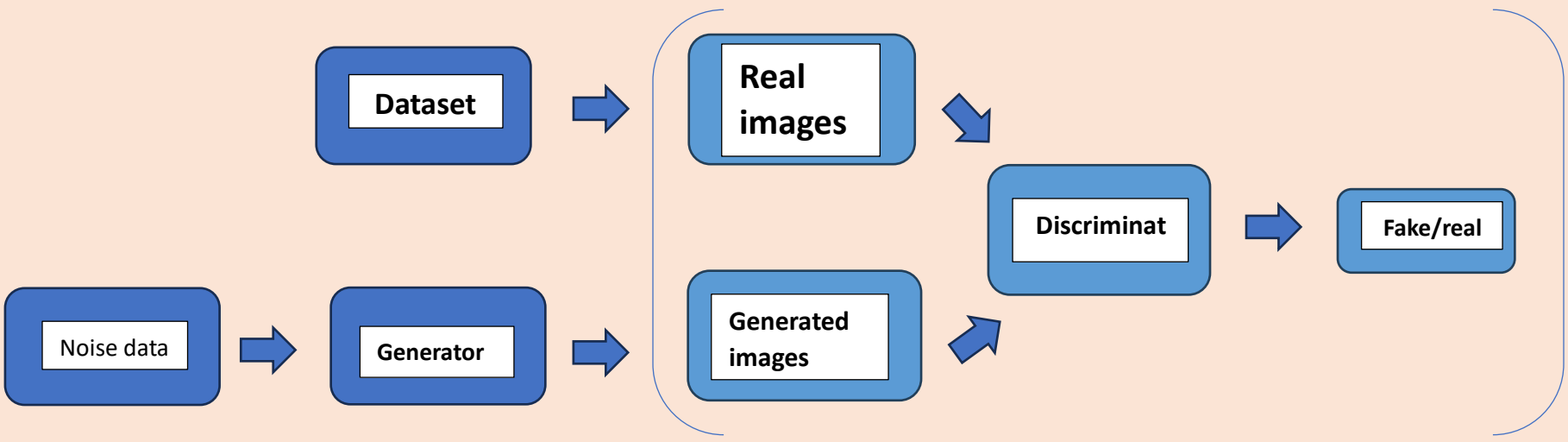
Generator: Up samples noise into images using CNNs, with LeakyReLU and batch normalization for better training.

Discriminator: Classifies real vs. generated images with CNNs, using a sigmoid output (0=fake, 1=real).

Training involves fooling the discriminator with generated images, using separate loss functions and optimizers for each network.

Conclusion:

This project successfully leveraged a GAN with CNNs to generate realistic fashion images from the TensorFlow Fashion MNIST dataset. By employing techniques like LeakyReLU and batch normalization, the generator effectively upsampled noise vectors into clothing images. The discriminator, trained to distinguish real from generated images, helped refine the generator's output. Further exploration of advanced GAN architectures and hyperparameter tuning can potentially unlock even more impressive image generation capabilities.



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