Train CGAN

A GAN (Generative Adversarial Network) is a type of neural network system consisting of a generator and a discriminator. The generator creates data that resembles real data, while the discriminator evaluates and distinguishes between real and fake data. They engage in an adversarial process during training, where the generator aims to produce data that fools the discriminator, ultimately leading to the generation of high-quality synthetic data.

On the other hand, a CGAN (Conditional Generative Adversarial Network) is a variation of GANs that incorporates conditional information during training. This additional input guides the generator to produce data that not only resembles real data but also fulfills specific conditions or criteria. CGANs offer enhanced control over the generated data and are used in tasks where you want to generate data with specific attributes or characteristics.

Train a Conditional Generative Adversarial Network (CGAN) on the MNIST dataset. Figure 1 illustrates structural CGAN and GAN architecture.
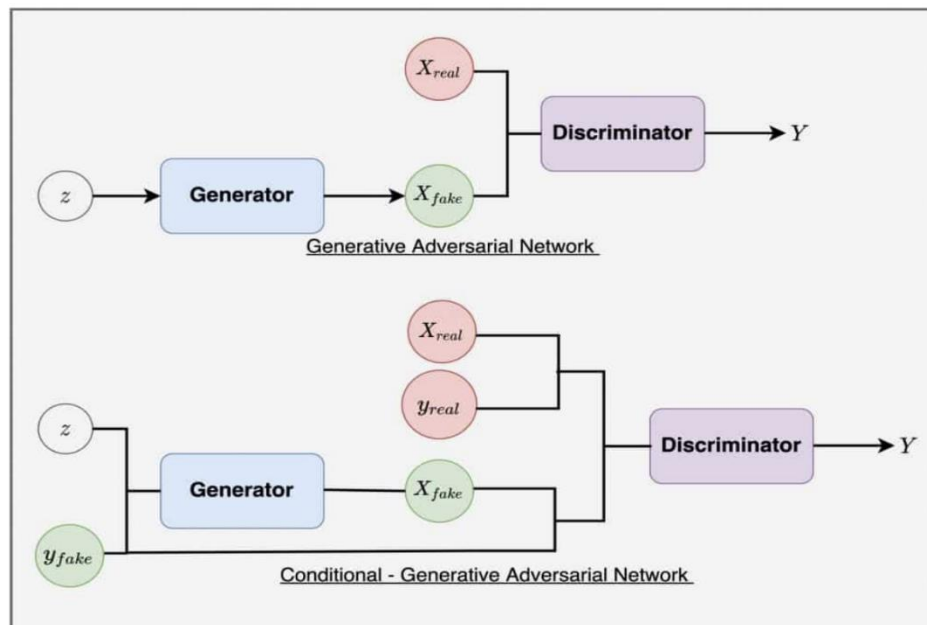

Figure 1.

Provide visual representations of the discriminator and generator models, and error diagrams for both models. Also depict a 10x10 matrix of noise vectors, each row corresponding to one of the labels 0-9, including generated output samples from the generator for each label (Figure 2).

Figure 2.