

MSSE277b: Machine Learning
Homework assignment #12 (extra credit): GAN
Assigned Apr. 27 and Due May. 4

1. Generative Adversarial Network(GAN) applied to MNIST dataset.(10 pt)

Train a GAN model for the MNIST dataset. A GAN model is composed of a generator and a discriminator competing with each other.

- (a) (12pt) Use two multi-layer perceptions each with 4 linear layers for generator and discriminator. The input to the generator is a random vector of length 100. Use LeakyReLU with negative slope of 0.2 as your activation for the hidden layers. Use learning rate of 0.0002 and regularization technique of your choice. Train the model and generate some new image by passing in random vectors to the generator, using the `plot_digits()` function from last week's homework reference to visualize them.
- (b) (8pt) Use two CNNs each with 4 convolutional blocks for generator and discriminator. Each convolutional block is composed of a convolution layer, a batch normalization and a LeakyReLU with negative slope of 0.2 activation function. The input to the generator is a random vector of length 100. Use learning rate of 0.0002. Train the model and generate some new image by passing in random vectors to the generator, using the `plot_digits()` function from last week's homework reference to visualize them. Does the generated image look more like real image?