Columbia University
IEOR4742 – Deep Learning for OR & FE (Hirsa)
Assignment 4 – Due 8:40 am on Tuesday Nov 26th, 2019

Problem 1 (Generative Adversarial Networks - GANS): In the sample code *example_GANs2.jpynb*

(a) use entire training examples in `MNIST` for training the GAN

(b) use the first 5,000 training examples, and do random shuffling for training the GAN using the following sample code for shuffling

```
def next_batch(data, batchSize):

    #Return a total of 'batchSize' random samples

    idx = np.arange(0 , len(data))

    np.random.shuffle(idx)

    idx = idx[:batchSize]

    data_shuffle = array([data[i] for i in idx])

    return data_shuffle
```

(c) use the first 5,000 training samples and use various different autoencoders to create more samples to train the GAN

(d) use the first 5,000 training samples and add various different noises such as salt&pepper, masking, and Gaussian to create more samples to train the GAN

(e) compare and assess your results

Problem 2 (Deep Convolutional GAN): In building an architecture for a deep convolutional GAN, assume 5 convolutional layer for the generator using `tf.layers.conv2d_transpose` and 5 covolutional layer for the discriminator using tf.layers.conv2d. Specify filters, kenrnel_size, and strides in your architecture if your image sizes are 512×512.