

Fall 2018, CS 416: Algorithms for Machine Learning

Friday, September 28, 2018. Total Marks: 100 Points

Note: Each student is required to submit his own code and is expected to explain it to class **RA**.

Assignment Description:

For this programming assignment use the MNIST data set. The MNIST database of handwritten digits, available from this page, has a training set of 60,000 examples, and a test set of 10,000 examples (<http://yann.lecun.com/exdb/mnist/>). Usage of colab is recommended.

- (1) Load the MNIST data in `train_set` and `test_set`.
- (2) Design a convolution autoencoder for denoising with at least 2-encoder and 2-decoder layers.
- (3) Add Noise to each input batch during training.(function `torch.random()` may be helpful)
- (4) Report the loss after each epoch.
- (5) Select randomly 10 images from the test set. Add noise to it and run it on the trained network. Plot the images before noise addition, after the noise addition and the output images from the network. The grading of the code will be based on how well the noise has been removed from the images.

Please report the results with following hyperparameters.

- (a) Play with different configuration of convolution autoencoders.
- (b) Try different learning rate 0.00001,0.0001,0.001,0.01,0.1.
- (c) Try different number of epochs 10,100,500,1000.
- (d) Try batch sizes of 16,32,64,128.