Assignment 2

Advanced Machine Learning (CS566)

Date: 08-Feb-2021

Deadline: February 22, 2021

The assignment targets to implement a character recognition network based on the autoencoder. MNIST character recognition dataset has to be used. Data contains training images and labels as well as test images and labels.
http://yann.lecun.com/exdb/mnist/
Or you can directly download the dataset from the deep learning libraries. Deep learning libraries also provide the MNIST dataset as a package that can be imported into the program easily. They also provide the training and test splits.

- TensorFlow: tensorflow.keras.datasets.mnist
- PyTorch: torchvision.datasets.MNIST

What you have to do:

1. Implement a deep neural network to recognize the handwritten characters given the image pixels.
    - **a.** Run for 10 epochs. Keep the hyperparameters same for all the models.
    - **b.** Introduce 0%, 10%, 30% and 50% noise in the input data.
    - **c.** Plot any 2 image inputs to show the difference in images before and after adding the noise.
    - **d.** Train 4 models using the noise variants (0, 10, 30 and 50%) and report the accuracy over testset for each model.

Instructions:

1. The assignments should be completed and uploaded before the deadline.
2. Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
3. Proper indentation and appropriate comments are mandatory.
4. Submission Details :
    a. You should zip all the files and name the zip file as <all-roll_no.zip>, eg. 1921cs28_1921cs29_1921cs30.zip.
    b. Submit your code along with images/answers to questions for proper evaluation.
    c. Submission link: https://www.dropbox.com/request/VidYltRGdVgeecqs5dkW
5. Make necessary assumptions if required. For further clarification, you can contact the TAs from http://172.16.1.5/~asif/CS566-AML/