

CS89BD Deep Learning, Spring 2025

Assignment 2

Due: March 3, 2025

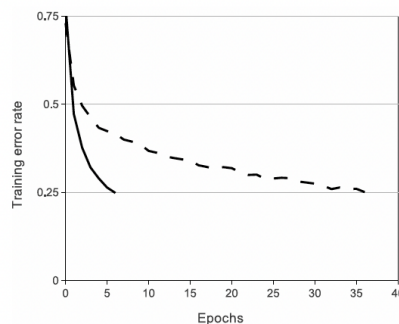
Total Points: 180

Question 1 (80 Points): Dataset Preparation

- Get [ILSVRC2010](#) dataset
- Create your own dataset from the ILSVRC2010 dataset as follows:
 - o Consider only 100 classes from the dataset
 - o From each class, take 500 images
 - o Split your dataset into training, testing, and validation sets such that training set contains 30,000, testing contains, 10,000, and validation set contains 10,000 images
 - o Prepare your data for your model as described in section 2 of AlexNet paper.
 - o Important: Your code must have appropriate comments.

Question 2 (100 Points): Experiments on Non-Linear Activation Function

- Your dataset for this experiment is [CIFAR-10](#). This dataset is readily available on all deep learning framework like (PyTorch, TensorFlow).
- Create a four-layer convolutional Neural Network for CIFAR-10 dataset and do the experiments to get the similar graph.
- Train your network until you get $\leq 25\%$ training error. Once your training error reaches 25% stop your training.
- Note: You need to create two experiments with “ReLU”, “Tanh”, “Sigmoid” activation functions in the hidden layers.



- You also need to report the time required for each epoch for all trainings. Place both graphs on same figure. Note, your x-axis should hold number of epoch and y-axis should hold time (in second) for each epoch.
- Write a report that should describe your approach and contain your original results from your experiments. Also, you should require to explain the results in well manner.