CS89BD Deep Learning, Spring 2025

Assignment 2

Due: October 16, 2025

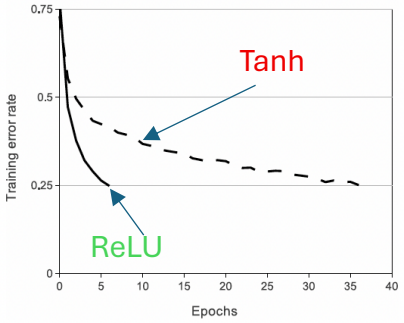
Total Points: 180

Question 1 (80 Points): Dataset Preparation

- Get Tiny ImageNet dataset
- Create your own dataset from the Tiny ImageNet dataset as follows:
    - Consider only 100 classes from the dataset
    - From each class, take 500 images
    - 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
    - Prepare your data for your model as described in section 2 of AlexNet paper.
    - Important: You 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 <= 25% training error. Once your training error reaches 25% stop your training.
- Note: You need to create two experiments with "**ReLU**", "**Tanh**", activation function s in the hidden layers. Note that one model will use only "ReLU" activation function in all layers except the output layer, and other model will use "Tanh" activation function as hidden layers activations.



- 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.