CS89BD Deep Learning, Fall 2024

Assignment 4

Due: November 5, 2024

Total Points: 100

Question 1 (100 Points): Generative Models Hands-on Experiments

Your task is to implement Convolutional **Variational Auto-Encoder (VAE)**, and **Deep Convolutional Generative Adversarial Network (DCGAN)** and provide comparative analysis of two models in terms of training accuracy and time complexity. Additionally, please provide the qualitative and quantitative comparison using MSE and SSIM methods for generated samples from both models.

Dataset: The train and test the models with CIFAR 10 dataset. The randomly selected example images are shown in Figure 1

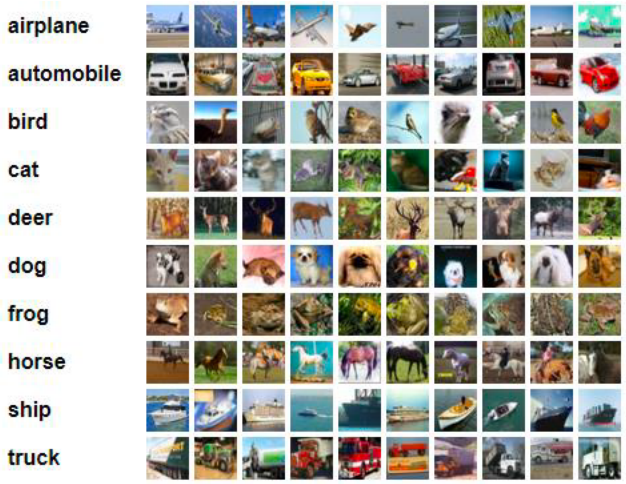

Figure 1: Example images from CIFAR-10 dataset.

Write a report that represents a comparison of two models.

The report outlines: The report must contain:

- The title page includes course title, course number, your name, WSU ID, and assignment number
- Introduction
- Methodology
- Deep Learning Architecture
- Experiment and Results (graphs)
    - A graph that represents training error (y-axis) and training time(x-axis)
    - A graph that represents errors (i.e., training error and testing error on the y-axis) and training time (x-axis)
    - A graph that represents loss (training loss and testing loss) and number of epochs (x-axis)
    - Report **state-of-the-art** accuracy for this dataset
- Conclusion
- Reference