COMP/EECE 7/8740 Neural Networks

Assignment 3

Fall 2021

Due: October 07, 2021

Total points: 100

The first objective of this assignment is to understand the Transfer Learning (TL) approach by implementing and fine-tune the state-of-the-art Deep Convolutional Neural Networks (DCNN) model called ResNet and the second objective is to ensemble models to achieve better testing accuracy for the object recognition tasks.

Dataset: Tiny ImageNet dataset

Source: **https://www.kaggle.com/akash2sharma/tiny-imagenet**

Tasks:

1. Implemented ResNet32 or 50 architecture (you are allowed to used existing implementation in keras framework) and evaluate the performance of the model on Tiny ImageNet dataset
2. Download the pretrained weights of ResNet32 or 50 model on ImageNet dataset, use the pretrained weights and fine-tune the model. Please provide the testing results for the experiment of 1 and 2. **Ref. code: Lecture_10_TL_X. ipynb**
3. Select the best model from assignment 2 for 15 classification tasks.
    a. Train and test single DCNN model on 15 classification tasks. **Ref. the best model from assignment 2**.
    b. Ensemble the three models and compare the results against the single model implementation in 3(a). **Ref. code: Lecture_10_model_ensemble. ipynb**

Note: You may choose a smaller number of sample sets for training and testing if necessary. However, you must make sure that an equal number of samples are selected from each class for both sets.

Report outlines: the report will be included:

1. The title page contains the course title, number, your name, ID, and assignment number.
2. Introduction
3. Methodology
4. Deep Learning Architecture
5. Experiment and Results
    i. Training and testing logs
    ii. Discussion and comparison (if necessary)
6. Conclusion
7. References (if available)