

CECS 551
Assignment 7
Total: 40 Points

General Instruction

- Submit uncompressed file(s) in the Dropbox folder via BeachBoard (Not email).
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1. Find the CIFAR-100 (not CIFAR-10) data set at *here*. There are 500 training images and 100 testing images per class. The 100 classes in the CIFAR-100 are grouped into 20 superclasses. Each image comes with a “fine” label (the class to which it belongs) and a “coarse” label (the superclass to which it belongs).
2. (40 points) Design convolutional neural networks to classify CIFAR-100 images using `keras` library.
 - (a) Split the training dataset into a sub_training set and a validation set by randomly allocating $\frac{1}{5}$ of the training dataset as validation set.
 - (b) The model should predict a “fine” label (class) not “coarse” label (superclass). **You will receive zero point** if your model predicts a “coarse” label (superclass).
 - (c) Evaluate multiple combinations of activation function, optimizer, hyper-parameters, and architecture.
 - (d) Using sub_training and validation sets, find three best models.
 - (e) Train the three best models again with the whole training dataset.
 - (f) Compute the **test accuracy** of three best models with the test dataset.
 - (g) Check your model’s ranking at *here*. High ranked models used extra training data, to be fair, you can select models without extra training data to compare with yours.
 - (h) Write a report to show the activation function, optimizer, hyper-parameters, and architecture of the three best models and their test accuracy, ranking, and **the number of parameters**.
3. Submit your `ipynb` file which include your source codes and `pdf` file which includes your report.