

# IIE 4123: Homework 3

Fall 2021

Deadline: November 17, 2021 (10:00pm)

Please submit ipynb file for 1 ~ 2. You can leave comments on ipynb files too. Please submit this via LearnUS.

Work on the following tasks: This homework assignment is for studying Tensorflow tutorial source codes and employing ideas from our lectures.

1. (Data Augmentation and Dropout) Open the Image Classification ipynb. The file contains the details of workflow and descriptions. Please check each line of code and learn a basic machine learning workflow.
  - (a) Demonstrate the performance difference with/without data augmentation. Please try to make performance improvements using the proper data augmentations. You may need to show training and validation loss.

Note: you can also refer to transfer learning code for other data augmentation types.
  - (b) Demonstrate the performance difference with/without dropout (you can specify percentage). Please try to make performance improvements using the proper dropout usage. You may need to show training and validation loss.
  - (c) Do some experiments to improve validation loss with the combinations of dropout and data augmentation. The goal is to improve validation accuracy.
2. (Transfer Learning and Fine Tuning) Open Transfer Learning ipynb. you will learn how to classify images of cats and dogs by using transfer learning from a pre-trained network.
  - (a) Please list techniques that have been used in the code.
  - (b) Please check test accuracies from the feature extractor model and fine-tuning model.
  - (c) Check if you increase the learning rate in the fine-tuning (current setting = base\_learning rate/10) what will happen. You can show with test accuracies or validation accuracies.