COS30082 Applied Machine Learning
Assignment: Image Classification

1. Objectives

This assignment involves working on a multi-class classification task. You are encouraged to apply any method you've learned or know to address this challenge.

2. Dataset

We use the dataset from Kaggle titled **"Deep Learning Practice - Image Classification".** You can access the dataset here:

https://drive.google.com/drive/folders/1dwGzQwooU4PT642faBxBj_CS6OB_FiFE

The dataset consists of two folders: train and test. The train folder contains 10,000 images, organized into 10 subfolders, each representing a class label and containing 1,000 images. The test folder contains unlabeled images and will not be used for this assignment.

For this assignment, only the train folder is provided as your dataset. You are expected to split it into training and testing sets yourself in order to train and evaluate your model.

3. Evaluation Metric

You are required to report your results using the following evaluation metrics: Top-1 Accuracy and Average Accuracy per Class. You may also include additional evaluation metrics.

Top-1 Accuracy measures how often the model's top predicted class (i.e., the class with the highest predicted probability) matches the ground truth label.

Average Accuracy per Class assesses the model's performance across each individual class. It is calculated by computing the accuracy for each class separately and then averaging these values.

4. Submission

4.1 Report

Your report (in PDF format) should include two sections: "Methodology" and "Results and Discussion".

It is likely that you will encounter overfitting issues, so your methodology should address how to minimise this risk. In the report, describe the architecture of your models, the loss function, hyperparameters, and any other relevant details. Additionally, discuss any performance discrepancies between the models and provide a justification for which one yielded the best results.

4.2 Python Source Code

Please ensure that your code is clearly documented.

5. Marks Breakdown

1. Methodology (3 marks): Use of multiple models and their comparison, explanation of design choices, and strategies for handling overfitting.
2. Evaluation Metrics (2 marks): Correct use and interpretation of Top-1 Accuracy and Average Accuracy per Class.
3. Model Performance (2 marks): Quality of the results achieved and effort made to improve performance.
4. Report & Code Quality (3 marks): Clarity and structure of the report, as well as the readability and documentation of the code.