MSA Assessment Introduction

This is an individual assessment where you will be ranked against your peers. The MSA team has set a minimum standard that we require all students to pass but we will be expecting to see work above and beyond the minimum specifications (as per industry standards).

Students will be placed in teams with similar assessment scores, and your placement preference is weighted against your group's overall assessment score, along with organisational preference and student preference.

Basic Requirements

- Set up project on Azure Notebooks (https://notebooks.azure.com/).
- Download and pre-process the CIFAR-10 Dataset (https://www.cs.toronto.edu/~kriz/cifar.html) to create train, validation and test datasets.
- Create a Tensorflow keras model that can classify the above dataset. Build a convolutional neural network with 3 convolutional layers and 2 fully connected layers, with maxpooling and/or dropout. Train the model and plot both the training loss and the validation loss during training.
- Do a limited amount of hyperparameter tuning and attempt to increase accuracy on validation data. You may also modify the model architecture.
- Your Azure Notebook report should describe:
    - Details on implementation, design decisions and what is happening inside of the code. This can be in markdown or comments (Max 500 words)
    - The error metrics you have used, and what they mean
    - Plot your training curves over time using matplotlib
    - State your model accuracy on training, test and validation data
    - Do some basic analysis on the results. Include a confusion matrix and some precision recall numbers for some classes. You can also include an ROC curve. Explain your analysis. State any biases that your data might have
    - Describe what hyperparameters you have tuned with a brief explanation.

Advanced Requirements

- Use a pre-trained ResNet (https://arxiv.org/abs/1512.03385) model that has been pretrained with Imagenet or the Microsoft COCO dataset. Replace the last few layers and train just those layers on a new dataset of your choice (e.g. you could create a new dataset that can recognize your face). This process is called Transfer Learning.
- Deploy your machine learning model with Azure Functions (or any other Azure Service –like Azure Machine Learning Services). Document your process.
- Create an API and frontend for your machine learning model which can accept an image and output a classification result.
- Create a fully functional Web App with your own model.

Submission Format

You will be required to complete two specific submission tasks

1) Upload your source code at https://aka.ms/msa2019p2dasubmission by 8am 17th August 2019. (40%)
2) Present to the MSA team in-person at the assessment centre
    a. Presentations are 15-minute slots
    b. 7 minutes of presentation. You should do a structured presentation using the given slide deck or your own (20%)
    c. 7 minutes of Q&A from MSA team, we will be assessing your technical ability in depth (40%)
    d. Holistically, we will be assessing your intricate understanding of your solution, it's application in the real world and your presentation / soft skills.

Academic Integrity

The MSA Programme strictly enforces academic integrity and students that do not uphold academic integrity will not be allowed to proceed within the programme. Any work you submit should be your work and differentiated from others if you have collaborated or troubleshooted with other parties. This includes any sample solutions and tutorials we provide. Please clarify with us at nzmsa@microsoft.com if you have questions.

Deadline: 8am 17th August 2019

Book interview here: http://aka.ms/msa2019p2submission
Upload your code here: https://aka.ms/msa2019p2dasubmission
Submit group preferences here: http://aka.ms/msa2019p2teams
(1 per group)

Have a question?
Email nzmsa@microsoft.com or ask on the Facebook group