**Machine Learning**

MET CS767

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**(50 points) Question**

Build ResNet50 using Keras.

I have also uploaded ResNet paper to Blackboard, which captured the details of the ResNet design.

Build a classifier - classify “cifar10” data by building an ResNet50 neural network and classify 10 classes embedded into the dataset. The goal is getting maximum possible accuracy.

About the data - The CIFAR-10 dataset consists of 60000 32x32 colour images in 10 classes, with 6000 images per class. There are 50000 training images and 10000 test images.

How to load the data - Use following commands to load the data -

from tensorflow.keras.datasets import cifar10

(x\_train, y\_train), (x\_test, y\_test) = cifar10.load\_data()

Setting of your solution – It is expected that you try different designs with different setting to get the best performance. Before each run, set the seed of any random generator that you are using to 767. For example

InitSeed = 767

tf.random.set\_seed(InitSeed)

np.random.seed( InitSeed)

1. (15 point) Build a ResidualUnit layer.

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1. (20 point) Build the entire network.

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1. (5 points) Transfer learning – The ResNet50 model which won Imagenet2015 is available on Keras. Transfer the weights from the Keras pretrained model to your model.

KerasModel=Keras.applications.resnet50.ResNet50(weights = “imagenet”)

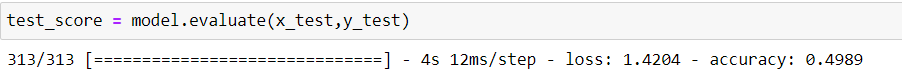
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1. (10 points) Train your model, run the classifier, show the results and report the accuracy.

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1. (Bonus point – 5 points) Finding the best model – Change different hyperparameters and run the model with different hyperparameters and report the best performance.

Student with the highest performance and also students within the 1% of the highest performance will get the extra bonus points.

Graphical user interface, text, application

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