

## Assignment 5

This assignment aims to get you familiar with ImageDataGenerator in TensorFlow/ Keras. You will use data augmentation techniques to randomly flip, rotate and zoom the training dataset using ImageDataGenerator. You will also use the TensorFlow Hub for transfer learning. Go through the TensorFlow tutorial on transfer learning with TF Hub before working on this assignment.

1. Download the “Cats and Dogs” dataset using the following code. You can find this code in TensorFlow tutorial for image classification.

```
_URL = 'https://storage.googleapis.com/mledu-datasets/cats_and_dogs_filtered.zip'

path_to_zip = tf.keras.utils.get_file('cats_and_dogs.zip', origin=_URL, extract=True)

PATH = os.path.join(os.path.dirname(path_to_zip), 'cats_and_dogs_filtered')

train_dir = os.path.join(PATH, 'train')

validation_dir = os.path.join(PATH, 'validation')
```

2. Design and train a convolutional neural network for this dataset. Show the training and validation accuracy curves for each epoch. Apply various data augmentation techniques using ImageDataGenerator to reduce the overfitting.
3. Install TensorFlow Hub and use “MobileNet” model as a feature extractor to implement transfer learning on “Cats and Dogs” dataset. Show the training and validation accuracy curves for each epoch. You can use following url to access “MobileNet” model. Compare your results against your previous model.  
  
[https://tfhub.dev/google/tf2-preview/mobilenet\\_v2/feature\\_vector/4](https://tfhub.dev/google/tf2-preview/mobilenet_v2/feature_vector/4)
4. (Only for grad students) Use “ResNet V2 50” and “ResNet V2 101” models from TF Hub as a feature extractor and compare the results against MobileNet.

Note : Please save your notebook file with results and plots so that I can see the results without executing the code. Although I should be able to execute your code.