**CPRE 487/587 Lab 1: DNN Intro (Tensorflow)**

**Introduction:** In this lab, we will be exploring the very basics of the several different libraries we will be using to help complement our usage of the Tensorflow Python library in CPRE 487/587. We will also begin to learn some of the basic operations of the framework to better understand the foundation of deep neural networks for image processing inside of machine learning.

**Module 3.3 - Working With the Data-set:**

One of the most important reasons for having a larger amount of data points to use (in this case, for training and validation) is to make sure that there is a larger amount of data to use as a check for accuracy and precision when it comes to making predictions. Though a smaller data set may allow for small peaks in performance and storage size, a larger data set can ensure that the statistics of the check for a model are more accurately trained.

Our data set is not considerably small. We have 10,000 images in our validation set and 100,000 images in our training set. The large size lets us know how much accuracy needs to be put into each step of the process.

**Module 3.4 – Model Exploration**

As the image becomes processed down the pipeline of the feature maps, we can see that the input starts to become a smaller grid of cells, which follows the principles of the decreasing mapping size relationship from lectures (output = input – feature\_map + unit\_step...).

As we can see, the deeper the feature maps in the pipeline, we can see that overall the number of parameters in a given channel (and even sometimes the number of channels) tends to decrease and condense the amount of data in given channels. For example, we begin with a general (?, 60, 60, 32) shape for the first conv2d layer, and then we reduce to (? 8, 8, 128). This means that we convert from a 60x60 pixel image down to an 8x8 pixel image, thus proving the order of the feature map correlates to the number of pixels it is handling. A “higher number” layer might also been seen deeper in the layer pipeline, for example, conv2d vs conv2d\_5.