**Classification Read-Me file**

Our task was to classify the Images of Skin Lesions into three classes Melanoma(Mel), Seborrheic Keratosis(SK) and Nevus(Nev).  
  
For this task we are using the transfer learning method using Matlab.  
First we load a pre-trained network, and for this classification, we used AlexNet which is well known for its Image Classification capabilities. We listed all the layers to see the functions of each of them.

We the layer 23 into 3 fully connected layers as per our requirement and also made the classification layer 25 into a blank one so as the network learns from our data set.

Pre-processing of images is done by creating an image directory with all the images and resizing them to the size that the network expects, in this case its 227 by 227 for AlexNet.

We then set up an Image Data store with all the Images and split it into two in the ratio 90:10, the former being the Training Data and later the Test Data.

We specify the training options to train our network by specifying the optimizer used, learning rate, number of epochs and the mini batch size. The trained network is then saved to be called for future uses.

The trained network is then tested with a number of factors like Accuracy, Specificity, Sensitivity and Area under the ROC Curve. For this we calculate parameters such as True Positive, True Negative, False Positive and False Negative of each of the classes individually. After obtaining all these parameters the Sensitivity which is the ratio of True Positive to the sum of true positive and false negative is calculated. Likewise, the Specificity which is the ratio of True negative to the sum of true negative and false positive is also calculated. The mean of the predicted true labels is calculated which is the accuracy.

The Roc curve is plotted by splitting the individual class scores and then defining it to its parameters in the ‘perfcurve’ and then plotting the parameters.