Face Mask Detection using Transfer learning:

* The dataset consists of real world face images which have been retrieved from various sources (Google search) and has been categorized into 2 classes – Masked and Unmasked faces.
* Fairness has been guaranteed by including images of both male and female in the same percentage.
* The images are first resized to 224\*224 which act as input for the pre-trained model (ResNet50).
* The dataset is divided into train and validation data (70:30), each with further 2 classes.
* For the Deep learning CNN, various transfer learning architectures were tried including the VGG, ResNet50, InceptionV3 ,etc which have been pre-trained on imagenet dataset.
* However, ResNet50 outperforms the others for the given problem.
* Since the train dataset has limited images, so the real time data augmentation technique is used to create a large trainable data from the existing images. We target values between 0 and 1 instead by scaling with a 1./255. factor. This also helps to reduce overfitting problem. Also, batch sizes are varied to get best fit model.
* We have used *.flow\_from\_directory()*to generate batches of image data (and their labels) directly from our .jpgs in their respective folders.
* For the transfer learning models, the final layer is not included. This helps to create a base model using the pre-trained weights which is useful for feature extraction and further use a final classification on the top of pre-trained model.
* The final layer is updated by adding a average pooling layer, followed by flattening the layer, Dense layer, dropout of 0.5, and a final dropout layer using softmax.
* The ResNet model further creates 5 conv layers each with a convolution and identity block.
* The Loss function, optimizer and accuracies are varied to create a best fit model
* Further the model is compiled and fit by defining the optimum no. of epochs.
* Finally, the accuracy and loss of both the train and validation data is evaluated for performance of the model.