It is nearly impossible to completely train a large convolutional neural network model such as Inception v3, this is because the train process needs a dataset with a large size and tons of CPU or GPU computing tasks must be done, a personal computer or laptop has no such capacity to do this. In here, we choose a pretrained model of Inception v3 from Keras library and use our own dataset to do a fine tuning on the last 20 layers of the model. Typically, a pre-trained CNN model can be directly used to do the image recognition works, the neural network weights are well-setup for the feature mapping. If we only need to train the last 20 layers, for the other layers, we use the well-defined neural network weights, the trainable weights numbers are significantly decreased and the CPU computing time is also significantly decreased, and in the meantime, we can still maintain an acceptable classification accuracy.

In the network train process, we add a global averaging pooling layer and a dense layer, which can be considered as a fully connected layer. We also use the softmax activation function to match with the categorical-crossentropy loss function, these two functions are highly compatible in the last layer of the neural network. The optimizer we use is called as Adam optimizer, this optimizer has a lot of benefits, one of the benefits is that the update step in the learning has nothing to do with the learning rate, which is set to 0.0001 in the train process, its value is only depended by the Alpha, beta\_1, and beta\_2 values.