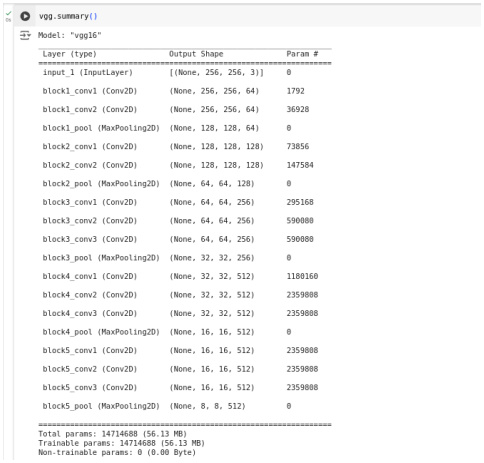
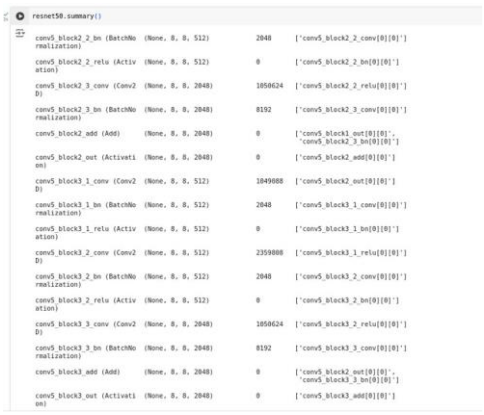
Model Development Phase Template

Date	15 March 2024
Team ID	SWTID1720440447
Project Title	Covid Vision: Advanced COVID-19 Detection from Lung X-rays with Deep Learning
Maximum Marks	10 Marks

Initial Model Training Code (5 marks):

```
[ ] from tensorflow.keras.applications.inception_v3 import InceptionV3
    from tensorflow.keras.layers import Dense,Flatten
    from tensorflow.keras.models import Model

[ ] InceptionV3 = InceptionV3(include_top=False,input_shape=(256,256,3))

    Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/inception_v3/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5
    87910968/87910968 [==============================] - 1s 0us/step

[ ] x = Flatten()(InceptionV3.output)

[ ] output = Dense(1, activation='sigmoid')(x)

[ ] InceptionV3 = Model(InceptionV3.input,output)

[ ] InceptionV3.summary()

    Show hidden output

[ ] InceptionV3.compile(loss='binary_crossentropy',optimizer='adam',metrics=['accuracy'])
```

Model Validation and Evaluation Report:

Model	Summary	Training and Validation Performance Metrics
VGG16		
RESNET 50		

INCEPTION	`InceptionV3.summary()`
	`Model: "model"`
	Layer (type) · Output Shape · Param # · Connected to
	input_1 (InputLayer) · [(None, 256, 256, 3)] · 0 · []
	conv2d (Conv2D) · (None, 127, 127, 32) · 864 · ['input_1[0][0]']
	batch_normalization (BatchNormalization) · (None, 127, 127, 32) · 96 · ['conv2d[0][0]']
	activation (Activation) · (None, 127, 127, 32) · 0 · ['batch_normalization[0][0]']
	conv2d_1 (Conv2D) · (None, 125, 125, 32) · 9216 · ['activation[0][0]']
	batch_normalization_1 (BatchNormalization) · (None, 125, 125, 32) · 96 · ['conv2d_1[0][0]']
	activation_1 (Activation) · (None, 125, 125, 32) · 0 · ['batch_normalization_1[0][0]']
	conv2d_2 (Conv2D) · (None, 125, 125, 64) · 18432 · ['activation_1[0][0]']
	batch_normalization_2 (BatchNormalization) · (None, 125, 125, 64) · 192 · ['conv2d_2[0][0]']
	activation_2 (Activation) · (None, 125, 125, 64) · 0 · ['batch_normalization_2[0][0]']
	max_pooling2d (MaxPooling2D) · (None, 62, 62, 64) · 0 · ['activation_2[0][0]']
	conv2d_3 (Conv2D) · (None, 62, 62, 80) · 5120 · ['max_pooling2d[0][0]']
	batch_normalization_3 (BatchNormalization) · (None, 62, 62, 80) · 240 · ['conv2d_3[0][0]']
	activation_3 (Activation) · (None, 62, 62, 80) · 0 · ['batch_normalization_3[0][0]']
	conv2d_4 (Conv2D) · (None, 60, 60, 192) · 138240 · ['activation_3[0][0]']
	batch_normalization_4 (BatchNormalization) · (None, 60, 60, 192) · 576 · ['conv2d_4[0][0]']
	activation_4 (Activation) · (None, 60, 60, 192) · 0 · ['batch_normalization_4[0][0]']
		`InceptionV3.fit(train_generator,validation_data=validation_generator,epochs=5)`
		Epoch 1/5
		317/317 [==========] - 4239s 13s/step - loss: 0.5572 - accuracy: 0.8221 - val_loss: 0.3898 - val_accuracy: 0.9045
		Epoch 2/5
		317/317 [==========] - 3903s 12s/step - loss: 0.3359 - accuracy: 0.8841 - val_loss: 30.5079 - val_accuracy: 0.4451
		Epoch 3/5
		317/317 [==========] - 3900s 12s/step - loss: 0.2376 - accuracy: 0.9139 - val_loss: 0.4145 - val_accuracy: 0.8459
		Epoch 4/5
		317/317 [==========] - 3840s 12s/step - loss: 0.1801 - accuracy: 0.9327 - val_loss: 5.6839 - val_accuracy: 0.8252
		Epoch 5/5
		317/317 [==========] - 3843s 12s/step - loss: 0.7310 - accuracy: 0.7561 - val_loss: 11.8076 - val_accuracy: 0.5798
		<keras.src.callbacks.History at 0x7b9d8bf51870>

XCEPTION	`Xception.summary()`
	`Model: "model"`
	Layer (type) · Output Shape · Param # · Connected to
	input_1 (InputLayer) · [(None, 256, 256, 3)] · 0 · []
	block1_conv1 (Conv2D) · (None, 127, 127, 32) · 864 · ['input_1[0][0]']
	block1_conv1_bn (BatchNormalization) · (None, 127, 127, 32) · 128 · ['block1_conv1[0][0]']
	block1_conv1_act (Activation) · (None, 127, 127, 32) · 0 · ['block1_conv1_bn[0][0]']
	block1_conv2 (Conv2D) · (None, 125, 125, 64) · 18432 · ['block1_conv1_act[0][0]']
	block1_conv2_bn (BatchNormalization) · (None, 125, 125, 64) · 256 · ['block1_conv2[0][0]']
	block1_conv2_act (Activation) · (None, 125, 125, 64) · 0 · ['block1_conv2_bn[0][0]']
	block2_sepconv1 (SeparableConv2D) · (None, 125, 125, 128) · 8768 · ['block1_conv2_act[0][0]']
	block2_sepconv1_bn (BatchNormalization) · (None, 125, 125, 128) · 512 · ['block2_sepconv1[0][0]']
	block2_sepconv2_act (Activation) · (None, 125, 125, 128) · 0 · ['block2_sepconv1_bn[0][0]']
	block2_sepconv2 (SeparableConv2D) · (None, 125, 125, 128) · 17536 · ['block2_sepconv2_act[0][0]']
	block2_sepconv2_bn (BatchNormalization) · (None, 125, 125, 128) · 512 · ['block2_sepconv2[0][0]']
	conv2d (Conv2D) · (None, 63, 63, 128) · 8192 · ['block1_conv2_act[0][0]']
	block2_pool (MaxPooling2D) · (None, 63, 63, 128) · 0 · ['block2_sepconv2_bn[0][0]']
	batch_normalization (BatchNormalization) · (None, 63, 63, 128) · 512 · ['conv2d[0][0]']
	add (Add) · (None, 63, 63, 128) · 0 · ['block2_pool[0][0]', 'batch_normalization[0][0]']
	block3_sepconv1_act (Activ · (None, 63, 63, 128) · 0 · ['add[0][0]']
		`Xception.fit(train_generator,validation_data=validation_generator,epochs=5)`
		Epoch 1/5
		317/317 [==========] - 1808s 6s/step - loss: 0.7154 - accuracy: 0.7125 - val_loss: 0.3625 - val_accuracy: 0.9302
		Epoch 2/5
		317/317 [==========] - 195s 615ms/step - loss: 0.4983 - accuracy: 0.7914 - val_loss: 0.3387 - val_accuracy: 0.9208
		Epoch 3/5
		317/317 [==========] - 194s 611ms/step - loss: 0.4281 - accuracy: 0.8245 - val_loss: 0.3204 - val_accuracy: 0.9401
		Epoch 4/5
		317/317 [==========] - 194s 612ms/step - loss: 0.3912 - accuracy: 0.8397 - val_loss: 0.3189 - val_accuracy: 0.9123
		Epoch 5/5
		317/317 [==========] - 193s 608ms/step - loss: 0.3545 - accuracy: 0.8541 - val_loss: 0.2998 - val_accuracy: 0.9047
		<keras.src.callbacks.History at 0x7f791c2ef9e0>
		<keras.src.callbacks.History at 0x7b9d8bf51870>