

## Model Development Phase Template

Date	19 March 2024
Team ID	SWTID1720240510
Project Title	Covid vision: Advanced Covid-19 Detection From Lung X-Rays With Deep Learning
Maximum Marks	10 Marks

### Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

### Initial Model Training Code (5 marks):



```
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

```
198 !unzip '/content/drive/MyDrive/dataset.zip'
```

```
inflating: dataset/traindata/normal/Normal-3656.png
inflating: dataset/traindata/normal/Normal-3657.png
inflating: dataset/traindata/normal/Normal-3658.png
inflating: dataset/traindata/normal/Normal-3659.png
inflating: dataset/traindata/normal/Normal-366.png
inflating: dataset/traindata/normal/Normal-3660.png
inflating: dataset/traindata/normal/Normal-3661.png
inflating: dataset/traindata/normal/Normal-3662.png
inflating: dataset/traindata/normal/Normal-3663.png
inflating: dataset/traindata/normal/Normal-3664.png
inflating: dataset/traindata/normal/Normal-3665.png
inflating: dataset/traindata/normal/Normal-3666.png
inflating: dataset/traindata/normal/Normal-3667.png
inflating: dataset/traindata/normal/Normal-3668.png
inflating: dataset/traindata/normal/Normal-3669.png
inflating: dataset/traindata/normal/Normal-367.png
inflating: dataset/traindata/normal/Normal-3670.png
inflating: dataset/traindata/normal/Normal-3671.png
inflating: dataset/traindata/normal/Normal-3672.png
inflating: dataset/traindata/normal/Normal-3673.png
inflating: dataset/traindata/normal/Normal-3674.png
inflating: dataset/traindata/normal/Normal-3675.png
inflating: dataset/traindata/normal/Normal-3676.png
inflating: dataset/traindata/normal/Normal-3677.png
inflating: dataset/traindata/normal/Normal-3678.png
inflating: dataset/traindata/normal/Normal-3679.png
```

```
inflating: dataset/traindata/normal/Normal-3753.png
```

```
[15] imagesize = [299,299]
trainpath = '/content/dataset/traindata'
```

```
[16] testpath = '/content/dataset/testdata'
```

```
[17] import matplotlib.pyplot as plt
import numpy as np
import tensorflow_hub as hub
from tensorflow.keras.layers import Input, Lambda, Dense, Flatten, Activation, GlobalAveragePooling2D, Dropout
from tensorflow.keras.models import Model
from tensorflow.keras.preprocessing import image
from tensorflow.keras.applications.xception import Xception, preprocess_input
from tensorflow.keras.preprocessing.image import ImageDataGenerator, load_img
from glob import glob
import numpy as np
import matplotlib.pyplot as plt
```

```
train_datagen = ImageDataGenerator(rescale=1./255, zoom_range=0.2, width_shift_range=0.2, height_shift_range=0.2, horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
```

```
[20] train = train_datagen.flow_from_directory(trainpath, target_size=(299,299), batch_size=32, class_mode='categorical')
test = test_datagen.flow_from_directory(testpath, target_size=(299,299), batch_size=32, class_mode='categorical')
```

```
Found 14679 images belonging to 4 classes.
Found 6665 images belonging to 4 classes.
```

## Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics																																																								
Xception model	<pre>[11] xception = xception(input_shape=image_size[1:], weights= 'imagenet', include_top=False)  [12] Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/xception/xception_weights_tf_dim_ordering_tf_kernels_notop_83643764/83643764 [-----] - 0s 0s/stop  [22] for layer in xception.layers:     layer.trainable = False  [23] x = Flatten()(xception.output)  [24] prediction = Dense(1, activation= 'softmax')(x)  [25] model = Model(inputs=xception.input, outputs=prediction)  [26] model.summary()  Model: "model"</pre>	<table><tr><th>Layer (Type)</th><th>Output Shape</th><th>Param #</th><th>Connected to</th></tr><tr><td>input_1 (InputLayer)</td><td>(None, 299, 299, 3)]</td><td>0</td><td>[]</td></tr><tr><td>block1_conv1 (Conv2D)</td><td>(None, 149, 149, 32)</td><td>864</td><td>['input_1[0][0]']</td></tr><tr><td>block1_conv1_bn (BatchNormal alization)</td><td>(None, 149, 149, 32)</td><td>128</td><td>['block1_conv1[0][0]']</td></tr><tr><td>block1_conv1_act (Activati on)</td><td>(None, 149, 149, 32)</td><td>0</td><td>['block1_conv1_bn[0][0]']</td></tr><tr><td>block1_conv2 (Conv2D)</td><td>(None, 147, 147, 64)</td><td>18432</td><td>['block1_conv1_act[0][0]']</td></tr><tr><td>block1_conv2_bn (BatchNorm alization)</td><td>(None, 147, 147, 64)</td><td>256</td><td>['block1_conv2[0][0]']</td></tr><tr><td>block1_conv2_act (Activati on)</td><td>(None, 147, 147, 64)</td><td>0</td><td>['block1_conv2_bn[0][0]']</td></tr><tr><td>block2_sepconv1 (Separable Conv2D)</td><td>(None, 147, 147, 128)</td><td>8768</td><td>['block1_conv2_act[0][0]']</td></tr><tr><td>block2_sepconv1_bn (BatchN ormalization)</td><td>(None, 147, 147, 128)</td><td>512</td><td>['block2_sepconv1[0][0]']</td></tr><tr><td>block2_sepconv2_act (Activ ation)</td><td>(None, 147, 147, 128)</td><td>0</td><td>['block2_sepconv1_bn[0][0]']</td></tr><tr><td>block2_sepconv2 (Separable Conv2D)</td><td>(None, 147, 147, 128)</td><td>17936</td><td>['block2_sepconv2_act[0][0]']</td></tr><tr><td>block2_sepconv2_bn (BatchN ormalization)</td><td>(None, 147, 147, 128)</td><td>512</td><td>['block2_sepconv2[0][0]']</td></tr><tr><td>conv2d (Conv2D)</td><td>(None, 74, 74, 128)</td><td>8192</td><td>['block2_sepconv2_bn[0][0]']</td></tr></table>	Layer (Type)	Output Shape	Param #	Connected to	input_1 (InputLayer)	(None, 299, 299, 3)]	0	[]	block1_conv1 (Conv2D)	(None, 149, 149, 32)	864	['input_1[0][0]']	block1_conv1_bn (BatchNormal alization)	(None, 149, 149, 32)	128	['block1_conv1[0][0]']	block1_conv1_act (Activati on)	(None, 149, 149, 32)	0	['block1_conv1_bn[0][0]']	block1_conv2 (Conv2D)	(None, 147, 147, 64)	18432	['block1_conv1_act[0][0]']	block1_conv2_bn (BatchNorm alization)	(None, 147, 147, 64)	256	['block1_conv2[0][0]']	block1_conv2_act (Activati on)	(None, 147, 147, 64)	0	['block1_conv2_bn[0][0]']	block2_sepconv1 (Separable Conv2D)	(None, 147, 147, 128)	8768	['block1_conv2_act[0][0]']	block2_sepconv1_bn (BatchN ormalization)	(None, 147, 147, 128)	512	['block2_sepconv1[0][0]']	block2_sepconv2_act (Activ ation)	(None, 147, 147, 128)	0	['block2_sepconv1_bn[0][0]']	block2_sepconv2 (Separable Conv2D)	(None, 147, 147, 128)	17936	['block2_sepconv2_act[0][0]']	block2_sepconv2_bn (BatchN ormalization)	(None, 147, 147, 128)	512	['block2_sepconv2[0][0]']	conv2d (Conv2D)	(None, 74, 74, 128)	8192	['block2_sepconv2_bn[0][0]']
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