Model Development Phase Template

Date	2 July 2024
Team ID	**SWTID1720176710**
Project Title	Visual Diagnostics: Detecting Tomato Plant Diseases Through Leaf Image Analysis
Maximum Marks	10 Marks

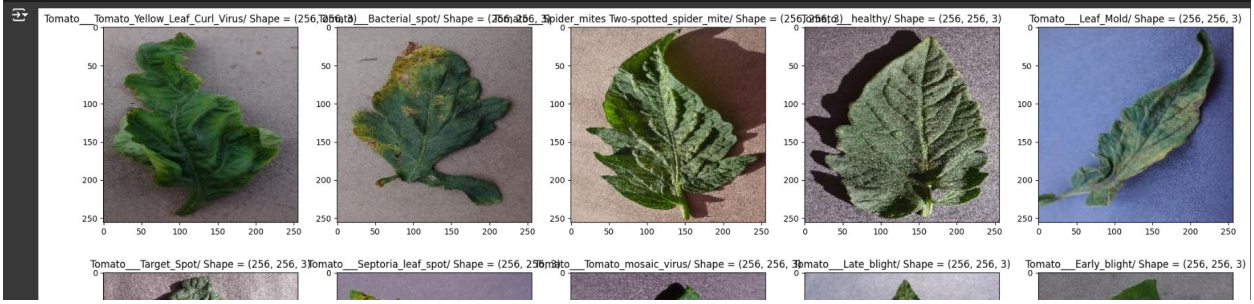
Initial Model Training Code, Model Validation and Evaluation Report

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):

```
classes = os.listdir('./train')
plt.figure(figsize=(25,10))


for i in enumerate(classes) :
  pic = os.listdir('./train/'+i[1])[0]
  image= Image.open('./train/'+i[1]+'/'+pic)
  image= np.asarray(image)
  plt.subplot(2,5, i[0]+1)
  plt.title('{0}/ Shape = {1}'.format(i[1], image. shape))
  plt.imshow(image)
plt . show()
```




```
base_model = ResNet152V2(input_shape=(256,256,3), include_top=False)

    # Freeze the first 140 layers
    for layers in base_model.layers[:140]:
        layers.trainable = False

    # Unfreeze the remaining layers
    for layers in base_model.layers[140:]:
        layers.trainable = True
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/resnet/resnet152v2_weights_tf_dim_ordering_tf_kernels_notop.h5
234545216/234545216 [==============================] - 3s 0us/step
```

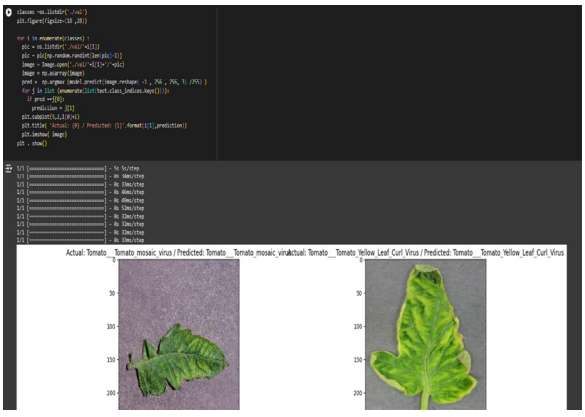
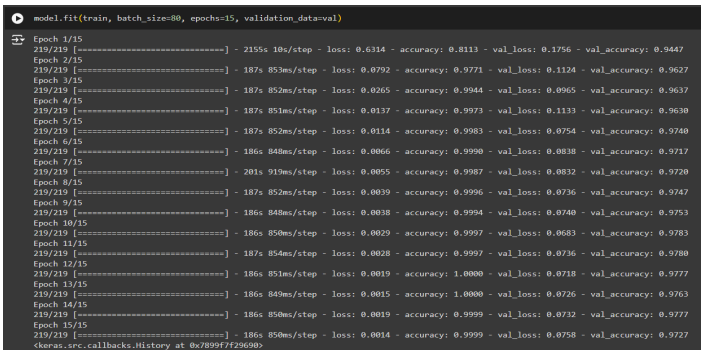
```
[ ] x = base_model.output
    x= GlobalAveragePooling2D()(x)
    x = Dense(1000, activation='relu')(x)
    pred =Dense(10, activation='softmax')(x)
    model = Model(inputs=base_model.input, outputs=pred)
```

```
[ ] model.compile(loss='categorical_crossentropy',optimizer='sgd' ,metrics='accuracy' )
```

```
model.fit(train, batch_size=80, epochs=15, validation_data=val)

Epoch 1/15
219/219 [==============================] - 2155s 10s/step - loss: 0.6314 - accuracy: 0.8113 - val_loss: 0.1756 - val_accuracy: 0.9447
Epoch 2/15
219/219 [==============================] - 187s 853ms/step - loss: 0.0792 - accuracy: 0.9771 - val_loss: 0.1124 - val_accuracy: 0.9627
Epoch 3/15
219/219 [==============================] - 187s 852ms/step - loss: 0.0265 - accuracy: 0.9944 - val_loss: 0.0965 - val_accuracy: 0.9637
Epoch 4/15
219/219 [==============================] - 187s 851ms/step - loss: 0.0137 - accuracy: 0.9973 - val_loss: 0.1133 - val_accuracy: 0.9630
Epoch 5/15
219/219 [==============================] - 187s 852ms/step - loss: 0.0114 - accuracy: 0.9983 - val_loss: 0.0754 - val_accuracy: 0.9740
Epoch 6/15
219/219 [==============================] - 186s 848ms/step - loss: 0.0066 - accuracy: 0.9990 - val_loss: 0.0838 - val_accuracy: 0.9717
Epoch 7/15
219/219 [==============================] - 201s 919ms/step - loss: 0.0055 - accuracy: 0.9987 - val_loss: 0.0832 - val_accuracy: 0.9720
Epoch 8/15
219/219 [==============================] - 187s 852ms/step - loss: 0.0039 - accuracy: 0.9996 - val_loss: 0.0736 - val_accuracy: 0.9747
Epoch 9/15
219/219 [==============================] - 186s 848ms/step - loss: 0.0038 - accuracy: 0.9994 - val_loss: 0.0740 - val_accuracy: 0.9753
```

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics
Model 1		 97.27% accuracy