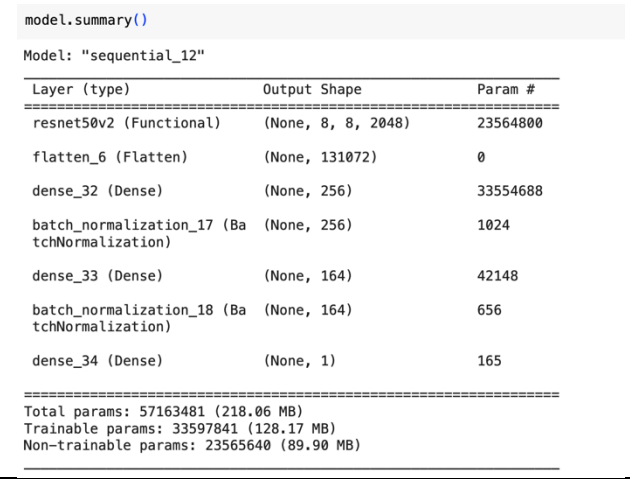
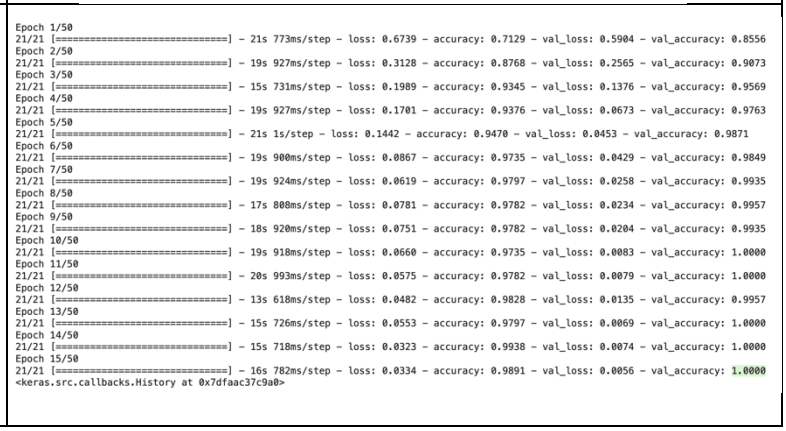
Project Development Phase
Model Performance Test

Date	7 November 2023
Team ID	Team - 592706
Project Name	PoxVisio: A Deep Learning Expedition into Monkeypox Skin Lesions
Team Members	1) Atharva Pravin Navghane – 21BCE0083 2) Mrudul Sunil Patil – 21BCE3386 3) Onkar Hule – 21BCE3363 4) Mehul Gupta – 21BCE3897

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Model Summary	Total params: 57163481 Trainable params: 33597841 Non-trainable params: 23565640	
2.	Accuracy	Training Accuracy - 0.9891 Validation Accuracy - 1.0000	

```
model.summary()

Model: "sequential_12"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 resnet50v2 (Functional)     (None, 8, 8, 2048)        23564800

 flatten_6 (Flatten)         (None, 131072)            0

 dense_32 (Dense)            (None, 256)               33554688

 batch_normalization_17 (Ba  (None, 256)               1024
 tchNormalization)

 dense_33 (Dense)            (None, 164)               42148

 batch_normalization_18 (Ba  (None, 164)               656
 tchNormalization)

 dense_34 (Dense)            (None, 1)                 165

=================================================================
Total params: 57163481 (218.06 MB)
Trainable params: 33597841 (128.17 MB)
Non-trainable params: 23565640 (89.90 MB)
_________________________________________________________________
```

```
Epoch 1/50
21/21 [==============================] - 21s 773ms/step - loss: 0.6739 - accuracy: 0.7129 - val_loss: 0.5904 - val_accuracy: 0.8556
Epoch 2/50
21/21 [==============================] - 19s 927ms/step - loss: 0.3128 - accuracy: 0.8768 - val_loss: 0.2565 - val_accuracy: 0.9073
Epoch 3/50
21/21 [==============================] - 15s 731ms/step - loss: 0.1989 - accuracy: 0.9345 - val_loss: 0.1376 - val_accuracy: 0.9569
Epoch 4/50
21/21 [==============================] - 19s 927ms/step - loss: 0.1701 - accuracy: 0.9376 - val_loss: 0.0673 - val_accuracy: 0.9763
Epoch 5/50
21/21 [==============================] - 21s 1s/step - loss: 0.1442 - accuracy: 0.9470 - val_loss: 0.0453 - val_accuracy: 0.9871
Epoch 6/50
21/21 [==============================] - 19s 900ms/step - loss: 0.0867 - accuracy: 0.9735 - val_loss: 0.0429 - val_accuracy: 0.9849
Epoch 7/50
21/21 [==============================] - 19s 924ms/step - loss: 0.0619 - accuracy: 0.9797 - val_loss: 0.0258 - val_accuracy: 0.9935
Epoch 8/50
21/21 [==============================] - 17s 808ms/step - loss: 0.0781 - accuracy: 0.9782 - val_loss: 0.0234 - val_accuracy: 0.9957
Epoch 9/50
21/21 [==============================] - 18s 920ms/step - loss: 0.0751 - accuracy: 0.9782 - val_loss: 0.0204 - val_accuracy: 0.9935
Epoch 10/50
21/21 [==============================] - 19s 918ms/step - loss: 0.0660 - accuracy: 0.9735 - val_loss: 0.0083 - val_accuracy: 1.0000
Epoch 11/50
21/21 [==============================] - 20s 993ms/step - loss: 0.0575 - accuracy: 0.9782 - val_loss: 0.0079 - val_accuracy: 1.0000
Epoch 12/50
21/21 [==============================] - 13s 618ms/step - loss: 0.0482 - accuracy: 0.9828 - val_loss: 0.0135 - val_accuracy: 0.9957
Epoch 13/50
21/21 [==============================] - 15s 726ms/step - loss: 0.0553 - accuracy: 0.9797 - val_loss: 0.0069 - val_accuracy: 1.0000
Epoch 14/50
21/21 [==============================] - 15s 718ms/step - loss: 0.0323 - accuracy: 0.9938 - val_loss: 0.0074 - val_accuracy: 1.0000
Epoch 15/50
21/21 [==============================] - 16s 782ms/step - loss: 0.0334 - accuracy: 0.9891 - val_loss: 0.0056 - val_accuracy: 1.0000
<keras.src.callbacks.History at 0x7dfaac37c9a0>
```

3.	Testing Accuracy	Testing Accuracy - 1.0	`test_loss, test_accuracy = best_model.evaluate(test_data)`
			`print("Test Loss:", test_loss)`
			`print("Test Accuracy:", test_accuracy)`
			
			`8/8 [==============================] - 2s 114ms/step - loss: 0.0112 - accuracy: 1.0000`
			`Test Loss: 0.011192228645086288`
			`Test Accuracy: 1.0`

3.	Confidence Score (Only Yolo Projects)	Class Detected - Confidence Score -	NA

Screenshots:

Summary

```
model.summary()
```

```
Model: "sequential_12"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 resnet50v2 (Functional)     (None, 8, 8, 2048)        23564800

 flatten_6 (Flatten)         (None, 131072)            0

 dense_32 (Dense)            (None, 256)               33554688

 batch_normalization_17 (Ba  (None, 256)               1024
 tchNormalization)

 dense_33 (Dense)            (None, 164)               42148

 batch_normalization_18 (Ba  (None, 164)               656
 tchNormalization)

 dense_34 (Dense)            (None, 1)                 165

=================================================================
Total params: 57163481 (218.06 MB)
Trainable params: 33597841 (128.17 MB)
Non-trainable params: 23565640 (89.90 MB)
_________________________________________________________________
```

Accuracy

```
Epoch 1/50
21/21 [==============================] - 21s 773ms/step - loss: 0.6739 - accuracy: 0.7129 - val_loss: 0.5904 - val_accuracy: 0.8556
Epoch 2/50
21/21 [==============================] - 19s 927ms/step - loss: 0.3128 - accuracy: 0.8768 - val_loss: 0.2565 - val_accuracy: 0.9073
Epoch 3/50
21/21 [==============================] - 15s 731ms/step - loss: 0.1989 - accuracy: 0.9345 - val_loss: 0.1376 - val_accuracy: 0.9569
Epoch 4/50
21/21 [==============================] - 19s 927ms/step - loss: 0.1701 - accuracy: 0.9376 - val_loss: 0.0673 - val_accuracy: 0.9763
Epoch 5/50
21/21 [==============================] - 21s 1s/step - loss: 0.1442 - accuracy: 0.9470 - val_loss: 0.0453 - val_accuracy: 0.9871
Epoch 6/50
21/21 [==============================] - 19s 900ms/step - loss: 0.0867 - accuracy: 0.9735 - val_loss: 0.0429 - val_accuracy: 0.9849
Epoch 7/50
21/21 [==============================] - 19s 924ms/step - loss: 0.0619 - accuracy: 0.9797 - val_loss: 0.0258 - val_accuracy: 0.9935
Epoch 8/50
21/21 [==============================] - 17s 808ms/step - loss: 0.0781 - accuracy: 0.9782 - val_loss: 0.0234 - val_accuracy: 0.9957
Epoch 9/50
21/21 [==============================] - 18s 920ms/step - loss: 0.0751 - accuracy: 0.9782 - val_loss: 0.0204 - val_accuracy: 0.9935
Epoch 10/50
21/21 [==============================] - 19s 918ms/step - loss: 0.0660 - accuracy: 0.9735 - val_loss: 0.0083 - val_accuracy: 1.0000
Epoch 11/50
21/21 [==============================] - 20s 993ms/step - loss: 0.0575 - accuracy: 0.9782 - val_loss: 0.0079 - val_accuracy: 1.0000
Epoch 12/50
21/21 [==============================] - 13s 618ms/step - loss: 0.0482 - accuracy: 0.9828 - val_loss: 0.0135 - val_accuracy: 0.9957
Epoch 13/50
21/21 [==============================] - 15s 726ms/step - loss: 0.0553 - accuracy: 0.9797 - val_loss: 0.0069 - val_accuracy: 1.0000
Epoch 14/50
21/21 [==============================] - 15s 718ms/step - loss: 0.0323 - accuracy: 0.9938 - val_loss: 0.0074 - val_accuracy: 1.0000
Epoch 15/50
21/21 [==============================] - 16s 782ms/step - loss: 0.0334 - accuracy: 0.9891 - val_loss: 0.0056 - val_accuracy: 1.0000
<keras.src.callbacks.History at 0x7dfaac37c9a0>
```

Testing Accuracy

```
test_loss, test_accuracy = best_model.evaluate(test_data)
print("Test Loss:", test_loss)
print("Test Accuracy:", test_accuracy)
```

```
8/8 [==============================] - 2s 114ms/step - loss: 0.0112 - accuracy: 1.0000
Test Loss: 0.011192228645086288
Test Accuracy: 1.0
```

MSLDv1 Accuracy

```
MSLDv1_data = gen.flow_from_directory(dataset_path + 'MSLD v1/', target_size=(256, 256), shuffle=False, class_mode='binary')

# Evaluate the model on the test data
test_loss, test_accuracy = best_model.evaluate(MSLDv1_data)
print("Test Loss:", test_loss)
print("Test Accuracy:", test_accuracy)
```

```
Found 228 images belonging to 2 classes.
8/8 [==============================] - 1s 103ms/step - loss: 0.0751 - accuracy: 0.9737
Test Loss: 0.07510682195425034
Test Accuracy: 0.9736841917037964
```