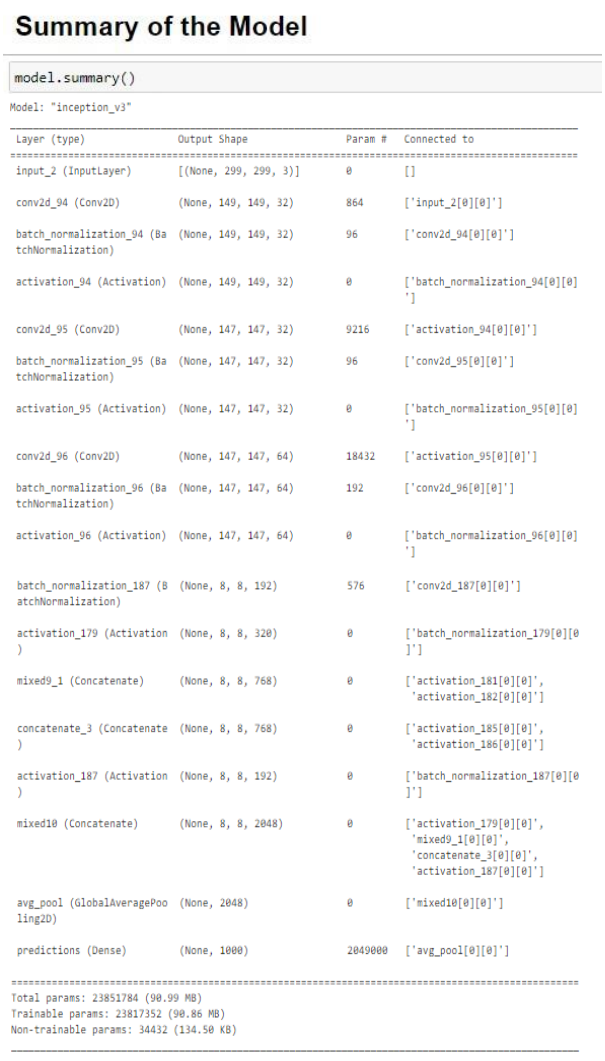
Project Development Phase

Model Performance Test

Date	14 September 2022
Team ID	EXT2023TMID592333
Project Name	Microbe Mapper: Visual Recognition Of Micro-Organisms
Maximum Marks	10 Marks

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: 23851784 (90.99 MB)** **Trainable params: 23817352 (90.86 MB)** **Non-trainable params: 34432 (134.50 KB)**	

Summary of the Model

```
model.summary()
```

```
Model: "inception_v3"
__________________________________________________________________________________________________
 Layer (type)                Output Shape              Param #   Connected to
==================================================================================================
 input_2 (InputLayer)        [(None, 299, 299, 3)]     0         []

 conv2d_94 (Conv2D)          (None, 149, 149, 32)      864       ['input_2[0][0]']

 batch_normalization_94 (Ba  (None, 149, 149, 32)      96        ['conv2d_94[0][0]']
 tchNormalization)

 activation_94 (Activation)  (None, 149, 149, 32)      0         ['batch_normalization_94[0][0]
                                                                 ']

 conv2d_95 (Conv2D)          (None, 147, 147, 32)      9216      ['activation_94[0][0]']

 batch_normalization_95 (Ba  (None, 147, 147, 32)      96        ['conv2d_95[0][0]']
 tchNormalization)

 activation_95 (Activation)  (None, 147, 147, 32)      0         ['batch_normalization_95[0][0]
                                                                 ']

 conv2d_96 (Conv2D)          (None, 147, 147, 64)      18432     ['activation_95[0][0]']

 batch_normalization_96 (Ba  (None, 147, 147, 64)      192       ['conv2d_96[0][0]']
 tchNormalization)

 activation_96 (Activation)  (None, 147, 147, 64)      0         ['batch_normalization_96[0][0]
                                                                 ']

 batch_normalization_187 (B  (None, 8, 8, 192)         576       ['conv2d_187[0][0]']
 atchNormalization)

 activation_179 (Activation  (None, 8, 8, 320)         0         ['batch_normalization_179[0][0
 )                                                               ']

 mixed9_1 (Concatenate)      (None, 8, 8, 768)         0         ['activation_181[0][0]',
                                                                  'activation_182[0][0]']

 concatenate_3 (Concatenate  (None, 8, 8, 768)         0         ['activation_185[0][0]',
 )                                                                'activation_186[0][0]']

 activation_187 (Activation  (None, 8, 8, 192)         0         ['batch_normalization_187[0][0
 )                                                               ']

 mixed10 (Concatenate)       (None, 8, 8, 2048)        0         ['activation_179[0][0]',
                                                                  'mixed9_1[0][0]',
                                                                  'concatenate_3[0][0]',
                                                                  'activation_187[0][0]']

 avg_pool (GlobalAveragePoo  (None, 2048)              0         ['mixed10[0][0]']
 ling2D)

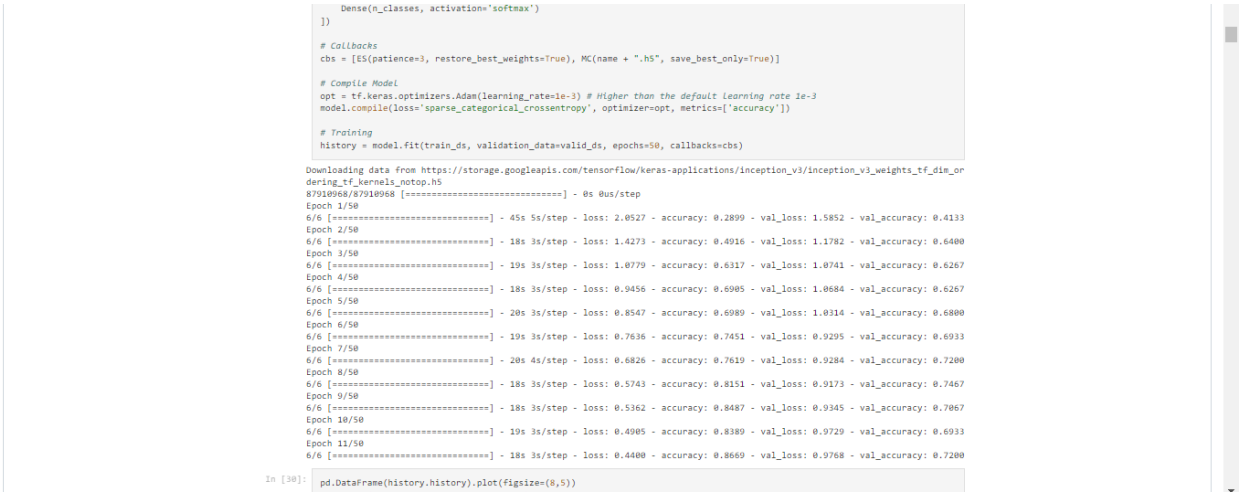
 predictions (Dense)         (None, 1000)              2049000   ['avg_pool[0][0]']

==================================================================================================
Total params: 23851784 (90.99 MB)
Trainable params: 23817352 (90.86 MB)
Non-trainable params: 34432 (134.50 KB)
__________________________________________________________________________________________________
```

2.	Accuracy	Training Accuracy - 97.68 Validation Accuracy - 72.00	Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/inception_v3/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5 87910968/87910968 [==============================] - 0s 0us/step Epoch 1/50 6/6 [==============================] - 45s 5s/step - loss: 2.0527 - accuracy: 0.2899 - val_loss: 1.5852 - val_accuracy: 0.4133 Epoch 2/50 6/6 [==============================] - 18s 3s/step - loss: 1.4273 - accuracy: 0.4916 - val_loss: 1.1782 - val_accuracy: 0.6400 Epoch 3/50 6/6 [==============================] - 19s 3s/step - loss: 1.0779 - accuracy: 0.6317 - val_loss: 1.0741 - val_accuracy: 0.6267 Epoch 4/50 6/6 [==============================] - 18s 3s/step - loss: 0.9456 - accuracy: 0.6905 - val_loss: 1.0684 - val_accuracy: 0.6267 Epoch 5/50 6/6 [==============================] - 20s 3s/step - loss: 0.8547 - accuracy: 0.6989 - val_loss: 1.0314 - val_accuracy: 0.6800 Epoch 6/50 6/6 [==============================] - 19s 3s/step - loss: 0.7636 - accuracy: 0.7451 - val_loss: 0.9295 - val_accuracy: 0.6933 Epoch 7/50 6/6 [==============================] - 20s 4s/step - loss: 0.6826 - accuracy: 0.7619 - val_loss: 0.9284 - val_accuracy: 0.7200 Epoch 8/50 6/6 [==============================] - 18s 3s/step - loss: 0.5743 - accuracy: 0.8151 - val_loss: 0.9173 - val_accuracy: 0.7467 Epoch 9/50 6/6 [==============================] - 18s 3s/step - loss: 0.5362 - accuracy: 0.8487 - val_loss: 0.9345 - val_accuracy: 0.7067 Epoch 10/50 6/6 [==============================] - 19s 3s/step - loss: 0.4905 - accuracy: 0.8389 - val_loss: 0.9729 - val_accuracy: 0.6933 Epoch 11/50 6/6 [==============================] - 18s 3s/step - loss: 0.4400 - accuracy: 0.8669 - val_loss: 0.9768 - val_accuracy: 0.7200
3.	Confidence Score (Only Yolo Projects)	Class Detected - NA Confidence Score - NA	Not Applicable

Screenshot:

Model Summary



```
    Dense(n_classes, activation='softmax')
])

# Callbacks
cbs = [ES(patience=3, restore_best_weights=True), MC(name + ".h5", save_best_only=True)]

# Compile Model
opt = tf.keras.optimizers.Adam(learning_rate=1e-3) # Higher than the default learning rate 1e-3
model.compile(loss='sparse_categorical_crossentropy', optimizer=opt, metrics=['accuracy'])

# Training
history = model.fit(train_ds, validation_data=valid_ds, epochs=50, callbacks=cbs)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/inception_v3/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5
87910968/87910968 [==============================] - 0s 0us/step
Epoch 1/50
6/6 [==============================] - 45s 5s/step - loss: 2.0527 - accuracy: 0.2899 - val_loss: 1.5852 - val_accuracy: 0.4133
Epoch 2/50
6/6 [==============================] - 18s 3s/step - loss: 1.4273 - accuracy: 0.4916 - val_loss: 1.1782 - val_accuracy: 0.6400
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```
In [30]: pd.DataFrame(history.history).plot(figsize=(8,5))
```

Accuracy

```
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In [30]:

```
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