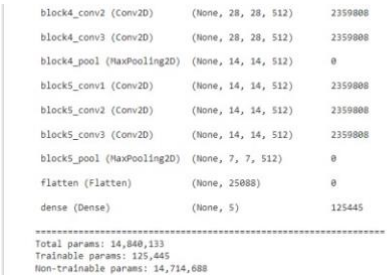
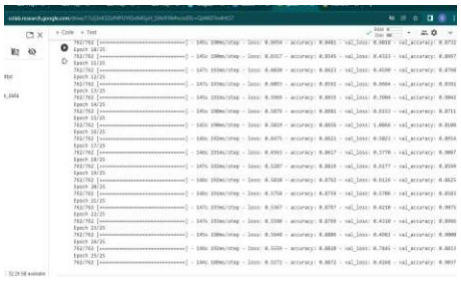
Project Development Phase
Model Performance Test

Date	22 November 2022
Team ID	PNT2022TMID49396
Project Name	Digital Naturalist – AI Enabled Tools For Biodiversity Researchers.
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: 14,840,133 Trainable params: 125,445 Non-trainable params: 14,714,688	
2.	Accuracy	Training Accuracy -88.72 Validation Accuracy – 90.37	

Model Summary

```
[18] model = Model(inputs=vgg16.input, outputs=prediction)
```

```
model.summary()
```

```
Model: "model"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 input_1 (InputLayer)        [(None, 224, 224, 3)]     0

 block1_conv1 (Conv2D)       (None, 224, 224, 64)      1792

 block1_conv2 (Conv2D)       (None, 224, 224, 64)      36928

 block1_pool (MaxPooling2D)  (None, 112, 112, 64)      0

 block2_conv1 (Conv2D)       (None, 112, 112, 128)     73856

 block2_conv2 (Conv2D)       (None, 112, 112, 128)     147584

 block2_pool (MaxPooling2D)  (None, 56, 56, 128)       0

 block3_conv1 (Conv2D)       (None, 56, 56, 256)       295168

 block3_conv2 (Conv2D)       (None, 56, 56, 256)       590080

 block3_conv3 (Conv2D)       (None, 56, 56, 256)       590080

 block3_pool (MaxPooling2D)  (None, 28, 28, 256)       0

 block4_conv1 (Conv2D)       (None, 28, 28, 512)       1180160

 block4_conv2 (Conv2D)       (None, 28, 28, 512)       2359808
```

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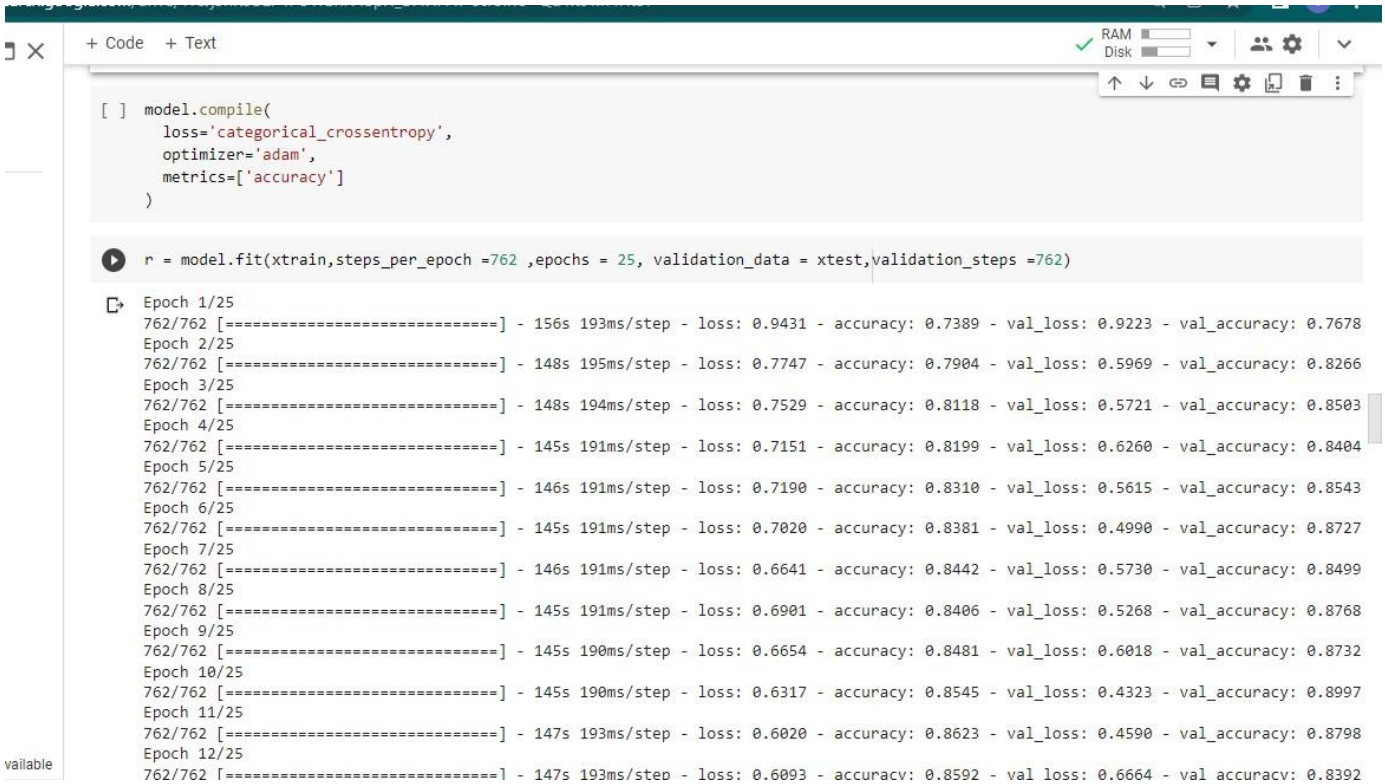
```
 block2_pool (MaxPooling2D)  (None, 56, 56, 128)       0

 block3_conv1 (Conv2D)       (None, 56, 56, 256)       295168

 block3_conv2 (Conv2D)       (None, 56, 56, 256)       590080

 block3_conv3 (Conv2D)       (None, 56, 56, 256)       590080

 block3_pool (MaxPooling2D)  (None, 28, 28, 256)       0

 block4_conv1 (Conv2D)       (None, 28, 28, 512)       1180160

 block4_conv2 (Conv2D)       (None, 28, 28, 512)       2359808

 block4_conv3 (Conv2D)       (None, 28, 28, 512)       2359808

 block4_pool (MaxPooling2D)  (None, 14, 14, 512)       0

 block5_conv1 (Conv2D)       (None, 14, 14, 512)       2359808

 block5_conv2 (Conv2D)       (None, 14, 14, 512)       2359808

 block5_conv3 (Conv2D)       (None, 14, 14, 512)       2359808

 block5_pool (MaxPooling2D)  (None, 7, 7, 512)         0

 flatten (Flatten)           (None, 25088)             0

 dense (Dense)               (None, 5)                 125445

=================================================================
Total params: 14,840,133
Trainable params: 125,445
Non-trainable params: 14,714,688
```

Accuracy



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

r = model.fit(xtrain,steps_per_epoch =762 ,epochs = 25, validation_data = xtest,validation_steps =762)

Epoch 1/25
762/762 [==============================] - 156s 193ms/step - loss: 0.9431 - accuracy: 0.7389 - val_loss: 0.9223 - val_accuracy: 0.7678
Epoch 2/25
762/762 [==============================] - 148s 195ms/step - loss: 0.7747 - accuracy: 0.7904 - val_loss: 0.5969 - val_accuracy: 0.8266
Epoch 3/25
762/762 [==============================] - 148s 194ms/step - loss: 0.7529 - accuracy: 0.8118 - val_loss: 0.5721 - val_accuracy: 0.8503
Epoch 4/25
762/762 [==============================] - 145s 191ms/step - loss: 0.7151 - accuracy: 0.8199 - val_loss: 0.6260 - val_accuracy: 0.8404
Epoch 5/25
762/762 [==============================] - 146s 191ms/step - loss: 0.7190 - accuracy: 0.8310 - val_loss: 0.5615 - val_accuracy: 0.8543
Epoch 6/25
762/762 [==============================] - 145s 191ms/step - loss: 0.7020 - accuracy: 0.8381 - val_loss: 0.4990 - val_accuracy: 0.8727
Epoch 7/25
762/762 [==============================] - 146s 191ms/step - loss: 0.6641 - accuracy: 0.8442 - val_loss: 0.5730 - val_accuracy: 0.8499
Epoch 8/25
762/762 [==============================] - 145s 191ms/step - loss: 0.6901 - accuracy: 0.8406 - val_loss: 0.5268 - val_accuracy: 0.8768
Epoch 9/25
762/762 [==============================] - 145s 190ms/step - loss: 0.6654 - accuracy: 0.8481 - val_loss: 0.6018 - val_accuracy: 0.8732
Epoch 10/25
762/762 [==============================] - 145s 190ms/step - loss: 0.6317 - accuracy: 0.8545 - val_loss: 0.4323 - val_accuracy: 0.8997
Epoch 11/25
762/762 [==============================] - 147s 193ms/step - loss: 0.6020 - accuracy: 0.8623 - val_loss: 0.4590 - val_accuracy: 0.8798
Epoch 12/25
762/762 [==============================] - 147s 193ms/step - loss: 0.6093 - accuracy: 0.8592 - val_loss: 0.6664 - val_accuracy: 0.8392
```

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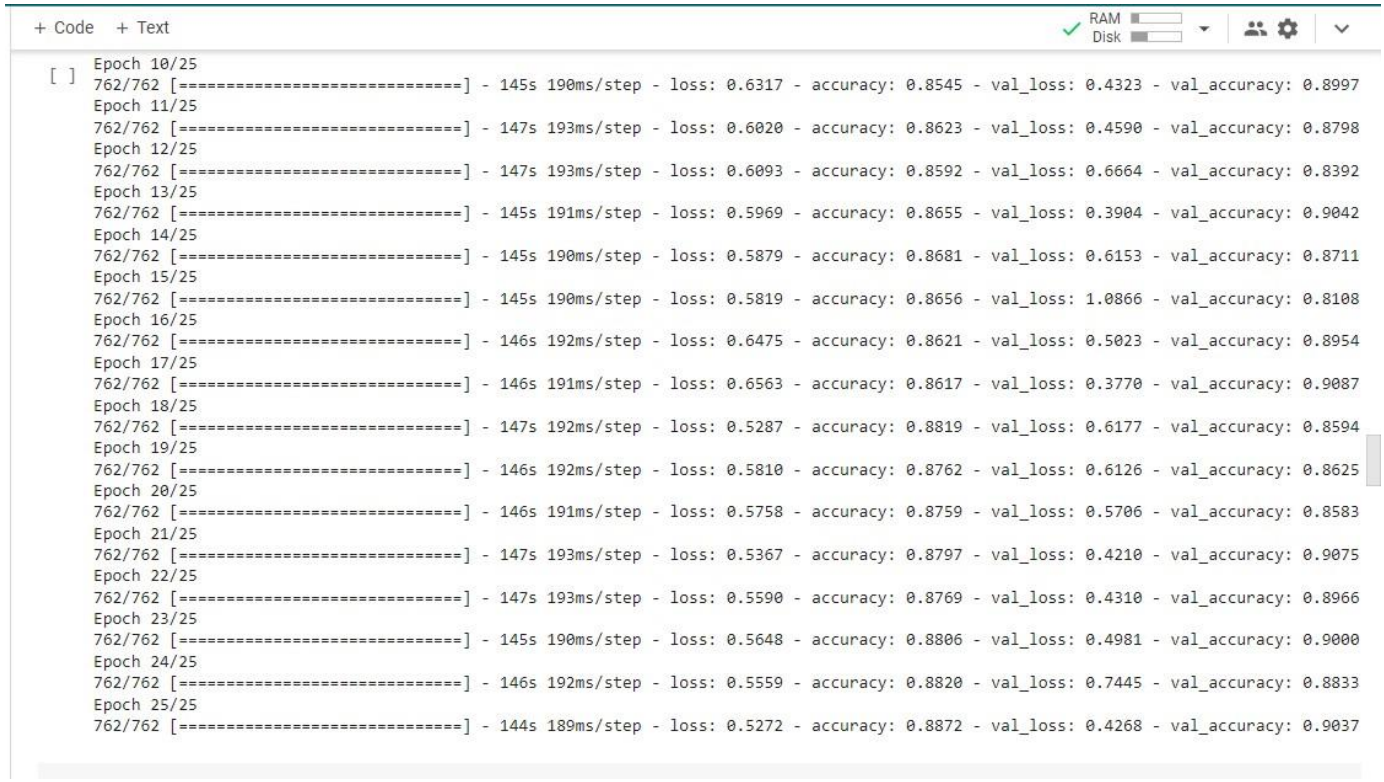

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[ ] Epoch 10/25
762/762 [==============================] - 145s 190ms/step - loss: 0.6317 - accuracy: 0.8545 - val_loss: 0.4323 - val_accuracy: 0.8997
Epoch 11/25
762/762 [==============================] - 147s 193ms/step - loss: 0.6020 - accuracy: 0.8623 - val_loss: 0.4590 - val_accuracy: 0.8798
Epoch 12/25
762/762 [==============================] - 147s 193ms/step - loss: 0.6093 - accuracy: 0.8592 - val_loss: 0.6664 - val_accuracy: 0.8392
Epoch 13/25
762/762 [==============================] - 145s 191ms/step - loss: 0.5969 - accuracy: 0.8655 - val_loss: 0.3904 - val_accuracy: 0.9042
Epoch 14/25
762/762 [==============================] - 145s 190ms/step - loss: 0.5879 - accuracy: 0.8681 - val_loss: 0.6153 - val_accuracy: 0.8711
Epoch 15/25
762/762 [==============================] - 145s 190ms/step - loss: 0.5819 - accuracy: 0.8656 - val_loss: 1.0866 - val_accuracy: 0.8108
Epoch 16/25
762/762 [==============================] - 146s 192ms/step - loss: 0.6475 - accuracy: 0.8621 - val_loss: 0.5023 - val_accuracy: 0.8954
Epoch 17/25
762/762 [==============================] - 146s 191ms/step - loss: 0.6563 - accuracy: 0.8617 - val_loss: 0.3770 - val_accuracy: 0.9087
Epoch 18/25
762/762 [==============================] - 147s 192ms/step - loss: 0.5287 - accuracy: 0.8819 - val_loss: 0.6177 - val_accuracy: 0.8594
Epoch 19/25
762/762 [==============================] - 146s 192ms/step - loss: 0.5810 - accuracy: 0.8762 - val_loss: 0.6126 - val_accuracy: 0.8625
Epoch 20/25
762/762 [==============================] - 146s 191ms/step - loss: 0.5758 - accuracy: 0.8759 - val_loss: 0.5706 - val_accuracy: 0.8583
Epoch 21/25
762/762 [==============================] - 147s 193ms/step - loss: 0.5367 - accuracy: 0.8797 - val_loss: 0.4210 - val_accuracy: 0.9075
Epoch 22/25
762/762 [==============================] - 147s 193ms/step - loss: 0.5590 - accuracy: 0.8769 - val_loss: 0.4310 - val_accuracy: 0.8966
Epoch 23/25
762/762 [==============================] - 145s 190ms/step - loss: 0.5648 - accuracy: 0.8806 - val_loss: 0.4981 - val_accuracy: 0.9000
Epoch 24/25
762/762 [==============================] - 146s 192ms/step - loss: 0.5559 - accuracy: 0.8820 - val_loss: 0.7445 - val_accuracy: 0.8833
Epoch 25/25
762/762 [==============================] - 144s 189ms/step - loss: 0.5272 - accuracy: 0.8872 - val_loss: 0.4268 - val_accuracy: 0.9037
```