Project Development Phase
Model Performance Test

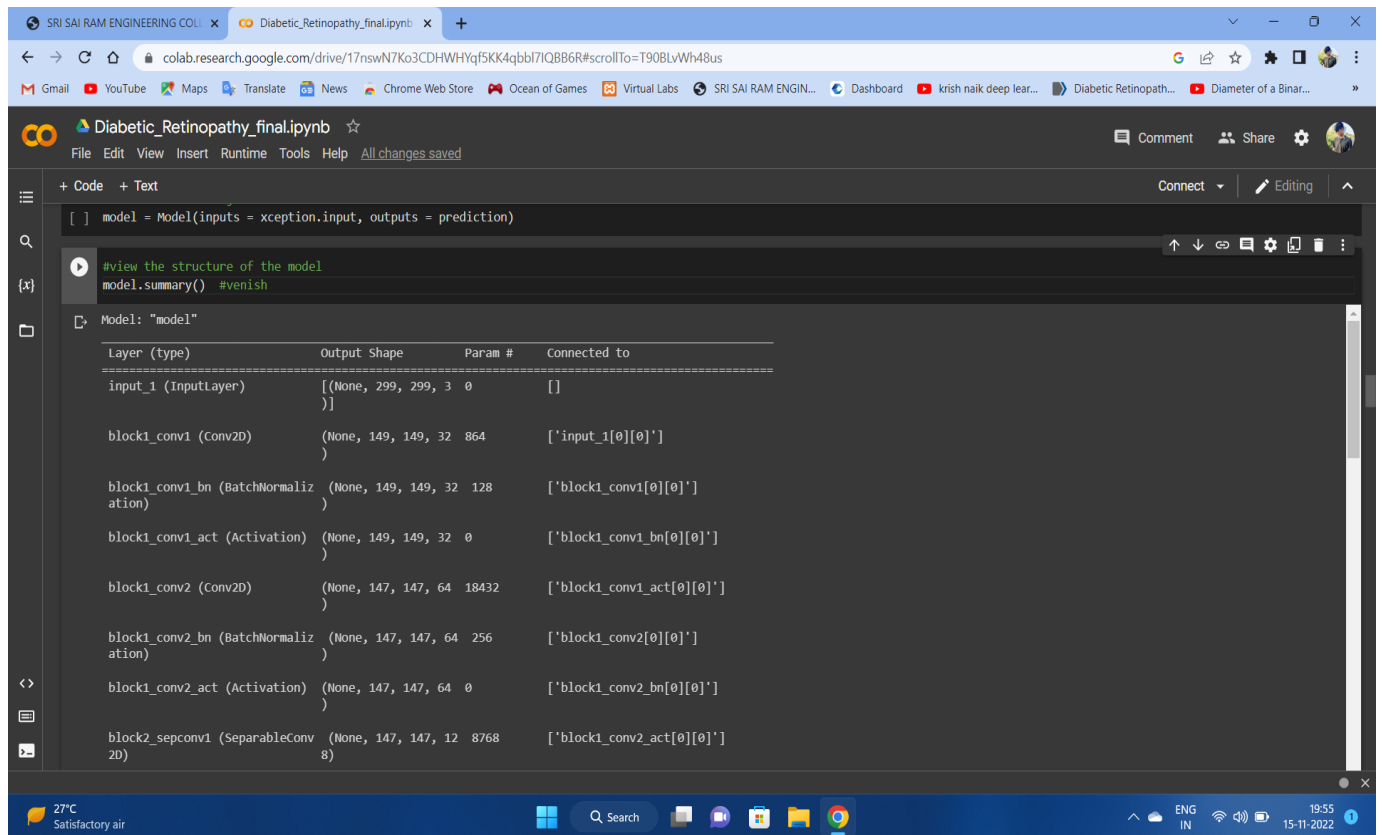|	
Date	12 November 2022
Team ID	PNT2022TMID16537
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	10 Marks

Model Performance Testing:

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

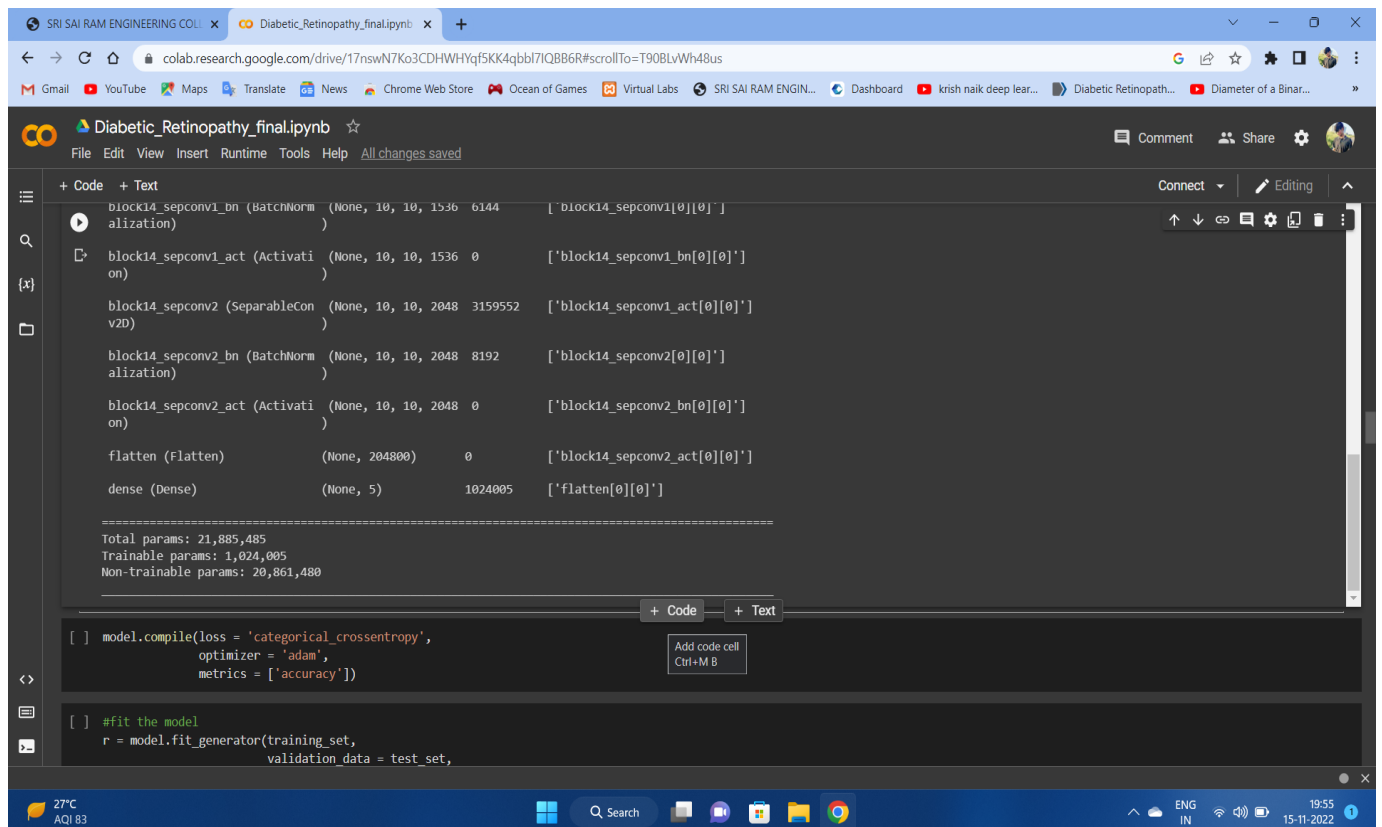| S.No.	Parameter	Values	Screenshot
1.	Model Summary	Total params: 21,885,485 Trainable params: 1,024,005 Non-trainable params: 20,861,480	Attached below
2.	Accuracy	Training Accuracy - 72% Validation Accuracy - 59%	Attached below
3.	Confidence Score (Only Yolo Projects)	Class Detected - NILL Confidence Score - NILL	NILL

SCREENSHOTS :

MODEL SUMMARY :

Diabetic_Retinopathy_final.ipynb

File   Edit   View   Insert   Runtime   Tools   Help   All changes saved

+ Code   + Text

Connect   Editing

```python
model = Model(inputs = xception.input, outputs = prediction)
```

```python
#view the structure of the model
model.summary()   #venish
```

```
Model: "model"
_____
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 (BatchNormaliz  (None, 149, 149, 32  128         ['block1_conv1[0][0]']
ation)                          )

block1_conv1_act (Activation)   (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 (BatchNormaliz  (None, 147, 147, 64  256         ['block1_conv2[0][0]']
ation)                          )

block1_conv2_act (Activation)   (None, 147, 147, 64  0           ['block1_conv2_bn[0][0]']
                                )

block2_sepconv1 (SeparableConv  (None, 147, 147, 12  8768        ['block1_conv2_act[0][0]']
2D)                             8)
```

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Diabetic_Retinopathy_final.ipynb

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```
block14_sepconv1_bn (BatchNorm  (None, 10, 10, 1536  6144        ['block14_sepconv1[0][0]']
alization)                      )

block14_sepconv1_act (Activati  (None, 10, 10, 1536  0           ['block14_sepconv1_bn[0][0]']
on)                             )

block14_sepconv2 (SeparableCon  (None, 10, 10, 2048  3159552     ['block14_sepconv1_act[0][0]']
v2D)                            )

block14_sepconv2_bn (BatchNorm  (None, 10, 10, 2048  8192        ['block14_sepconv2[0][0]']
alization)                      )

block14_sepconv2_act (Activati  (None, 10, 10, 2048  0           ['block14_sepconv2_bn[0][0]']
on)                             )

flatten (Flatten)               (None, 204800)       0           ['block14_sepconv2_act[0][0]']

dense (Dense)                   (None, 5)            1024005     ['flatten[0][0]']

=================================================================================
Total params: 21,885,485
Trainable params: 1,024,005
Non-trainable params: 20,861,480
```

+ Code   + Text

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

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```python
#fit the model
r = model.fit_generator(training_set,
                        validation_data = test_set,
```

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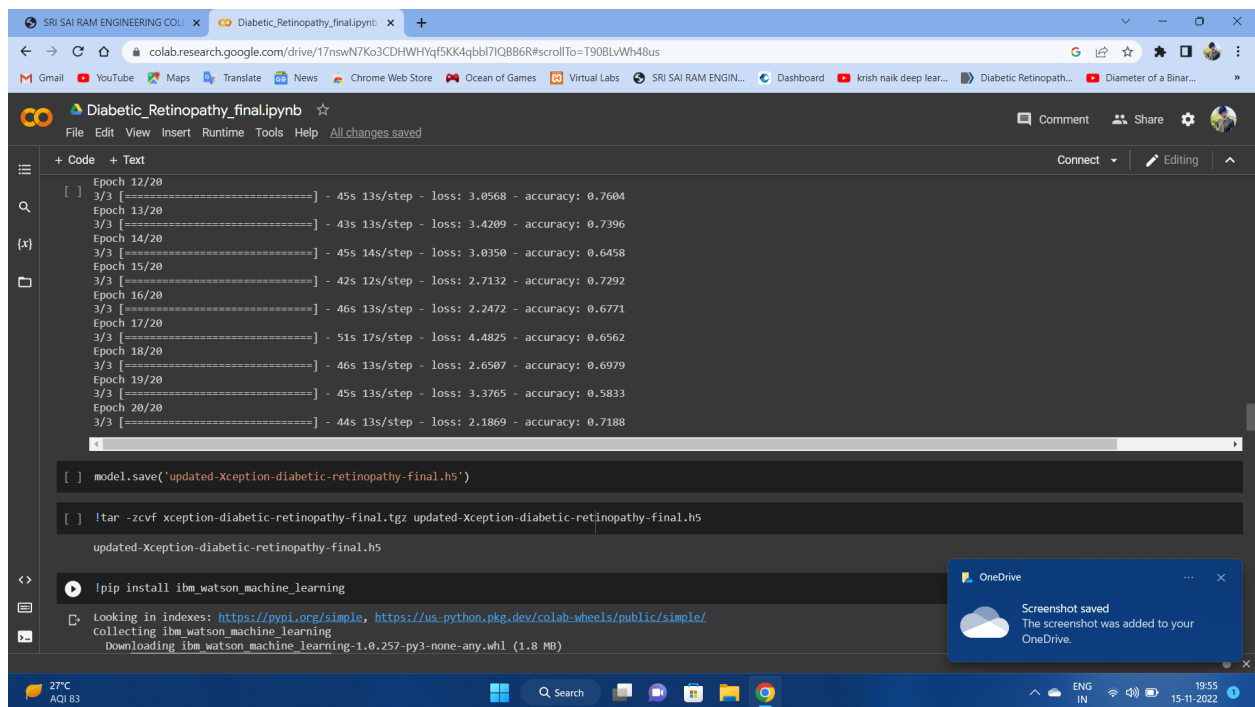## ACCURACY :


```
#fit the model
r = model.fit_generator(training_set,
                        validation_data = test_set,
                        epochs = 20,
                        steps_per_epoch = len(training_set)//32,
                        validation_steps = len(test_set)//32
                        )
```

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which

```
Epoch 1/20
3/3 [==============================] - 49s 15s/step - loss: 2.7268 - accuracy: 0.7396
Epoch 2/20
3/3 [==============================] - 43s 13s/step - loss: 4.3926 - accuracy: 0.7083
Epoch 3/20
3/3 [==============================] - 44s 12s/step - loss: 2.6215 - accuracy: 0.7396
Epoch 4/20
3/3 [==============================] - 45s 13s/step - loss: 3.4382 - accuracy: 0.6979
Epoch 5/20
3/3 [==============================] - 44s 13s/step - loss: 2.8401 - accuracy: 0.7292
Epoch 6/20
3/3 [==============================] - 42s 13s/step - loss: 3.1065 - accuracy: 0.6979
Epoch 7/20
3/3 [==============================] - 43s 12s/step - loss: 3.0641 - accuracy: 0.7188
Epoch 8/20
3/3 [==============================] - 45s 13s/step - loss: 4.7238 - accuracy: 0.6354
Epoch 9/20
3/3 [==============================] - 45s 14s/step - loss: 3.9736 - accuracy: 0.7188
Epoch 10/20
3/3 [==============================] - 48s 14s/step - loss: 4.7514 - accuracy: 0.5625
Epoch 11/20
```



```
Epoch 12/20
3/3 [==============================] - 45s 13s/step - loss: 3.0568 - accuracy: 0.7604
Epoch 13/20
3/3 [==============================] - 43s 13s/step - loss: 3.4209 - accuracy: 0.7396
Epoch 14/20
3/3 [==============================] - 45s 14s/step - loss: 3.0350 - accuracy: 0.6458
Epoch 15/20
3/3 [==============================] - 42s 12s/step - loss: 2.7132 - accuracy: 0.7292
Epoch 16/20
3/3 [==============================] - 46s 13s/step - loss: 2.2472 - accuracy: 0.6771
Epoch 17/20
3/3 [==============================] - 51s 17s/step - loss: 4.4825 - accuracy: 0.6562
Epoch 18/20
3/3 [==============================] - 46s 13s/step - loss: 2.6507 - accuracy: 0.6979
Epoch 19/20
3/3 [==============================] - 45s 13s/step - loss: 3.3765 - accuracy: 0.5833
Epoch 20/20
3/3 [==============================] - 44s 13s/step - loss: 2.1869 - accuracy: 0.7188
```

```
model.save('updated-Xception-diabetic-retinopathy-final.h5')
```
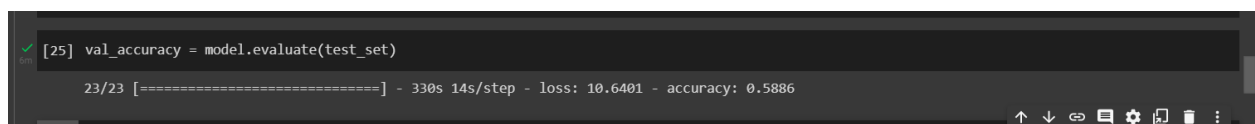
```
!tar -zcvf xception-diabetic-retinopathy-final.tgz updated-Xception-retinopathy-final.h5
```

updated-Xception-diabetic-retinopathy-final.h5

```
!pip install ibm_watson_machine_learning
```

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting ibm_watson_machine_learning
  Downloading ibm_watson_machine_learning-1.0.257-py3-none-any.whl (1.8 MB)

VALIDATION ACCURACY :


```
[25] val_accuracy = model.evaluate(test_set)

23/23 [==============================] - 330s 14s/step - loss: 10.6401 - accuracy: 0.5886
```