GENDER CLASSIFICATION WITH 203K IMAGES DB

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Why doing this?!

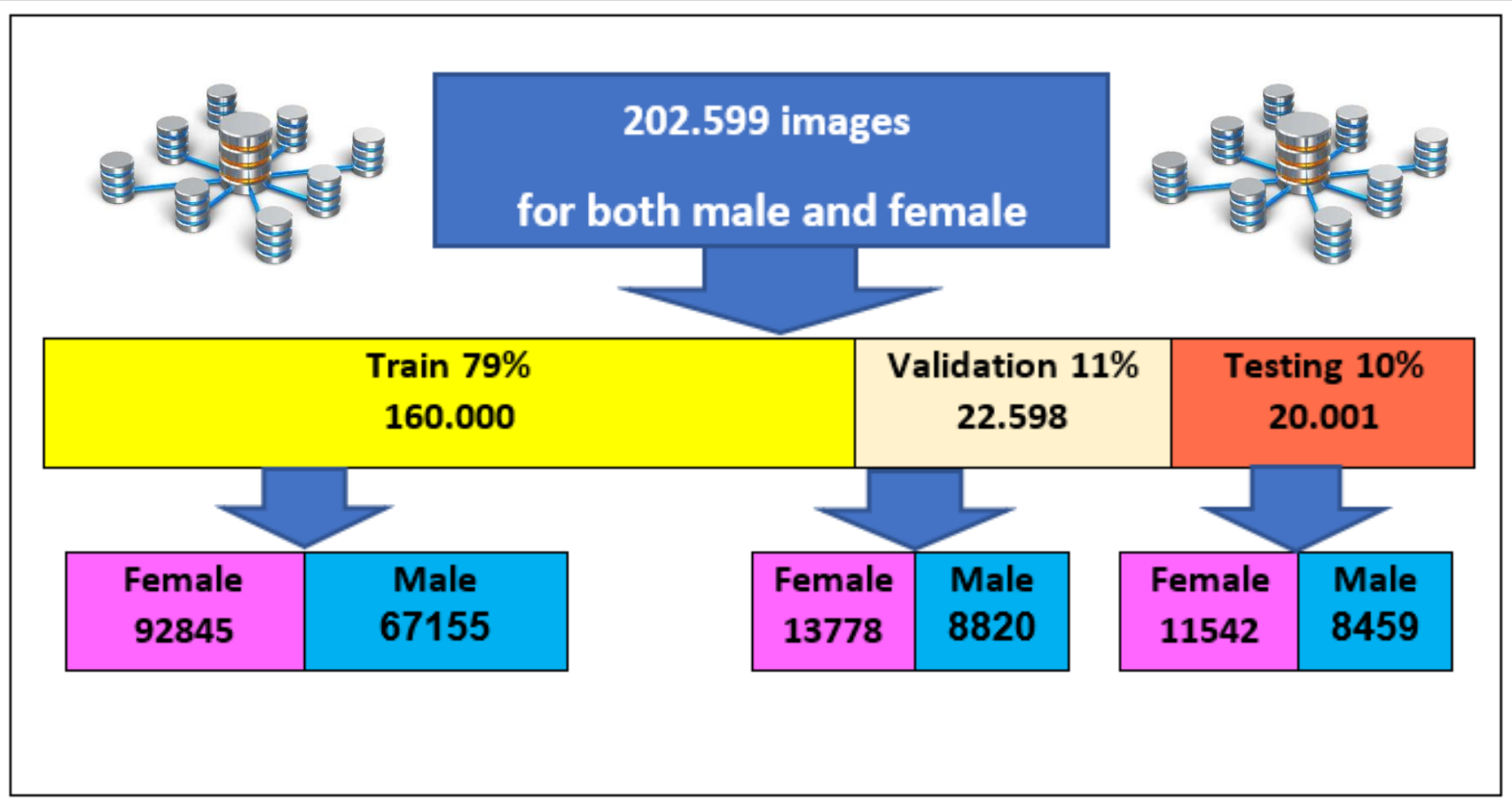
THE GENDER CLASSIFICATION IS BEING MORE ATTENTION BY RECOGNIZING A PERSON'S GENDER BASED ON THE CHARACTERISTICS THAT DIFFERENTIATE MASCULINITY AND FEMININITY.

I AM REALLY INTERESTED DOING SUCH PROJECT TO IMPROVE MY TECHNICAL SKILLS AS I WORK AS A BIOMETRIC ANALYST FOR MORE THAN 8 YEARS.

I HAVE DONE A BIG PROJECT IN BIOMETRICS AS A PART OF MY MASTER STUDY USING MATLAB.

NOW, I GOT THE CHANCE TO LEARN AND DO SOMETHING USEFUL TO BIOMETRICS THROUGH PYTHON.

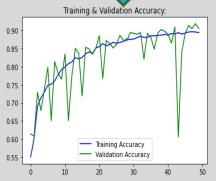
Data: 203k facial images as following:



Algorithms and Tools:

- Main algorithms is Classification > Male or Female?
- Neural network with keras model is used to build the model in Python.
- Libraries used are: os, tensorflow, matplotlib, tkinter, numpy, keras.

Layers
Model
ImageDataGenerator



UGI

Adam

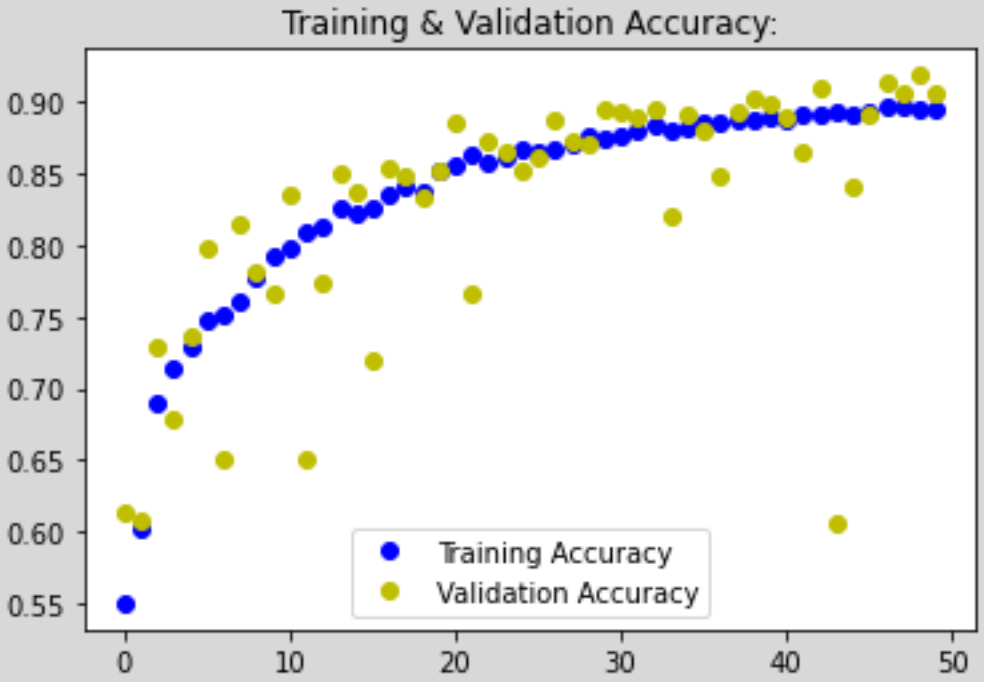
- **“model.fit”** model is used for **training** as following:
  steps_per_epoch=128, epochs=50, validation_steps=128
  >> It took > 10 hours!

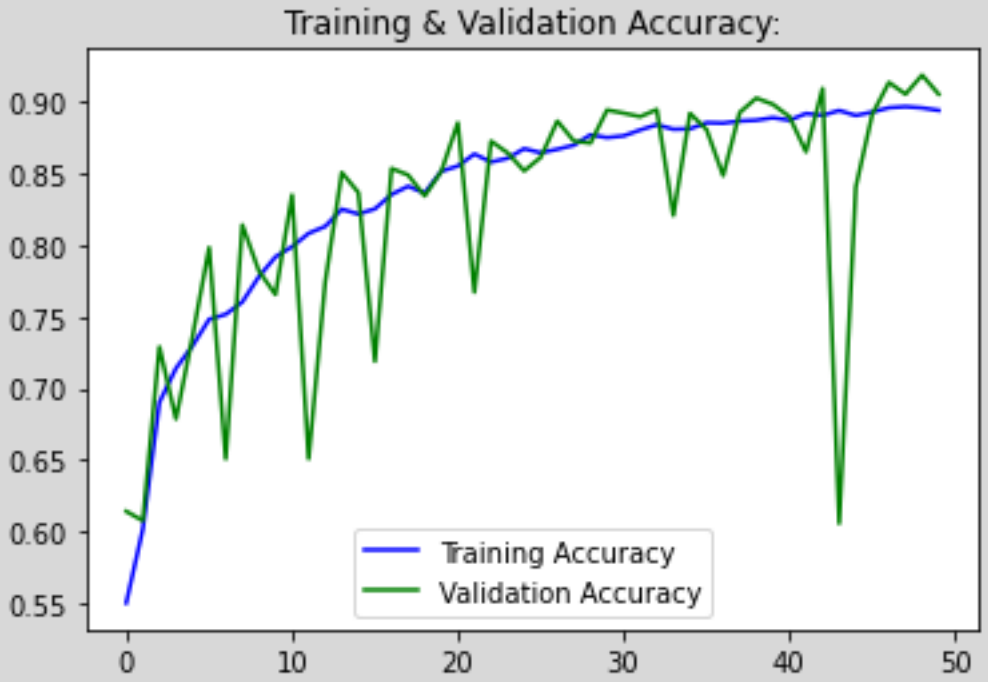
The best gotten values:

loss: 0.2529 - accuracy: 0.8960 - val_loss: 0.2066 - val_accuracy: 0.9136

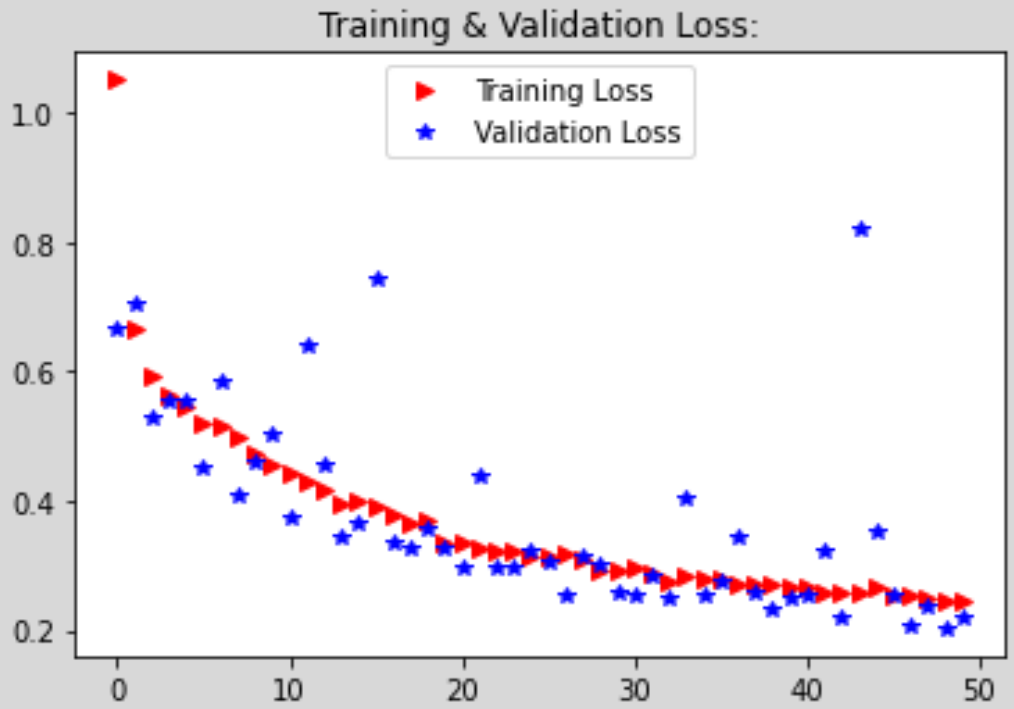
```
# 160000 images for the model to pick up the local patterns
0.6059
Epoch 45/50
128/128 [==============================] - 364s 3s/step - loss: 0.2658 - accuracy: 0.8906 - val_loss: 0.3510 - val_accuracy:
0.8406
Epoch 46/50
128/128 [==============================] - 361s 3s/step - loss: 0.2524 - accuracy: 0.8930 - val_loss: 0.2560 - val_accuracy:
0.8916
Epoch 47/50
128/128 [==============================] - 370s 3s/step - loss: 0.2529 - accuracy: 0.8960 - val_loss: 0.2066 - val_accuracy:
0.9136
Epoch 48/50
128/128 [==============================] - 374s 3s/step - loss: 0.2498 - accuracy: 0.8967 - val_loss: 0.2372 - val_accuracy:
0.9055
Epoch 49/50
128/128 [==============================] - 383s 3s/step - loss: 0.2444 - accuracy: 0.8959 - val_loss: 0.2026 - val_accuracy:
0.9188
Epoch 50/50
128/128 [==============================] - 702s 5s/step - loss: 0.2456 - accuracy: 0.8942 - val_loss: 0.2201 - val_accuracy:
0.9055
```

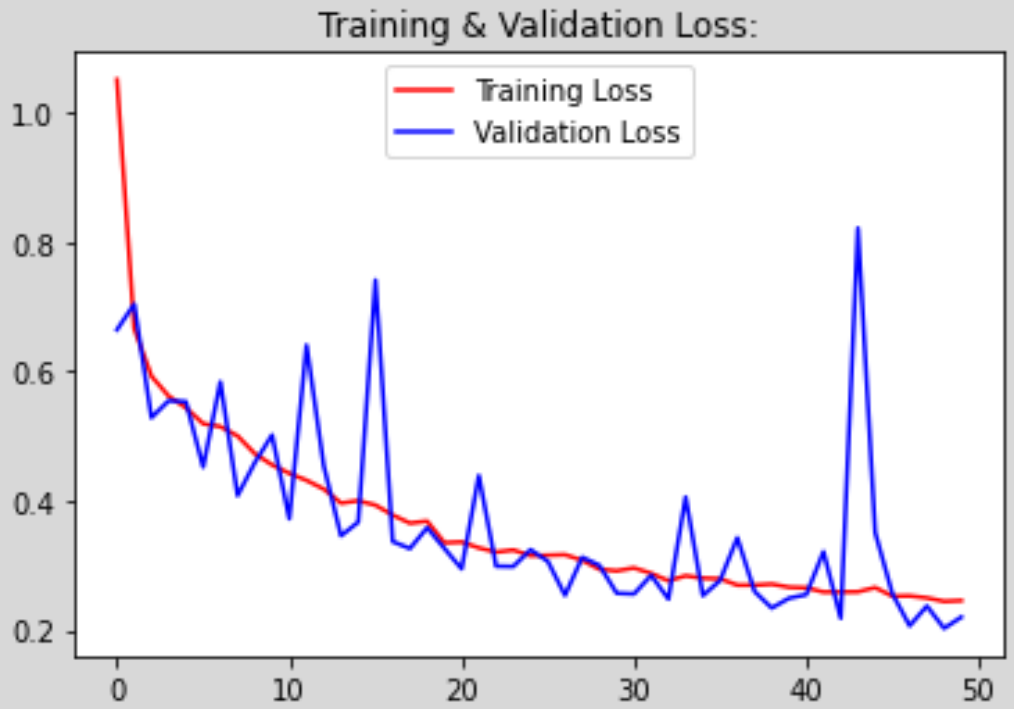
Plotting training vs validation accuracy graphs:





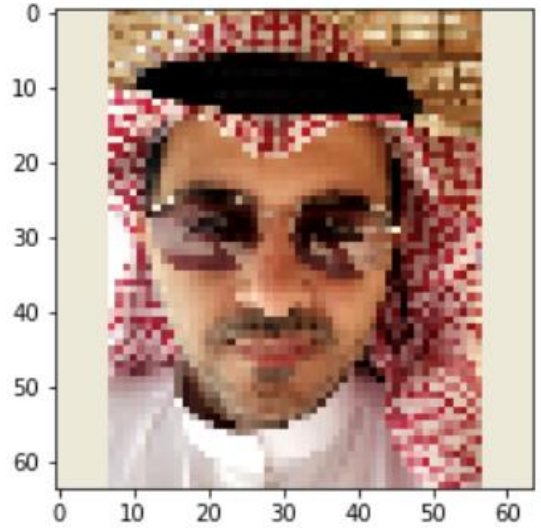
Plotting training vs validation loss graphs:





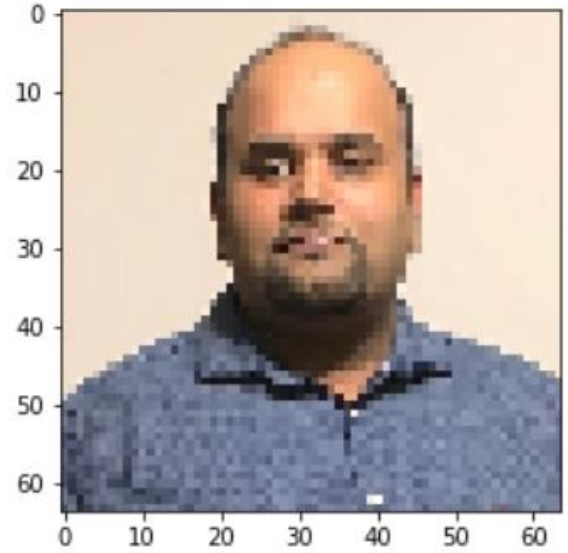
Testing with completely new images:

```
[1.]
-It is very likely he is Male.     .البرنامج يقول أنه رجل-

Out[97]: <matplotlib.figure.AxesImage at 0x185d6a051c0>
```



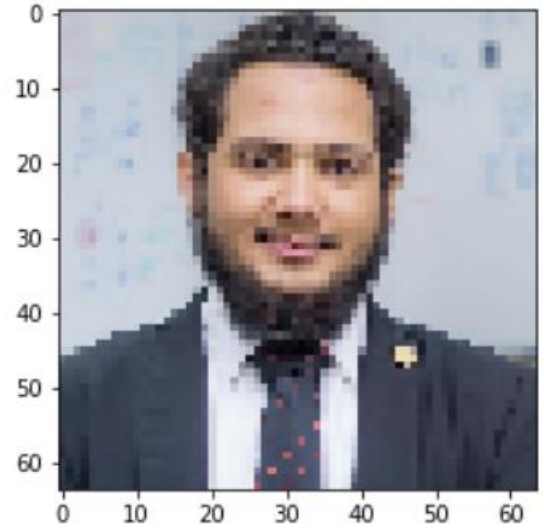
Testing with completely new images:

```
[1.]
-It is very likely he is Male.     .البرنامج يقول أنه رجل-

Out[117]: <matplotlib.figure.AxesImage at 0x185d6c6f130>
```



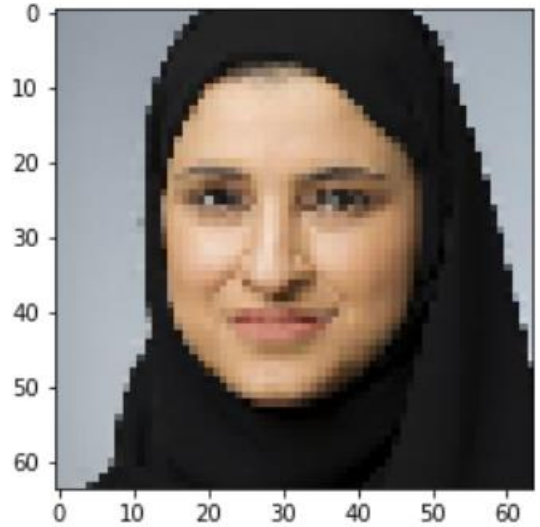
Testing with completely new images:

```
[1.]
-It is very likely he is Male.    .البرنامج يقول أنه رجل-

Out[113]: <matplotlib.figure.AxesImage at 0x185d6b9d5e0>
```



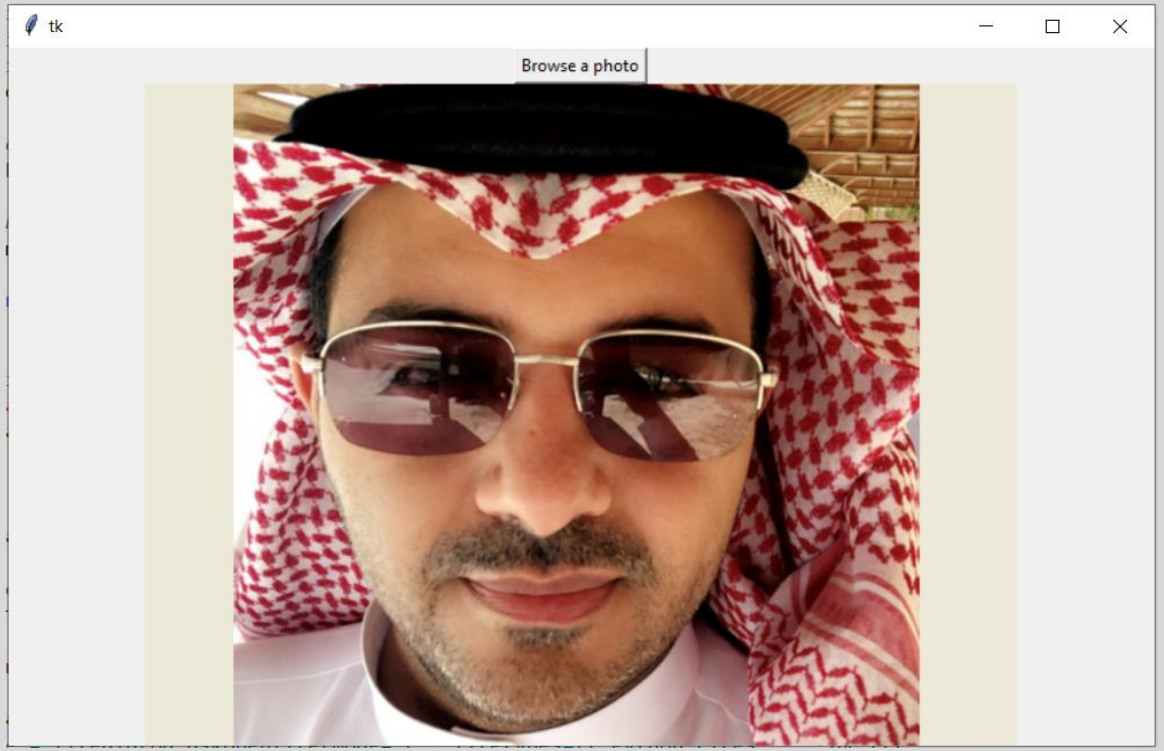
Testing with completely new images:

```
[2.0179896e-13]
-It is very likely she is Female.     .البرنامج يقول أنها أنثى-

Out[104]: <matplotlib.figure.AxesImage at 0x185d6ab72b0>
```



Future improvements:

- I wish if there was more time to build UGI by **tkinter**.
- I started it to allow browsing any photo on the computer instead of writing its link but there was no time to complete it.
- The result should be displaced next to the photo directly.



The End

THANK YOU FOR LISTENING