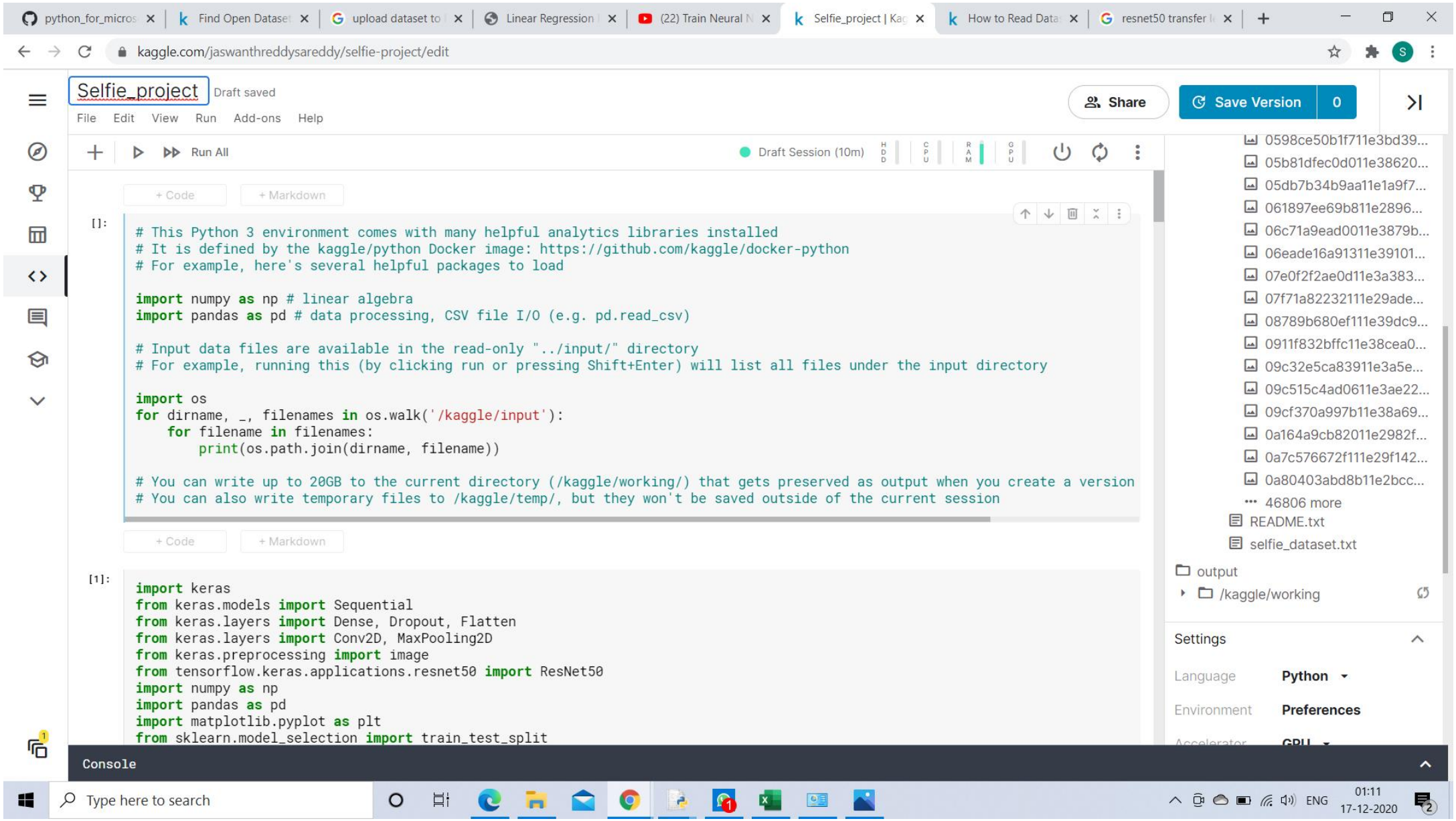
python_for_micros
Find Open Dataset
upload dataset to
Linear Regression
(22) Train Neural N
Selfie_project | Kag
How to Read Data
resnet50 transfer l
kaggle.com/jaswanthreddysareddy/selfie-project/edit
Selfie_project
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+ Code + Markdown
[]:
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
for filename in filenames:
print(os.path.join(dirname, filename))
# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
+ Code + Markdown
[1]:
import keras
from keras.models import Sequential
from keras.layers import Dense, Dropout, Flatten
from keras.layers import Conv2D, MaxPooling2D
from keras.preprocessing import image
from tensorflow.keras.applications.resnet50 import ResNet50
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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[1]:
```
import keras
from keras.models import Sequential
from keras.layers import Dense, Dropout, Flatten
from keras.layers import Conv2D, MaxPooling2D
from keras.preprocessing import image
from tensorflow.keras.applications.resnet50 import ResNet50
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from tqdm import tqdm
from keras.layers import BatchNormalization
from keras.layers import Input, Lambda, Dense, Flatten
from keras.models import Model
from keras.preprocessing import image
from keras.preprocessing.image import ImageDataGenerator
from glob import glob
import matplotlib.pyplot as plt
```

+ Code + Markdown

[2]:
```
df=pd.read_csv("../input/selfie-csv/selfie_dataset.csv")
```

[3]:
```
df.head()
```

Out[3]:

0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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[3]:
```
df.head()
```

Out[3]:

	Unnamed: 0	image	score	partial_faces	is_female	baby	child	teenager	youth	middle_age	senior
0	0	00a454da495e11e28a7322000a1fa414_6	3.901	1	1	0	0	0	1	0	0
1	1	00cddb96ac4c11e3a30212279ba1b65f_6	4.385	1	1	0	0	0	0	0	0
2	2	01cdd7aa1a1a11e2aaa822000a1fb0dd_6	4.243	0	1	0	0	1	0	0	0
3	3	024696bead0c11e389d50ec42b3b1b1c_6	4.169	0	0	0	0	1	0	0	0
4	4	026df048221a11e2b52122000a1fa4b5_6	3.873	0	1	0	0	0	0	1	0

[4]:
```
df=df.drop(columns=['Unnamed: 0','score','partial_faces'])
df.head()
```

Out[4]:

	image	is_female	baby	child	teenager	youth	middle_age	senior
0	00a454da495e11e28a7322000a1fa414_6	1	0	0	0	1	0	0
1	00cddb96ac4c11e3a30212279ba1b65f_6	1	0	0	0	0	0	0
2	01cdd7aa1a1a11e2aaa822000a1fb0dd_6	1	0	0	1	0	0	0
3	024696bead0c11e389d50ec42b3b1b1c_6	0	0	0	1	0	0	0
4	026df048221a11e2b52122000a1fa4b5_6	1	0	0	0	0	1	0

+ Code + Markdown

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0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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[5]:
```
df=df.iloc[:4000]
df.shape
```

Out[5]:
```
(4000, 8)
```

[6]:
```
image_directory = '../input/selfie2/Selfie-dataset/images/'
```

[7]:
```
SIZE = 224
X_dataset = []
for i in tqdm(range(df.shape[0])):
    img = image.load_img(image_directory +df['image'][i]+'.jpg', target_size=(SIZE,SIZE,3))
    img = image.img_to_array(img)
    img = img/255.
    X_dataset.append(img)

X = np.array(X_dataset)
```

```
100%|██████████| 4000/4000 [00:23<00:00, 173.15it/s]
```

[8]:
```
y = np.array(df.drop(['image'], axis=1))
y.shape
```

0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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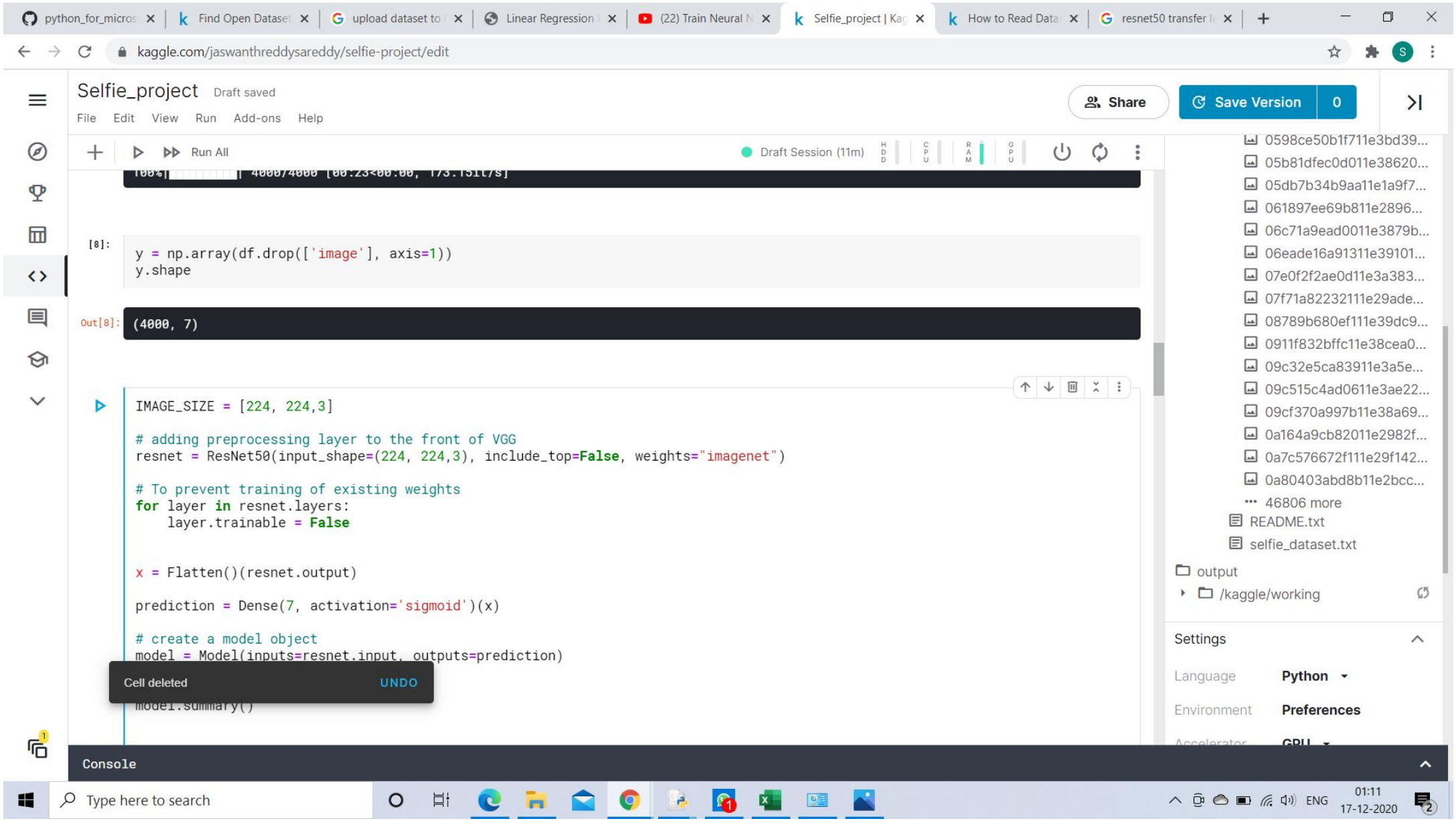
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[8]:
y = np.array(df.drop(['image'], axis=1))
y.shape
Out[8]:
(4000, 7)
IMAGE_SIZE = [224, 224,3]
# adding preprocessing layer to the front of VGG
resnet = ResNet50(input_shape=(224, 224,3), include_top=False, weights="imagenet")
# To prevent training of existing weights
for layer in resnet.layers:
layer.trainable = False
x = Flatten()(resnet.output)
prediction = Dense(7, activation='sigmoid')(x)
# create a model object
model = Model(inputs=resnet.input, outputs=prediction)
Cell deleted
UNDO
model.summary()
0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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```
model = Model(inputs=resnet.input, outputs=prediction)

# To view the structure of the model
model.summary()


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

```
Layer (type)                 Output Shape         Param #     Connected to
==================================================================================================
input_1 (InputLayer)         [(None, 224, 224, 3) 0
__________________________________________________________________________________________________
conv1_pad (ZeroPadding2D)    (None, 230, 230, 3)  0           input_1[0][0]
__________________________________________________________________________________________________
conv1_conv (Conv2D)          (None, 112, 112, 64) 9472        conv1_pad[0][0]
__________________________________________________________________________________________________
conv1_bn (BatchNormalization)(None, 112, 112, 64) 256         conv1_conv[0][0]
__________________________________________________________________________________________________
conv1_relu (Activation)      (None, 112, 112, 64) 0           conv1_bn[0][0]
__________________________________________________________________________________________________
pool1_pad (ZeroPadding2D)    (None, 114, 114, 64) 0           conv1_relu[0][0]
__________________________________________________________________________________________________
pool1_pool (MaxPooling2D)    (None, 56, 56, 64)   0           pool1_pad[0][0]
__________________________________________________________________________________________________
conv2_block1_1_conv (Conv2D) (None, 56, 56, 64)   4160        pool1_pool[0][0]
```

+ Code + Markdown

[10]:

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=20, test_size=0.3)
```

Console

0598ce50b1f711e3bd39...
05b81dfec0d011e38620...
05db7b34b9aa11e1a9f7...
061897ee69b811e2896...
06c71a9ead0011e3879b...
06eade16a91311e39101...
07e0f2f2ae0d11e3a383...
07f71a82232111e29ade...
08789b680ef111e39dc9...
0911f832bffc11e38cea0...
09c32e5ca83911e3a5e...
09c515c4ad0611e3ae22...
09cf370a997b11e38a69...
0a164a9cb82011e2982f...
0a7c576672f111e29f142...
0a80403abd8b11e2bcc...
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[10]:

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=20, test_size=0.3)
```

[11]:

```
history = model.fit(X_train, y_train, epochs=10, validation_data=(X_test, y_test), batch_size=64)
```

```
Epoch 1/10
44/44 [==============================] - 9s 204ms/step - loss: 0.6064 - accuracy: 0.4850 - val_loss: 0.3360 - val_accuracy: 0.3483
Epoch 2/10
44/44 [==============================] - 7s 159ms/step - loss: 0.3051 - accuracy: 0.4896 - val_loss: 0.3266 - val_accuracy: 0.7325
Epoch 3/10
44/44 [==============================] - 7s 162ms/step - loss: 0.2844 - accuracy: 0.4904 - val_loss: 0.2835 - val_accuracy: 0.2133
Epoch 4/10
44/44 [==============================] - 7s 157ms/step - loss: 0.2521 - accuracy: 0.5064 - val_loss: 0.2799 - val_accuracy: 0.6933
Epoch 5/10
44/44 [==============================] - 7s 159ms/step - loss: 0.2762 - accuracy: 0.5525 - val_loss: 0.3442 - val_accuracy: 0.5125
Epoch 6/10
44/44 [==============================] - 7s 158ms/step - loss: 0.2498 - accuracy: 0.5421 - val_loss: 0.2763 - val_accuracy: 0.6883
Epoch 7/10
44/44 [==============================] - 7s 157ms/step - loss: 0.2282 - accuracy: 0.6104 - val_loss: 0.2710 - val_accuracy: 0.7358
Epoch 8/10
44/44 [==============================] - 7s 164ms/step - loss: 0.2189 - accuracy: 0.6061 - val_loss: 0.3356 - val_accuracy: 0.7333
Epoch 9/10
44/44 [==============================] - 7s 158ms/step - loss: 0.2377 - accuracy: 0.5429 - val_loss: 0.2967 - val_accuracy: 0.7400
```

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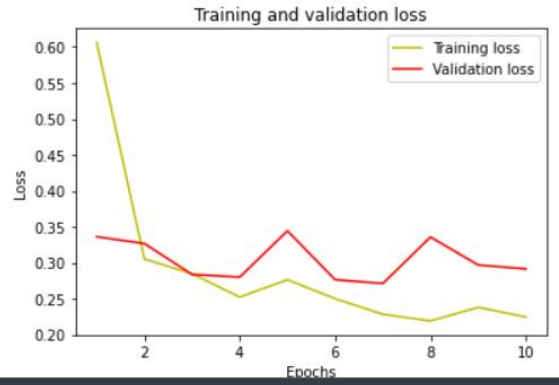
```
Epoch 10/10
44/44 [==============================] - 7s 159ms/step - loss: 0.2244 - accuracy: 0.6196 - val_loss: 0.2912 - val_accuracy: 0.2583
```

[12]:

```
#plot the training and validation accuracy and loss at each epoch
loss = history.history['loss']
val_loss = history.history['val_loss']
epochs = range(1, len(loss) + 1)
plt.plot(epochs, loss, 'y', label='Training loss')
plt.plot(epochs, val_loss, 'r', label='Validation loss')
plt.title('Training and validation loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()
plt.show()
```



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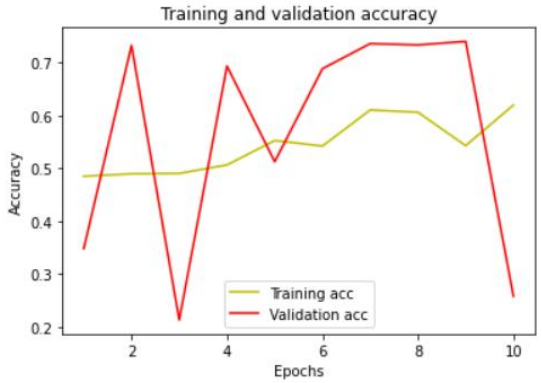
Epochs

[13]:

```
acc = history.history['accuracy']
val_acc = history.history['val_accuracy']
plt.plot(epochs, acc, 'y', label='Training acc')
plt.plot(epochs, val_acc, 'r', label='Validation acc')
plt.title('Training and validation accuracy')
plt.xlabel('Epochs')
plt.ylabel('Accuracy')
plt.legend()
plt.show()
```



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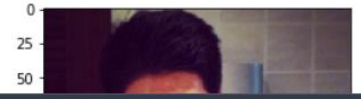
[15]:

```
#Validation on an image

img = image.load_img('../input/selfie2/Selfie-dataset/images/032a49b6bffb11e3b9ca0002c9dbcd18_6.jpg', target_size=(SIZE,SIZE,3)

img = image.img_to_array(img)
img = img/255.
plt.imshow(img)
img = np.expand_dims(img, axis=0)

classes = np.array(df.columns[1:]) #Get array of all classes
proba = model.predict(img)  #Get probabilities for each class
sorted_categories = np.argsort(proba[0])[:-8:-1]  #Get class names for top 8 categories

#Print classes and corresponding probabilities
for i in range(7):
    print("{}".format(classes[sorted_categories[i]])+" ({:.3})".format(proba[0][sorted_categories[i]]))
```

```
youth (0.462)
teenager (0.444)
is_female (0.103)
middle_age (0.000982)
child (0.00044)
baby (8.18e-06)
senior (4.82e-12)
```



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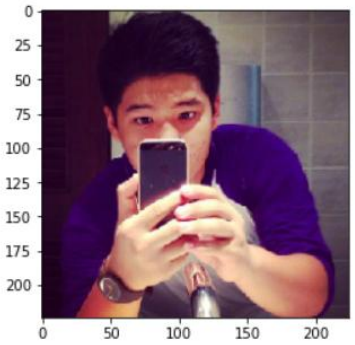
```
print('{}'.format(classes[sorted_categories[1]])+ ('{:.3}').format(proba[0][sorted_categories[1]]))
```

```
youth (0.462)
teenager (0.444)
is_female (0.103)
middle_age (0.000982)
child (0.00044)
baby (8.18e-06)
senior (4.82e-12)
```



[21]:

```
#Validation on an image

img = image.load_img('../input/selfie2/Selfie-dataset/images/00a454da495e11e28a7322000a1fa414_6.jpg', target_size=(SIZE,SIZE,3)
```

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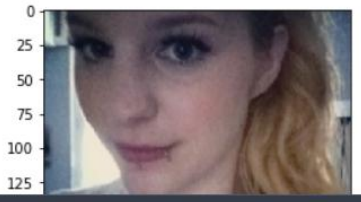
```
img = image.load_img('../input/selfie2/selfie-dataset/images/00a454da495e11e28a7322000a1fa414_6.jpg', target_size=(SIZE,SIZE,3))

img = image.img_to_array(img)
img = img/255.
plt.imshow(img)
img = np.expand_dims(img, axis=0)

classes = np.array(df.columns[1:]) #Get array of all classes
proba = model.predict(img)  #Get probabilities for each class
sorted_categories = np.argsort(proba[0])[:-8:-1]  #Get class names for top 8 categories

#Print classes and corresponding probabilities
for i in range(7):
    print("{}".format(classes[sorted_categories[i]])+" ({:.3})".format(proba[0][sorted_categories[i]]))
```

```
youth (0.773)
is_female (0.519)
teenager (0.167)
child (0.0058)
middle_age (0.00114)
baby (0.000163)
senior (2.14e-12)
```



output

/kaggle/working

Settings

Language Python

Environment Preferences

Accelerator GPU

GPU Quota 05:03 / 34 hrs

Internet

Code Help

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Console

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