In [1]:

```
import tensorflow as tf
import tensorflow_probability as tf
import pandas as pd
import numpy as np
from PIL import Image
import os
import matplotlib.pyplot as plt
import shutil
from glob import glob
from sklearn.model_selection import train_test_split
```

```
2023-12-04 05:49:10.228062: I tensorflow/core/platform/cpu_feature_guard.cc:182] This Te
nsorFlow binary is optimized to use available CPU instructions in performance-critical o
perations.
To enable the following instructions: SSE4.1 SSE4.2, in other operations, rebuild Tensor
Flow with the appropriate compiler flags.
```

In [2]:

```
df=pd.read_csv('list_attr_celeba.csv').drop(columns=['image_id'],index=np.linspace(50000
```

In [3]:

```
df.head()
```

Out[3]:

	5_o_Clock_Shadow	Arched_Eyebrows	Attractive	Bags_Under_Eyes	Bald	Bangs	Big_Lips	Big_Nose
0	-1	1	1	-1	-1	-1	-1	-1
1	-1	-1	-1	1	-1	-1	-1	1
2	-1	-1	-1	-1	-1	-1	1	-1
3	-1	-1	1	-1	-1	-1	-1	-1
4	-1	1	1	-1	-1	-1	1	-1

5 rows × 40 columns

In [4]:

```
from keras.models import Sequential,Model
from keras.layers import Conv2D, MaxPooling2D, Dense, Flatten, Dropout,Activation
from keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.optimizers import Adam
```

Al final si se logró corregir el problema de las imagenes ajustando el rango en df

In [5]:

```
n_imagen = sorted(glob(os.path.join("img_align_celeba", "*"))[50000:59000])
```

In [6]:

```
Image.open(n_imagen[149])
```

Out[6]:

In [8]:

```
data.shape
```

Out[8]:

```
(50000, 218, 178, 3)
```

In [11]:

```
dfff.shape
```

Out[11]:

```
(40000, 40)
```

In [7]:

```
data = np.zeros((50000, 218, 178, 3), dtype="uint8")  # Crear el arreglo con capacidad p
count = 0

for f in n_imagen:  # Iterar sobre todas las rutas de imagen en 'n_imagen'
    if count == 50000:  # Detener el bucle después de 50000 iteraciones
        break

    try:
        img = Image.open(f)
        data[count] = np.array(img)
        count += 1
    except:
        print(f"Error con imagen: {count}")
        continue
```

In [12]:

```
datax, data_test, dfx, df_test = train_test_split(data, df, test_size=0.2, random_state=
```

Sino se ejecutaba el siguiente bloque,no quedaban otra vez de tamaños compatibles:

In [10]:

```
tdf=len(df)
dff = int(tdf * 0.80)
dfff = df.sample(n=dff, random_state=42)
```

In [14]:

```
df_test.shape
```

Out[14]:

```
(10000, 40)
```

In [13]:

```
datax.shape
```

Out[13]:

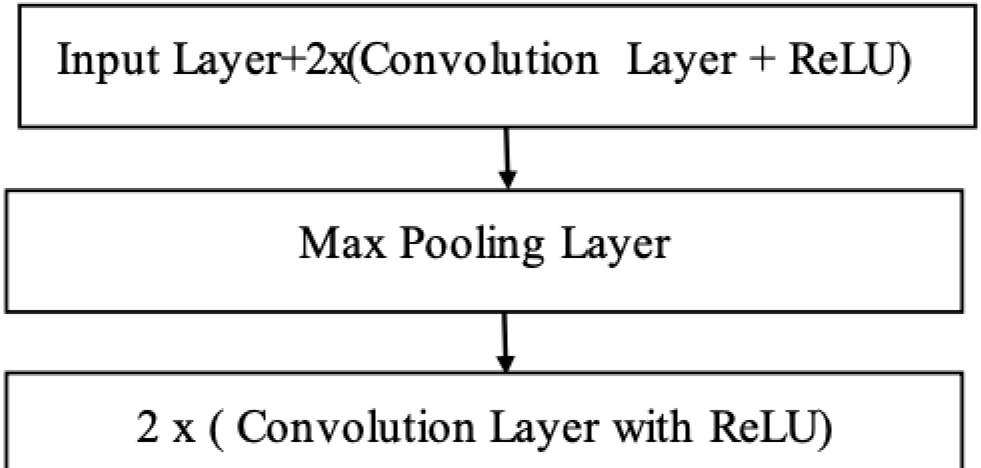
```
(40000, 218, 178, 3)
```

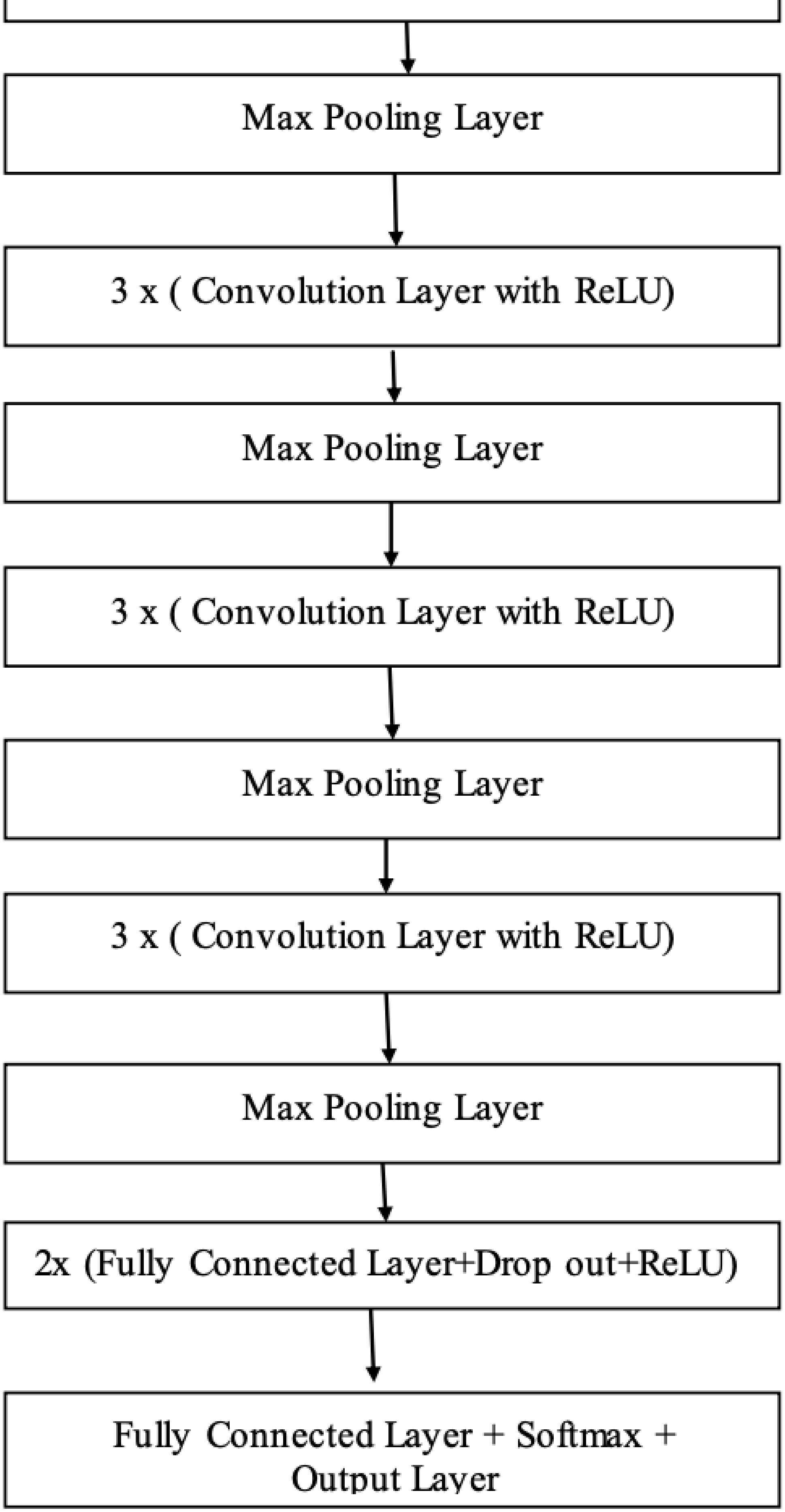
In [19]:

```
datax_train = datax.astype('float32')
dataxx_valid = data_test.astype('float32')
datax_train /= 255.
dataxx_valid /= 255.
df_train = dfff
df_valid = df_test
```

In [20]:

```
#Para nuestro modelo vamos a usar la técnica Transder learning que luce como
inp = (218,178,3)
```


Input Layer+2x(Convolution Layer + ReLU)
Max Pooling Layer
2 x (Convolution Layer with ReLU)


Max Pooling Layer
3 x (Convolution Layer with ReLU)
Max Pooling Layer
3 x (Convolution Layer with ReLU)
Max Pooling Layer
3 x (Convolution Layer with ReLU)
Max Pooling Layer
2x (Fully Connected Layer+Drop out+ReLU)
Fully Connected Layer + Softmax + Output Layer

In [21]:

```
model= Sequential()


#Bloque 1
model.add(Conv2D(10, (3,3) ,input_shape=inp ))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(MaxPooling2D(pool_size=(2,2)))

# Bloque 2
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
#Bloque 3
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3) ))
model.add(Activation('relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
#Bloque 4
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(Conv2D(10,  (3,3)))
model.add(Activation('relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
# Bloque final
model.add(Flatten())
model.add(Dense(128))
model.add(Activation('relu'))
model.add(Dropout(0.2))
model.add(Dense(40))
model.add(Activation('softmax'))
```

In [22]:

```
model.summary()
```

```
Model: "sequential_1"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_10 (Conv2D)          (None, 216, 176, 10)      280

 activation_12 (Activation)  (None, 216, 176, 10)      0

 conv2d_11 (Conv2D)          (None, 214, 174, 10)      910

 activation_13 (Activation)  (None, 214, 174, 10)      0

 max_pooling2d_4 (MaxPooling  (None, 107, 87, 10)      0
 2D)

 conv2d_12 (Conv2D)          (None, 105, 85, 10)       910

 activation_14 (Activation)  (None, 105, 85, 10)       0

 conv2d_13 (Conv2D)          (None, 103, 83, 10)       910

 activation_15 (Activation)  (None, 103, 83, 10)       0

 max_pooling2d_5 (MaxPooling  (None, 51, 41, 10)       0
 2D)

 conv2d_14 (Conv2D)          (None, 49, 39, 10)        910
 activation_16 (Activation)  (None, 49, 39, 10)        0

 conv2d_15 (Conv2D)          (None, 47, 37, 10)        910

 activation_17 (Activation)  (None, 47, 37, 10)        0

 conv2d_16 (Conv2D)          (None, 45, 35, 10)        910

 activation_18 (Activation)  (None, 45, 35, 10)        0

 max_pooling2d_6 (MaxPooling  (None, 22, 17, 10)       0
 2D)

 conv2d_17 (Conv2D)          (None, 20, 15, 10)        910

 activation_19 (Activation)  (None, 20, 15, 10)        0

 conv2d_18 (Conv2D)          (None, 18, 13, 10)        910

 activation_20 (Activation)  (None, 18, 13, 10)        0

 conv2d_19 (Conv2D)          (None, 16, 11, 10)        910

 activation_21 (Activation)  (None, 16, 11, 10)        0

 max_pooling2d_7 (MaxPooling  (None, 8, 5, 10)         0
 2D)

 flatten_1 (Flatten)         (None, 400)               0

 dense_2 (Dense)             (None, 128)               51328

 activation_22 (Activation)  (None, 128)               0

 dropout_1 (Dropout)         (None, 128)               0

 dense_3 (Dense)             (None, 40)                5160

 activation_23 (Activation)  (None, 40)                0

=================================================================
Total params: 64,958
Trainable params: 64,958
Non-trainable params: 0
_________________________________________________________________
```

In [23]:

```
model.compile(loss="mse", optimizer=Adam(learning_rate=0.001))
history = model.fit(datax_train, df_train, batch_size=35,epochs=5, validation_data=(data
```

```
Epoch 1/5
1143/1143 [==============================] - 1007s 879ms/step - loss: 0.9829 - val_loss:
0.9818
Epoch 2/5
1143/1143 [==============================] - 959s 839ms/step - loss: 0.9816 - val_loss:
0.9818
Epoch 3/5
1143/1143 [==============================] - 1042s 912ms/step - loss: 0.9816 - val_loss:
0.9818
Epoch 4/5
 726/1143 [==================>...........] - ETA: 5:06 - loss: 0.9815
```

In [24]:

```
model.save('my_model.h5')
```

se tardó un montón en ejecutar las épocas

```
In [ ]:
```