# Primera ejecución del modelo CNN simple

## Cambios vs. Version anterior:

* 1. Se ha añadido una segunda capa convolucional + maxPooling.
  2. No se han modificado hiperparámetros.

## Estructura:

from tensorflow.keras.preprocessing.image import ImageDataGenerator

from tensorflow.keras import Sequential

from tensorflow.keras.layers import Conv2D, MaxPool2D, Dropout, Flatten, \

Dense

import tensorflow as tf

physical\_devices = tf.config.experimental.list\_physical\_devices('GPU')

tf.config.experimental.set\_memory\_growth(physical\_devices[0], True)

training\_datagen = ImageDataGenerator(rescale=1. / 255,

rotation\_range=0.2,

shear\_range=0.05,

zoom\_range=[0.95, 1.2],

horizontal\_flip=True, )

test\_datagen = ImageDataGenerator(rescale=1. / 255)

training\_path = '/home/ruben/workspace/tfg/deep-learning-facial-recognition/data/age/training'

test\_path = '/home/ruben/workspace/tfg/deep-learning-facial-recognition/data/age/test'

training\_set = training\_datagen.flow\_from\_directory(training\_path,

target\_size=(64, 64),

batch\_size=32,

class\_mode='categorical',

shuffle=True,

seed=42)

test\_set = test\_datagen.flow\_from\_directory(test\_path,

target\_size=(64, 64),

batch\_size=32,

class\_mode='categorical',

shuffle=True,

seed=42)

age\_classifier = Sequential()

age\_classifier.add(

Conv2D(filters=32, kernel\_size=(3, 3), input\_shape=(64, 64, 3),

activation='relu'))

age\_classifier.add(MaxPool2D(pool\_size=(2, 2)))

age\_classifier.add(

Conv2D(filters=32, kernel\_size=(3, 3), activation='relu'))

age\_classifier.add(MaxPool2D(pool\_size=(2, 2)))

age\_classifier.add(Flatten())

age\_classifier.add(Dense(units=128, activation='relu'))

# *TODO: Think about using Dropout...*

age\_classifier.add(Dense(units=6, activation='softmax'))

age\_classifier.compile(optimizer='adam', loss='categorical\_crossentropy',

metrics=['accuracy'])

age\_classifier.fit(training\_set,

steps\_per\_epoch=(18966 // 32),

epochs=25,

validation\_data=test\_set,

validation\_steps=(4742//32))

## Resultado:

1. Epoch 1/25
2. 2020-05-20 12:50:03.128643: I tensorflow/stream\_executor/platform/default/dso\_loader.cc:44] Successfully opened dynamic library libcublas.so.10
3. 2020-05-20 12:50:03.470947: I tensorflow/stream\_executor/platform/default/dso\_loader.cc:44] Successfully opened dynamic library libcudnn.so.7
4. 592/592 [==============================] - 37s 62ms/step - loss: 1.1891 - accuracy: 0.5037 - val\_loss: 0.9949 - val\_accuracy: 0.5663
5. Epoch 2/25
6. 592/592 [==============================] - 35s 60ms/step - loss: 0.9640 - accuracy: 0.5856 - val\_loss: 0.9138 - val\_accuracy: 0.6037
7. Epoch 3/25
8. 592/592 [==============================] - 35s 59ms/step - loss: 0.8991 - accuracy: 0.6187 - val\_loss: 0.9194 - val\_accuracy: 0.5942
9. Epoch 4/25
10. 592/592 [==============================] - 35s 60ms/step - loss: 0.8619 - accuracy: 0.6278 - val\_loss: 0.8797 - val\_accuracy: 0.6197
11. Epoch 5/25
12. 592/592 [==============================] - 36s 61ms/step - loss: 0.8243 - accuracy: 0.6410 - val\_loss: 0.8549 - val\_accuracy: 0.6258
13. Epoch 6/25
14. 592/592 [==============================] - 36s 60ms/step - loss: 0.8000 - accuracy: 0.6523 - val\_loss: 0.8765 - val\_accuracy: 0.5997
15. Epoch 7/25
16. 592/592 [==============================] - 36s 61ms/step - loss: 0.7790 - accuracy: 0.6626 - val\_loss: 0.8233 - val\_accuracy: 0.6322
17. Epoch 8/25
18. 592/592 [==============================] - 36s 61ms/step - loss: 0.7655 - accuracy: 0.6676 - val\_loss: 0.7945 - val\_accuracy: 0.6503
19. Epoch 9/25
20. 592/592 [==============================] - 36s 61ms/step - loss: 0.7455 - accuracy: 0.6761 - val\_loss: 0.7843 - val\_accuracy: 0.6541
21. Epoch 10/25
22. 592/592 [==============================] - 36s 61ms/step - loss: 0.7298 - accuracy: 0.6875 - val\_loss: 0.8091 - val\_accuracy: 0.6444
23. Epoch 11/25
24. 592/592 [==============================] - 37s 62ms/step - loss: 0.7094 - accuracy: 0.6924 - val\_loss: 0.8020 - val\_accuracy: 0.6556
25. Epoch 12/25
26. 592/592 [==============================] - 37s 62ms/step - loss: 0.7046 - accuracy: 0.6952 - val\_loss: 0.7940 - val\_accuracy: 0.6582
27. Epoch 13/25
28. 592/592 [==============================] - 36s 61ms/step - loss: 0.6930 - accuracy: 0.6973 - val\_loss: 0.7987 - val\_accuracy: 0.6609
29. Epoch 14/25
30. 592/592 [==============================] - 37s 62ms/step - loss: 0.6738 - accuracy: 0.7044 - val\_loss: 0.8186 - val\_accuracy: 0.6429
31. Epoch 15/25
32. 592/592 [==============================] - 36s 62ms/step - loss: 0.6627 - accuracy: 0.7133 - val\_loss: 0.8283 - val\_accuracy: 0.6429
33. Epoch 16/25
34. 592/592 [==============================] - 37s 62ms/step - loss: 0.6533 - accuracy: 0.7144 - val\_loss: 0.8480 - val\_accuracy: 0.6438
35. Epoch 17/25
36. 592/592 [==============================] - 37s 62ms/step - loss: 0.6402 - accuracy: 0.7238 - val\_loss: 0.8032 - val\_accuracy: 0.6442
37. Epoch 18/25
38. 592/592 [==============================] - 37s 62ms/step - loss: 0.6291 - accuracy: 0.7273 - val\_loss: 0.8073 - val\_accuracy: 0.6558
39. Epoch 19/25
40. 592/592 [==============================] - 38s 64ms/step - loss: 0.6125 - accuracy: 0.7361 - val\_loss: 0.8086 - val\_accuracy: 0.6518
41. Epoch 20/25
42. 592/592 [==============================] - 37s 63ms/step - loss: 0.6024 - accuracy: 0.7440 - val\_loss: 0.8370 - val\_accuracy: 0.6554
43. Epoch 21/25
44. 592/592 [==============================] - 37s 63ms/step - loss: 0.5908 - accuracy: 0.7428 - val\_loss: 0.8359 - val\_accuracy: 0.6432
45. Epoch 22/25
46. 592/592 [==============================] - 37s 63ms/step - loss: 0.5824 - accuracy: 0.7526 - val\_loss: 0.8440 - val\_accuracy: 0.6617
47. Epoch 23/25
48. 592/592 [==============================] - 38s 63ms/step - loss: 0.5713 - accuracy: 0.7559 - val\_loss: 0.8454 - val\_accuracy: 0.6672
49. Epoch 24/25
50. 592/592 [==============================] - 38s 64ms/step - loss: 0.5654 - accuracy: 0.7538 - val\_loss: 0.8297 - val\_accuracy: 0.6672
51. Epoch 25/25
52. 592/592 [==============================] - 37s 63ms/step - loss: 0.5487 - accuracy: 0.7650 - val\_loss: 0.8536 - val\_accuracy: 0.6628
53. Process finished with exit code 0

## Conclusiones y Resultado vs. Version Anterior:

Continúa existiendo overfitting.

Acc. Training: 76.5%

Acc. Test: 66.3%

Ha mejorado la tasa de acierto en un 3% pero sigue sin ser significativo por el overfitting.