Andrea Cottone

Práctica 2 – Redes

Ejemplo 1:

```
model = Sequential()
model.add(Conv2D(32, kernel_size=(3, 3),
                 activation='relu',
                 input_shape=(150, 150, 3)))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Conv2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))
model.add(Flatten())
model.add(Dense(128, activation='relu'))

model.add(Dropout(0.5))
model.add(Dense(1, activation='sigmoid'))

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

model.summary()
```

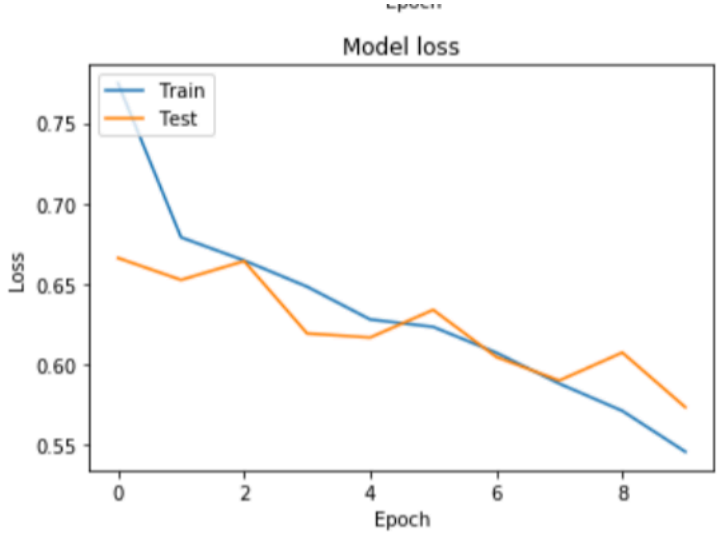
```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 148, 148, 32)      896
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 74, 74, 32)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 72, 72, 64)        18496
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 36, 36, 64)        0
_________________________________________________________________
dropout_1 (Dropout)          (None, 36, 36, 64)        0
_________________________________________________________________
flatten_1 (Flatten)          (None, 82944)             0
_________________________________________________________________
dense_1 (Dense)              (None, 128)               10616960
_________________________________________________________________
dropout_2 (Dropout)          (None, 128)               0
_________________________________________________________________
dense_2 (Dense)              (None, 1)                 129
=================================================================
```

```
Epoch 1/10
100/100 [==============================] - 732s 7s/step - loss: 0.7749 - acc: 0.5305 - val_loss: 0.6660 - val_acc: 0.5961

Epoch 00001: val_loss improved from inf to 0.66599, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 2/10
100/100 [==============================] - 50s 501ms/step - loss: 0.6788 - acc: 0.5880 - val_loss: 0.6523 - val_acc: 0.6006

Epoch 00002: val_loss improved from 0.66599 to 0.65230, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 3/10
```

```
100/100 [==============================] - 50s 505ms/step - loss: 0.6645 - acc: 0.6200 - val_loss: 0.6640 - val_acc: 0.6478

Epoch 00003: val_loss did not improve from 0.65230
Epoch 4/10
100/100 [==============================] - 48s 484ms/step - loss: 0.6481 - acc: 0.6395 - val_loss: 0.6189 - val_acc: 0.6772

Epoch 00004: val_loss improved from 0.65230 to 0.61893, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 5/10
100/100 [==============================] - 50s 498ms/step - loss: 0.6276 - acc: 0.6685 - val_loss: 0.6164 - val_acc: 0.6716

Epoch 00005: val_loss improved from 0.61893 to 0.61640, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 6/10
100/100 [==============================] - 50s 500ms/step - loss: 0.6230 - acc: 0.6655 - val_loss: 0.6336 - val_acc: 0.6641

Epoch 00006: val_loss did not improve from 0.61640
Epoch 7/10
100/100 [==============================] - 51s 508ms/step - loss: 0.6070 - acc: 0.6820 - val_loss: 0.6043 - val_acc: 0.6677

Epoch 00007: val_loss improved from 0.61640 to 0.60431, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 8/10
100/100 [==============================] - 50s 496ms/step - loss: 0.5877 - acc: 0.6880 - val_loss: 0.5896 - val_acc: 0.6925

Epoch 00008: val_loss improved from 0.60431 to 0.58959, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 9/10
100/100 [==============================] - 50s 501ms/step - loss: 0.5707 - acc: 0.6985 - val_loss: 0.6070 - val_acc: 0.6859

Epoch 00009: val_loss did not improve from 0.58959
Epoch 10/10
100/100 [==============================] - 84s 843ms/step - loss: 0.5452 - acc: 0.7260 - val_loss: 0.5729 - val_acc: 0.7125

Epoch 00010: val_loss improved from 0.58959 to 0.57293, saving model to ./gdrive/My Drive/fsi/weights.hdf5
```

Accuracy:

Loss:



Ejemplo 2: Cambio hyperparametros

```
model = Sequential()
model.add(Conv2D(32, kernel_size=(3, 3),
                 activation='relu',
                 input_shape=(150, 150, 3)))
model.add(MaxPooling2D(pool_size=(2, 2)))

#conv2d 64 to 128
model.add(Conv2D(128, (3, 3), activation='relu'))

model.add(MaxPooling2D(pool_size=(2, 2)))

#dropout 0.25 to 0.35
model.add(Dropout(0.35))

model.add(Flatten())
model.add(Dense(128, activation='relu'))

model.add(Dropout(0.5))
model.add(Dense(1, activation='sigmoid'))

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

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_________________________________________________________________
Layer (type)                 Output Shape              Param #
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_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 74, 74, 32)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 72, 72, 128)       36992
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 36, 36, 128)       0
_________________________________________________________________
dropout_1 (Dropout)          (None, 36, 36, 128)       0
_________________________________________________________________
flatten_1 (Flatten)          (None, 165888)            0
_________________________________________________________________
dense_1 (Dense)              (None, 128)               21233792
_________________________________________________________________
dropout_2 (Dropout)          (None, 128)               0
_________________________________________________________________
dense_2 (Dense)              (None, 1)                 129
=================================================================
Total params: 21,271,809
Trainable params: 21,271,809
Non-trainable params: 0
```
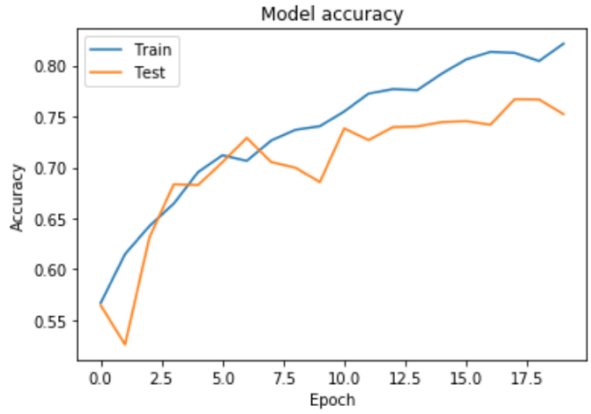

```
Epoch 1/20
100/100 [==============================] - 48s 480ms/step - loss: 0.7725 - acc: 0.5670 - val_loss: 0.6668 - val_acc: 0.5648

Epoch 00001: val_loss improved from inf to 0.66679, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 2/20
100/100 [==============================] - 40s 404ms/step - loss: 0.6694 - acc: 0.6150 - val_loss: 0.7846 - val_acc: 0.5262

Epoch 00002: val_loss did not improve from 0.66679
Epoch 3/20
100/100 [==============================] - 26s 264ms/step - loss: 0.6371 - acc: 0.6425 - val_loss: 0.6202 - val_acc: 0.6311

Epoch 00003: val_loss improved from 0.66679 to 0.62021, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 4/20
100/100 [==============================] - 28s 281ms/step - loss: 0.6236 - acc: 0.6645 - val_loss: 0.6007 - val_acc: 0.6835

Epoch 00004: val_loss improved from 0.62021 to 0.60073, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 5/20
100/100 [==============================] - 27s 271ms/step - loss: 0.5981 - acc: 0.6955 - val_loss: 0.5959 - val_acc: 0.6828

Epoch 00005: val_loss improved from 0.60073 to 0.59587, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 6/20
100/100 [==============================] - 28s 275ms/step - loss: 0.5777 - acc: 0.7120 - val_loss: 0.5863 - val_acc: 0.7052

Epoch 00006: val_loss improved from 0.59587 to 0.58634, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 7/20
100/100 [==============================] - 28s 282ms/step - loss: 0.5642 - acc: 0.7065 - val_loss: 0.5637 - val_acc: 0.7291
```

```
Epoch 00007: val_loss improved from 0.58634 to 0.56371, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 8/20
100/100 [==============================] - 27s 269ms/step - loss: 0.5497 - acc: 0.7265 - val_loss: 0.5636 - val_acc: 0.7053

Epoch 00008: val_loss improved from 0.56371 to 0.56355, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 9/20
100/100 [==============================] - 28s 284ms/step - loss: 0.5347 - acc: 0.7370 - val_loss: 0.5739 - val_acc: 0.6997

Epoch 00009: val_loss did not improve from 0.56355
Epoch 10/20
100/100 [==============================] - 26s 265ms/step - loss: 0.5177 - acc: 0.7405 - val_loss: 0.5853 - val_acc: 0.6857

Epoch 00010: val_loss did not improve from 0.56355
Epoch 11/20
100/100 [==============================] - 26s 264ms/step - loss: 0.5084 - acc: 0.7550 - val_loss: 0.5242 - val_acc: 0.7384

Epoch 00011: val_loss improved from 0.56355 to 0.52420, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 12/20
100/100 [==============================] - 29s 286ms/step - loss: 0.4863 - acc: 0.7725 - val_loss: 0.5455 - val_acc: 0.7269

Epoch 00012: val_loss did not improve from 0.52420
Epoch 13/20
100/100 [==============================] - 27s 265ms/step - loss: 0.4806 - acc: 0.7770 - val_loss: 0.5424 - val_acc: 0.7396

Epoch 00013: val_loss did not improve from 0.52420
Epoch 14/20
100/100 [==============================] - 26s 264ms/step - loss: 0.4664 - acc: 0.7760 - val_loss: 0.5315 - val_acc: 0.7403


Epoch 00014: val_loss did not improve from 0.52420
Epoch 15/20
100/100 [==============================] - 28s 284ms/step - loss: 0.4440 - acc: 0.7920 - val_loss: 0.5233 - val_acc: 0.7444

Epoch 00015: val_loss improved from 0.52420 to 0.52329, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 16/20
100/100 [==============================] - 29s 289ms/step - loss: 0.4120 - acc: 0.8060 - val_loss: 0.5359 - val_acc: 0.7455

Epoch 00016: val_loss did not improve from 0.52329
Epoch 17/20
100/100 [==============================] - 27s 273ms/step - loss: 0.4237 - acc: 0.8135 - val_loss: 0.5140 - val_acc: 0.7419

Epoch 00017: val_loss improved from 0.52329 to 0.51399, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 18/20
100/100 [==============================] - 28s 282ms/step - loss: 0.3974 - acc: 0.8125 - val_loss: 0.5082 - val_acc: 0.7671

Epoch 00018: val_loss improved from 0.51399 to 0.50817, saving model to ./gdrive/My Drive/fsi/weights.hdf5
Epoch 19/20
100/100 [==============================] - 27s 268ms/step - loss: 0.4113 - acc: 0.8045 - val_loss: 0.5192 - val_acc: 0.7668

Epoch 00019: val_loss did not improve from 0.50817
Epoch 20/20
100/100 [==============================] - 27s 275ms/step - loss: 0.4059 - acc: 0.8215 - val_loss: 0.5818 - val_acc: 0.7524

Epoch 00020: val_loss did not improve from 0.50817
```

Accuracy:



Loss: