```
 1 D:\OneDrive\TFG\TFG_Python\venv\Scripts\python.exe C:\
   Users\elias\AppData\Local\JetBrains\Toolbox\apps\PyCharm-P
   \ch-0\183.4284.139\helpers\pydev\pydevconsole.py --mode=
   client --port=63571
 2
 3 import sys; print('Python %s on %s' % (sys.version, sys.
   platform))
 4 sys.path.extend(['D:\\OneDrive\\TFG\\TFG_Python', 'D:/
   OneDrive/TFG/TFG_Python'])
 5
 6 PyDev console: starting.
 7
 8 Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [
   MSC v.1900 64 bit (AMD64)] on win32
 9 >>> runfile('D:/OneDrive/TFG/TFG_Python/core/model.py',
   wdir='D:/OneDrive/TFG/TFG_Python/core')
10 Using TensorFlow backend.
11 >>> model_training()
12 ISBINARY: True
13 tipo
14 benign           2510
15 malignant        2510
16 premalignant     2510
17 dtype: int64
18 Valid gen: Img leidas= 0
19 Valid gen: Img leidas= 100
20 Valid gen: Img leidas= 200
21 Valid gen: Img leidas= 300
22 Valid gen: Img leidas= 400
23 Valid gen: Img leidas= 500
24 Valid gen: Img leidas= 600
25 Valid gen: Img leidas= 700
26 Valid gen: Img leidas= 800
27 Valid gen: Img leidas= 900
28 Valid gen: Img leidas= 1000
29 Valid gen: Img leidas= 1100
30 Valid gen: Img leidas= 1200
31 Creando modelo y compilandolo
32 2019-04-26 21:47:51.174757: I tensorflow/core/platform/
   cpu_feature_guard.cc:141] Your CPU supports instructions
   that this TensorFlow binary was not compiled to use: AVX2
33 2019-04-26 21:47:51.433808: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:1432] Found device 0 with
    properties:
34 name: GeForce GTX 1070 major: 6 minor: 1 memoryClockRate(
```

```
34  GHz): 1.835
35  pciBusID: 0000:26:00.0
36  totalMemory: 8.00GiB freeMemory: 6.64GiB
37  2019-04-26 21:47:51.520662: I tensorflow/core/
    common_runtime/gpu/gpu_device.cc:1511] Adding visible gpu
    devices: 0
38  2019-04-26 21:47:55.806840: I tensorflow/core/
    common_runtime/gpu/gpu_device.cc:982] Device interconnect
    StreamExecutor with strength 1 edge matrix:
39  2019-04-26 21:47:55.806936: I tensorflow/core/
    common_runtime/gpu/gpu_device.cc:988]      0
40  2019-04-26 21:47:55.806994: I tensorflow/core/
    common_runtime/gpu/gpu_device.cc:1001] 0:   N
41  2019-04-26 21:47:55.856462: I tensorflow/core/
    common_runtime/gpu/gpu_device.cc:1115] Created TensorFlow
    device (/job:localhost/replica:0/task:0/device:GPU:0 with
    6397 MB memory) -> physical GPU (device: 0, name: GeForce
    GTX 1070, pci bus id: 0000:26:00.0, compute capability: 6.
    1)
42  Se comienza el entrenamiento del modelo
43  ['loss', 'acc']
44  Epoch 1/40
45  2019-04-26 21:49:23.866840: W tensorflow/core/
    common_runtime/bfc_allocator.cc:211] Allocator (GPU_0_bfc
    ) ran out of memory trying to allocate 2.03GiB. The caller
     indicates that this is not a failure, but may mean that
    there could be performance gains if more memory were
    available.
46  2019-04-26 21:49:24.035628: W tensorflow/core/
    common_runtime/bfc_allocator.cc:211] Allocator (GPU_0_bfc
    ) ran out of memory trying to allocate 2.00GiB. The caller
     indicates that this is not a failure, but may mean that
    there could be performance gains if more memory were
    available.
47  2019-04-26 21:49:24.038490: W tensorflow/core/
    common_runtime/bfc_allocator.cc:211] Allocator (GPU_0_bfc
    ) ran out of memory trying to allocate 2.15GiB. The caller
     indicates that this is not a failure, but may mean that
    there could be performance gains if more memory were
    available.
48   - 108s - loss: 0.6450 - acc: 0.7250 - val_loss: 2.0539 -
    val_acc: 0.5651
49  Epoch 2/40
50   - 74s - loss: 0.4198 - acc: 0.8385 - val_loss: 0.5179 -
    val_acc: 0.7859
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51 Epoch 3/40
52  - 64s - loss: 0.4228 - acc: 0.8083 - val_loss: 0.5773 -
   val_acc: 0.7950
53 Epoch 4/40
54  - 74s - loss: 0.3709 - acc: 0.8531 - val_loss: 0.5941 -
   val_acc: 0.7959
55 Epoch 5/40
56  - 61s - loss: 0.3461 - acc: 0.8542 - val_loss: 0.5595 -
   val_acc: 0.7917
57 Epoch 6/40
58  - 60s - loss: 0.3288 - acc: 0.8719 - val_loss: 0.3878 -
   val_acc: 0.8257
59 Epoch 7/40
60  - 66s - loss: 0.3221 - acc: 0.8750 - val_loss: 0.5416 -
   val_acc: 0.7469
61 Epoch 8/40
62  - 64s - loss: 0.3685 - acc: 0.8500 - val_loss: 0.4134 -
   val_acc: 0.8149
63 Epoch 9/40
64  - 67s - loss: 0.2770 - acc: 0.8948 - val_loss: 0.3964 -
   val_acc: 0.8299
65 Epoch 10/40
66  - 57s - loss: 0.2489 - acc: 0.9010 - val_loss: 0.4039 -
   val_acc: 0.8224
67 Epoch 11/40
68  - 60s - loss: 0.2211 - acc: 0.9125 - val_loss: 0.5233 -
   val_acc: 0.7942
69
70 Epoch 00011: ReduceLROnPlateau reducing learning rate to 0
   .0002000000094949026.
71 Epoch 12/40
72  - 61s - loss: 0.2017 - acc: 0.9198 - val_loss: 0.3718 -
   val_acc: 0.8556
73 Epoch 13/40
74  - 61s - loss: 0.1792 - acc: 0.9375 - val_loss: 0.3486 -
   val_acc: 0.8705
75 Epoch 14/40
76  - 60s - loss: 0.1427 - acc: 0.9500 - val_loss: 0.3564 -
   val_acc: 0.8672
77 Epoch 15/40
78  - 59s - loss: 0.1355 - acc: 0.9490 - val_loss: 0.3375 -
   val_acc: 0.8697
79 Epoch 16/40
80  - 60s - loss: 0.1332 - acc: 0.9469 - val_loss: 0.3363 -
   val_acc: 0.8714
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 81 Epoch 17/40
 82  - 53s - loss: 0.1271 - acc: 0.9531 - val_loss: 0.3414 -
    val_acc: 0.8805
 83 Epoch 18/40
 84  - 68s - loss: 0.1253 - acc: 0.9521 - val_loss: 0.3355 -
    val_acc: 0.8714
 85 Epoch 19/40
 86  - 78s - loss: 0.1247 - acc: 0.9500 - val_loss: 0.3816 -
    val_acc: 0.8631
 87 Epoch 20/40
 88  - 84s - loss: 0.0702 - acc: 0.9823 - val_loss: 0.3583 -
    val_acc: 0.8689
 89 Epoch 21/40
 90  - 56s - loss: 0.1035 - acc: 0.9615 - val_loss: 0.3382 -
    val_acc: 0.8747
 91 Epoch 22/40
 92  - 69s - loss: 0.0806 - acc: 0.9750 - val_loss: 0.4110 -
    val_acc: 0.8589
 93 Epoch 23/40
 94  - 60s - loss: 0.0802 - acc: 0.9698 - val_loss: 0.4198 -
    val_acc: 0.8647
 95
 96 Epoch 00023: ReduceLROnPlateau reducing learning rate to
    2.0000000949949027e-05.
 97 Epoch 24/40
 98  - 63s - loss: 0.0827 - acc: 0.9750 - val_loss: 0.3913 -
    val_acc: 0.8755
 99 Epoch 25/40
100  - 56s - loss: 0.0800 - acc: 0.9750 - val_loss: 0.3815 -
    val_acc: 0.8797
101 Epoch 26/40
102  - 57s - loss: 0.0535 - acc: 0.9844 - val_loss: 0.3693 -
    val_acc: 0.8772
103 Epoch 27/40
104  - 55s - loss: 0.0508 - acc: 0.9823 - val_loss: 0.3668 -
    val_acc: 0.8772
105 Epoch 28/40
106  - 57s - loss: 0.0629 - acc: 0.9802 - val_loss: 0.3603 -
    val_acc: 0.8788
107
108 Epoch 00028: ReduceLROnPlateau reducing learning rate to
    2.000001313746906e-06.
109 Entrenamiento completado, se procede al test final
110
111   32/1506 [..............................] - ETA: 1:02
```

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112    64/1506 [>................................] - ETA: 35s
113    96/1506 [>................................] - ETA: 26s
114   128/1506 [=>...............................] - ETA: 21s
115   160/1506 [==>..............................] - ETA: 18s
116   192/1506 [==>..............................] - ETA: 16s
117   224/1506 [===>.............................] - ETA: 15s
118   256/1506 [====>............................] - ETA: 14s
119   288/1506 [====>............................] - ETA: 13s
120   320/1506 [=====>...........................] - ETA: 12s
121   352/1506 [======>..........................] - ETA: 11s
122   384/1506 [======>..........................] - ETA: 10s
123   416/1506 [=======>.........................] - ETA: 10s
124   448/1506 [=======>.........................] - ETA: 9s
125   480/1506 [========>........................] - ETA: 9s
126   512/1506 [=========>.......................] - ETA: 8s
127   544/1506 [=========>.......................] - ETA: 8s
128   576/1506 [==========>......................] - ETA: 8s
129   608/1506 [==========>......................] - ETA: 7s
130   640/1506 [===========>.....................] - ETA: 7s
131   672/1506 [===========>.....................] - ETA: 7s
132   704/1506 [============>....................] - ETA: 6s
133   736/1506 [============>....................] - ETA: 6s
134   768/1506 [=============>...................] - ETA: 6s
135   800/1506 [==============>..................] - ETA: 5s
136   832/1506 [==============>..................] - ETA: 5s
137   864/1506 [===============>.................] - ETA: 5s
138   896/1506 [===============>.................] - ETA: 4s
139   928/1506 [================>................] - ETA: 4s
140   960/1506 [=================>...............] - ETA: 4s
141   992/1506 [=================>...............] - ETA: 4s
142  1024/1506 [==================>..............] - ETA: 3s
143  1056/1506 [==================>..............] - ETA: 3s
144  1088/1506 [===================>.............] - ETA: 3s
145  1120/1506 [===================>............] - ETA: 3s
146  1152/1506 [====================>...........] - ETA: 2s
147  1184/1506 [=====================>..........] - ETA: 2s
148  1216/1506 [=====================>.........] - ETA: 2s
149  1248/1506 [======================>........] - ETA: 1s
150  1280/1506 [=======================>.......] - ETA: 1s
151  1312/1506 [=======================>......] - ETA: 1s
152  1344/1506 [========================>.....] - ETA: 1s
153  1376/1506 [=========================>....] - ETA: 0s
154  1408/1506 [=========================>...] - ETA: 0s
155  1440/1506 [==========================>..] - ETA: 0s
156  1472/1506 [==========================>.] - ETA: 0s
```

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157 1504/1506 [============================>.] - ETA: 0s
158 1506/1506 [=============================] - 12s 8ms/step
159 ['loss', 'acc']
160 [0.30906463089890057, 0.8891102257636122]
161 Ahora vamos a dibujar la matriz de confusion
162 ['benign', 'premalignant', 'malignant']
163 Normalized confusion matrix
164 [[0.87878788 0.11363636 0.00757576]
165  [0.19661734 0.794926   0.00845666]
166  [0.00594059 0.00594059 0.98811881]]
167 El entrenamiento ha llevado : 2150.4966452121735
168
```