```
 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=61900
 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 09:55:57.078189: 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 09:55:57.304315: 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 09:55:57.304488: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:1511] Adding visible gpu
   devices: 0
38 2019-04-26 09:55:59.340488: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:982] Device interconnect
   StreamExecutor with strength 1 edge matrix:
39 2019-04-26 09:55:59.340585: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:988]      0
40 2019-04-26 09:55:59.340708: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:1001] 0:   N
41 2019-04-26 09:55:59.340955: 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 09:57:18.893499: 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 09:57:18.977316: 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 09:57:18.980307: 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  - 95s - loss: 0.8350 - acc: 0.6844 - val_loss: 1.6892 -
   val_acc: 0.6299
49 Epoch 2/40
50  - 57s - loss: 0.6676 - acc: 0.7104 - val_loss: 0.7870 -
   val_acc: 0.7685
```

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Epoch 3/40
 - 66s - loss: 0.5979 - acc: 0.7292 - val_loss: 0.6685 -
   val_acc: 0.7378
Epoch 4/40
 - 60s - loss: 0.5635 - acc: 0.7604 - val_loss: 0.6975 -
   val_acc: 0.6946
Epoch 5/40
 - 63s - loss: 0.6179 - acc: 0.7344 - val_loss: 0.5082 -
   val_acc: 0.7668
Epoch 6/40
 - 64s - loss: 0.5741 - acc: 0.7365 - val_loss: 0.6239 -
   val_acc: 0.7369
Epoch 7/40
 - 64s - loss: 0.5841 - acc: 0.7406 - val_loss: 0.5176 -
   val_acc: 0.7577
Epoch 8/40
 - 64s - loss: 0.5182 - acc: 0.7656 - val_loss: 0.4912 -
   val_acc: 0.7826
Epoch 9/40
 - 57s - loss: 0.5336 - acc: 0.7479 - val_loss: 0.6533 -
   val_acc: 0.7178
Epoch 10/40
 - 59s - loss: 0.5045 - acc: 0.7615 - val_loss: 0.5134 -
   val_acc: 0.7685
Epoch 11/40
 - 61s - loss: 0.5280 - acc: 0.7615 - val_loss: 0.4497 -
   val_acc: 0.7942
Epoch 12/40
 - 60s - loss: 0.5142 - acc: 0.7708 - val_loss: 0.4493 -
   val_acc: 0.8025
Epoch 13/40
 - 56s - loss: 0.4936 - acc: 0.7583 - val_loss: 0.4636 -
   val_acc: 0.7967
Epoch 14/40
 - 57s - loss: 0.5099 - acc: 0.7521 - val_loss: 0.6343 -
   val_acc: 0.7261
Epoch 15/40
 - 57s - loss: 0.4322 - acc: 0.8115 - val_loss: 0.6704 -
   val_acc: 0.7054
Epoch 16/40
 - 60s - loss: 0.5113 - acc: 0.7750 - val_loss: 0.4571 -
   val_acc: 0.7934
Epoch 17/40
 - 59s - loss: 0.4990 - acc: 0.7740 - val_loss: 0.4485 -
   val_acc: 0.7959
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 81 Epoch 18/40
 82  - 53s - loss: 0.4152 - acc: 0.8073 - val_loss: 0.5137 -
    val_acc: 0.7701
 83 Epoch 19/40
 84  - 59s - loss: 0.4631 - acc: 0.7896 - val_loss: 0.4268 -
    val_acc: 0.8025
 85 Epoch 20/40
 86  - 59s - loss: 0.4992 - acc: 0.7594 - val_loss: 0.6709 -
    val_acc: 0.6846
 87 Epoch 21/40
 88  - 50s - loss: 0.4452 - acc: 0.7969 - val_loss: 0.4319 -
    val_acc: 0.8050
 89 Epoch 22/40
 90  - 57s - loss: 0.4886 - acc: 0.7656 - val_loss: 0.5567 -
    val_acc: 0.7734
 91 Epoch 23/40
 92  - 50s - loss: 0.4257 - acc: 0.8042 - val_loss: 0.4339 -
    val_acc: 0.7925
 93 Epoch 24/40
 94  - 55s - loss: 0.4442 - acc: 0.7740 - val_loss: 0.7134 -
    val_acc: 0.7095
 95
 96 Epoch 00024: ReduceLROnPlateau reducing learning rate to
    0.00020000000949949026.
 97 Epoch 25/40
 98  - 48s - loss: 0.4120 - acc: 0.7937 - val_loss: 0.4273 -
    val_acc: 0.8033
 99 Epoch 26/40
100  - 60s - loss: 0.4411 - acc: 0.7729 - val_loss: 0.4075 -
    val_acc: 0.8166
101 Epoch 27/40
102  - 62s - loss: 0.4501 - acc: 0.7729 - val_loss: 0.3964 -
    val_acc: 0.8216
103 Epoch 28/40
104  - 56s - loss: 0.4228 - acc: 0.7771 - val_loss: 0.3983 -
    val_acc: 0.8191
105 Epoch 29/40
106  - 52s - loss: 0.3814 - acc: 0.8073 - val_loss: 0.3952 -
    val_acc: 0.8191
107 Epoch 30/40
108  - 60s - loss: 0.4098 - acc: 0.8021 - val_loss: 0.3944 -
    val_acc: 0.8224
109 Epoch 31/40
110  - 63s - loss: 0.3990 - acc: 0.8156 - val_loss: 0.3917 -
    val_acc: 0.8232
```

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111 Epoch 32/40
112  - 57s - loss: 0.4060 - acc: 0.7906 - val_loss: 0.4021 -
    val_acc: 0.8133
113 Epoch 33/40
114  - 59s - loss: 0.3519 - acc: 0.8229 - val_loss: 0.3918 -
    val_acc: 0.8174
115 Epoch 34/40
116  - 61s - loss: 0.3936 - acc: 0.8125 - val_loss: 0.3951 -
    val_acc: 0.8116
117 Epoch 35/40
118  - 59s - loss: 0.3890 - acc: 0.8240 - val_loss: 0.3897 -
    val_acc: 0.8183
119 Epoch 36/40
120  - 53s - loss: 0.3842 - acc: 0.8156 - val_loss: 0.3924 -
    val_acc: 0.8141
121 Epoch 37/40
122  - 57s - loss: 0.3951 - acc: 0.7990 - val_loss: 0.3935 -
    val_acc: 0.8207
123 Epoch 38/40
124  - 47s - loss: 0.4116 - acc: 0.8031 - val_loss: 0.3870 -
    val_acc: 0.8149
125 Epoch 39/40
126  - 62s - loss: 0.3704 - acc: 0.8229 - val_loss: 0.4020 -
    val_acc: 0.8141
127 Epoch 40/40
128  - 61s - loss: 0.3981 - acc: 0.8344 - val_loss: 0.3894 -
    val_acc: 0.8216
129 Entrenamiento completado, se procede al test final
130
131   32/1506 [..............................] - ETA: 10s
132   64/1506 [>.............................] - ETA: 9s
133   96/1506 [>.............................] - ETA: 9s
134  128/1506 [=>............................] - ETA: 8s
135  160/1506 [==>...........................] - ETA: 8s
136  192/1506 [==>...........................] - ETA: 8s
137  224/1506 [===>..........................] - ETA: 8s
138  256/1506 [====>.........................] - ETA: 8s
139  288/1506 [====>.........................] - ETA: 7s
140  320/1506 [=====>........................] - ETA: 7s
141  352/1506 [======>.......................] - ETA: 7s
142  384/1506 [======>.......................] - ETA: 7s
143  416/1506 [=======>......................] - ETA: 6s
144  448/1506 [=======>......................] - ETA: 6s
145  480/1506 [========>.....................] - ETA: 6s
146  512/1506 [=========>....................] - ETA: 6s
```

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147  544/1506 [=========>....................] - ETA: 6s
148  576/1506 [==========>...................] - ETA: 5s
149  608/1506 [===========>..................] - ETA: 5s
150  640/1506 [===========>..................] - ETA: 5s
151  672/1506 [============>.................] - ETA: 5s
152  704/1506 [=============>................] - ETA: 5s
153  736/1506 [=============>................] - ETA: 4s
154  768/1506 [==============>...............] - ETA: 4s
155  800/1506 [==============>...............] - ETA: 4s
156  832/1506 [===============>..............] - ETA: 4s
157  864/1506 [================>.............] - ETA: 4s
158  896/1506 [================>.............] - ETA: 3s
159  928/1506 [=================>............] - ETA: 3s
160  960/1506 [==================>...........] - ETA: 3s
161  992/1506 [==================>...........] - ETA: 3s
162 1024/1506 [===================>..........] - ETA: 3s
163 1056/1506 [====================>.........] - ETA: 2s
164 1088/1506 [====================>.........] - ETA: 2s
165 1120/1506 [=====================>........] - ETA: 2s
166 1152/1506 [=====================>........] - ETA: 2s
167 1184/1506 [======================>.......] - ETA: 2s
168 1216/1506 [======================>.......] - ETA: 1s
169 1248/1506 [=======================>......] - ETA: 1s
170 1280/1506 [========================>.....] - ETA: 1s
171 1312/1506 [========================>.....] - ETA: 1s
172 1344/1506 [=========================>....] - ETA: 1s
173 1376/1506 [=========================>....] - ETA: 0s
174 1408/1506 [==========================>...] - ETA: 0s
175 1440/1506 [==========================>...] - ETA: 0s
176 1472/1506 [===========================>..] - ETA: 0s
177 1504/1506 [===========================>..] - ETA: 0s
178 1506/1506 [==============================] - 10s 7ms/step
179 ['loss', 'acc']
180 [0.37520910377996375, 0.8359893758300133]
181 Ahora vamos a dibujar la matriz de confusion
182 ['benign', 'premalignant', 'malignant']
183 Normalized confusion matrix
184 [[0.73737374 0.22626263 0.03636364]
185  [0.21686747 0.77710843 0.0060241 ]
186  [0.00779727 0.00389864 0.98830409]]
187 El entrenamiento ha llevado : 2708.389142513275
188
```