```
 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=62572
 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 13:33:59.237991: 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 13:33:59.472377: 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 13:33:59.472549: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:1511] Adding visible gpu
   devices: 0
38 2019-04-26 13:34:01.482352: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:982] Device interconnect
   StreamExecutor with strength 1 edge matrix:
39 2019-04-26 13:34:01.482446: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:988]      0
40 2019-04-26 13:34:01.482496: I tensorflow/core/
   common_runtime/gpu/gpu_device.cc:1001] 0:   N
41 2019-04-26 13:34:01.482666: 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 13:35:24.827847: 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 13:35:24.913257: 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 13:35:24.916109: 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  - 98s - loss: 1.6062 - acc: 0.4896 - val_loss: 9.3886 -
   val_acc: 0.3353
49 Epoch 2/40
50  - 62s - loss: 0.9700 - acc: 0.5823 - val_loss: 7.9794 -
   val_acc: 0.4324
```

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Epoch 3/40
 - 69s - loss: 1.2113 - acc: 0.5896 - val_loss: 6.0826 -
val_acc: 0.4373
Epoch 4/40
 - 69s - loss: 1.1645 - acc: 0.6156 - val_loss: 2.7876 -
val_acc: 0.5950
Epoch 5/40
 - 64s - loss: 0.7013 - acc: 0.6198 - val_loss: 1.2557 -
val_acc: 0.5892
Epoch 6/40
 - 62s - loss: 0.6927 - acc: 0.6146 - val_loss: 0.7170 -
val_acc: 0.6656
Epoch 7/40
 - 62s - loss: 0.8241 - acc: 0.6125 - val_loss: 2.1047 -
val_acc: 0.6340
Epoch 8/40
 - 58s - loss: 0.6333 - acc: 0.7260 - val_loss: 2.8702 -
val_acc: 0.5046
Epoch 9/40
 - 55s - loss: 0.5937 - acc: 0.7354 - val_loss: 0.8104 -
val_acc: 0.6996
Epoch 10/40
 - 55s - loss: 0.5706 - acc: 0.7563 - val_loss: 0.6572 -
val_acc: 0.7286
Epoch 11/40
 - 48s - loss: 0.5188 - acc: 0.7594 - val_loss: 0.8056 -
val_acc: 0.7012
Epoch 12/40
 - 57s - loss: 0.5612 - acc: 0.7573 - val_loss: 0.5869 -
val_acc: 0.7477
Epoch 13/40
 - 60s - loss: 0.6229 - acc: 0.7417 - val_loss: 0.6095 -
val_acc: 0.7187
Epoch 14/40
 - 60s - loss: 0.5924 - acc: 0.7469 - val_loss: 0.6353 -
val_acc: 0.7436
Epoch 15/40
 - 55s - loss: 0.5588 - acc: 0.7604 - val_loss: 1.9610 -
val_acc: 0.4116
Epoch 16/40
 - 59s - loss: 0.5876 - acc: 0.7583 - val_loss: 1.6596 -
val_acc: 0.4656
Epoch 17/40
 - 59s - loss: 0.5425 - acc: 0.7583 - val_loss: 1.0735 -
val_acc: 0.6100
```

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 81
 82 Epoch 00017: ReduceLROnPlateau reducing learning rate to
    0.0029999999932944775.
 83 Epoch 18/40
 84  - 55s - loss: 0.4704 - acc: 0.7823 - val_loss: 0.7579 -
    val_acc: 0.6938
 85 Epoch 19/40
 86  - 60s - loss: 0.5215 - acc: 0.7656 - val_loss: 0.6394 -
    val_acc: 0.7203
 87 Epoch 20/40
 88  - 55s - loss: 0.4927 - acc: 0.7604 - val_loss: 0.5258 -
    val_acc: 0.7643
 89 Epoch 21/40
 90  - 55s - loss: 0.5257 - acc: 0.7802 - val_loss: 0.5064 -
    val_acc: 0.7726
 91 Epoch 22/40
 92  - 52s - loss: 0.4866 - acc: 0.7781 - val_loss: 0.4808 -
    val_acc: 0.7817
 93 Epoch 23/40
 94  - 50s - loss: 0.5310 - acc: 0.7792 - val_loss: 0.4726 -
    val_acc: 0.7942
 95 Epoch 24/40
 96  - 62s - loss: 0.4671 - acc: 0.7937 - val_loss: 0.4613 -
    val_acc: 0.7942
 97 Epoch 25/40
 98  - 65s - loss: 0.5366 - acc: 0.7594 - val_loss: 0.4794 -
    val_acc: 0.7925
 99 Epoch 26/40
100  - 53s - loss: 0.4614 - acc: 0.7865 - val_loss: 0.4597 -
    val_acc: 0.7884
101 Epoch 27/40
102  - 62s - loss: 0.4668 - acc: 0.7917 - val_loss: 0.4626 -
    val_acc: 0.7967
103 Epoch 28/40
104  - 63s - loss: 0.4985 - acc: 0.7729 - val_loss: 0.4537 -
    val_acc: 0.7892
105 Epoch 29/40
106  - 54s - loss: 0.5176 - acc: 0.7771 - val_loss: 0.4547 -
    val_acc: 0.7851
107 Epoch 30/40
108  - 59s - loss: 0.4662 - acc: 0.7833 - val_loss: 0.4521 -
    val_acc: 0.7975
109 Epoch 31/40
110  - 51s - loss: 0.5288 - acc: 0.7979 - val_loss: 0.4663 -
    val_acc: 0.7842
```

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111 Epoch 32/40
112  - 62s - loss: 0.5234 - acc: 0.7469 - val_loss: 0.4935 -
    val_acc: 0.7884
113 Epoch 33/40
114  - 56s - loss: 0.4894 - acc: 0.7885 - val_loss: 0.4593 -
    val_acc: 0.8033
115 Epoch 34/40
116  - 62s - loss: 0.4827 - acc: 0.7667 - val_loss: 0.4632 -
    val_acc: 0.7967
117 Epoch 35/40
118  - 53s - loss: 0.4898 - acc: 0.7771 - val_loss: 0.4706 -
    val_acc: 0.8058
119
120 Epoch 00035: ReduceLROnPlateau reducing learning rate to
    0.00030000000260770325.
121 Epoch 36/40
122  - 59s - loss: 0.5079 - acc: 0.7750 - val_loss: 0.4575 -
    val_acc: 0.8041
123 Epoch 37/40
124  - 46s - loss: 0.4910 - acc: 0.7667 - val_loss: 0.4558 -
    val_acc: 0.8017
125 Epoch 38/40
126  - 65s - loss: 0.4963 - acc: 0.7677 - val_loss: 0.4550 -
    val_acc: 0.8008
127 Epoch 39/40
128  - 51s - loss: 0.4585 - acc: 0.7760 - val_loss: 0.4546 -
    val_acc: 0.8017
129 Epoch 40/40
130  - 59s - loss: 0.4876 - acc: 0.7750 - val_loss: 0.4457 -
    val_acc: 0.8017
131 Entrenamiento completado, se procede al test final
132
133   32/1506 [..............................] - ETA: 10s
134   64/1506 [>.............................] - ETA: 9s
135   96/1506 [>.............................] - ETA: 9s
136  128/1506 [=>............................] - ETA: 9s
137  160/1506 [==>...........................] - ETA: 8s
138  192/1506 [==>...........................] - ETA: 8s
139  224/1506 [===>..........................] - ETA: 8s
140  256/1506 [====>.........................] - ETA: 8s
141  288/1506 [====>.........................] - ETA: 7s
142  320/1506 [=====>........................] - ETA: 7s
143  352/1506 [======>.......................] - ETA: 7s
144  384/1506 [======>.......................] - ETA: 7s
145  416/1506 [=======>......................] - ETA: 7s
```

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146  448/1506 [=======>......................] - ETA: 6s
147  480/1506 [========>.....................] - ETA: 6s
148  512/1506 [=========>....................] - ETA: 6s
149  544/1506 [=========>....................] - ETA: 6s
150  576/1506 [==========>...................] - ETA: 5s
151  608/1506 [===========>..................] - ETA: 5s
152  640/1506 [===========>..................] - ETA: 5s
153  672/1506 [============>.................] - ETA: 5s
154  704/1506 [=============>................] - ETA: 5s
155  736/1506 [=============>................] - ETA: 4s
156  768/1506 [==============>...............] - ETA: 4s
157  800/1506 [==============>...............] - ETA: 4s
158  832/1506 [===============>..............] - ETA: 4s
159  864/1506 [================>.............] - ETA: 4s
160  896/1506 [================>.............] - ETA: 3s
161  928/1506 [=================>............] - ETA: 3s
162  960/1506 [==================>...........] - ETA: 3s
163  992/1506 [==================>...........] - ETA: 3s
164 1024/1506 [===================>..........] - ETA: 3s
165 1056/1506 [====================>.........] - ETA: 2s
166 1088/1506 [====================>.........] - ETA: 2s
167 1120/1506 [=====================>........] - ETA: 2s
168 1152/1506 [=====================>........] - ETA: 2s
169 1184/1506 [======================>.......] - ETA: 2s
170 1216/1506 [======================>......] - ETA: 1s
171 1248/1506 [======================>......] - ETA: 1s
172 1280/1506 [=======================>.....] - ETA: 1s
173 1312/1506 [========================>....] - ETA: 1s
174 1344/1506 [========================>....] - ETA: 1s
175 1376/1506 [=========================>...] - ETA: 0s
176 1408/1506 [==========================>..] - ETA: 0s
177 1440/1506 [==========================>..] - ETA: 0s
178 1472/1506 [===========================>.] - ETA: 0s
179 1504/1506 [===========================>.] - ETA: 0s
180 1506/1506 [==============================] - 10s 7ms/step
181 ['loss', 'acc']
182 [0.47219474358387675, 0.7808764940239044]
183 Ahora vamos a dibujar la matriz de confusion
184 ['benign', 'premalignant', 'malignant']
185 Normalized confusion matrix
186 [[0.56299213 0.38779528 0.0492126 ]
187  [0.17821782 0.8039604  0.01782178]
188  [0.01014199 0.00811359 0.98174442]]
189 El entrenamiento ha llevado : 2702.940994977951
190
```