

```
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=51433
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 ISBINARY: True
12 tipo
13 benign          2510
14 malignant       2510
15 premalignant    2510
16 dtype: int64
17 Valid gen: Img leidas= 0
18 Valid gen: Img leidas= 100
19 Valid gen: Img leidas= 200
20 Valid gen: Img leidas= 300
21 Valid gen: Img leidas= 400
22 Valid gen: Img leidas= 500
23 Valid gen: Img leidas= 600
24 Valid gen: Img leidas= 700
25 Valid gen: Img leidas= 800
26 Valid gen: Img leidas= 900
27 Valid gen: Img leidas= 1000
28 Valid gen: Img leidas= 1100
29 Valid gen: Img leidas= 1200
30 Creando modelo y compilandolo
31 2019-04-27 14:21:53.212086: I tensorflow/core/platform/
  cpu_feature_guard.cc:141] Your CPU supports instructions
  that this TensorFlow binary was not compiled to use: AVX2
32 2019-04-27 14:21:53.453777: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:1432] Found device 0 with
  properties:
33 name: GeForce GTX 1070 major: 6 minor: 1 memoryClockRate(
  GHz): 1.835
```

```
34 pciBusID: 0000:26:00.0
35 totalMemory: 8.00GiB freeMemory: 6.64GiB
36 2019-04-27 14:21:53.453960: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:1511] Adding visible gpu
  devices: 0
37 2019-04-27 14:21:56.327582: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:982] Device interconnect
  StreamExecutor with strength 1 edge matrix:
38 2019-04-27 14:21:56.327679: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:988] 0
39 2019-04-27 14:21:56.327732: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:1001] 0: N
40 2019-04-27 14:21:56.343448: 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)
41 Se comienza el entrenamiento del modelo
42 ['loss', 'acc']
43 Epoch 1/40
44 2019-04-27 14:23:14.828426: 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.
45 2019-04-27 14:23:14.831349: 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.
46 - 83s - loss: 0.8191 - acc: 0.6552 - val_loss: 0.7091 -
  val_acc: 0.7419
47 Epoch 2/40
48 - 52s - loss: 0.5734 - acc: 0.7604 - val_loss: 2.0810 -
  val_acc: 0.5336
49 Epoch 3/40
50 - 68s - loss: 0.5328 - acc: 0.7542 - val_loss: 0.9884 -
  val_acc: 0.7768
51 Epoch 4/40
52 - 62s - loss: 0.4965 - acc: 0.7917 - val_loss: 0.6781 -
  val_acc: 0.7237
53 Epoch 5/40
```

```
54 - 64s - loss: 0.4642 - acc: 0.7937 - val_loss: 1.3226 -  
    val_acc: 0.6996  
55 Epoch 6/40  
56 - 58s - loss: 0.4572 - acc: 0.8094 - val_loss: 0.8235 -  
    val_acc: 0.7892  
57 Epoch 7/40  
58 - 58s - loss: 0.4423 - acc: 0.8240 - val_loss: 6.1448 -  
    val_acc: 0.3967  
59 Epoch 8/40  
60 - 55s - loss: 0.4311 - acc: 0.8188 - val_loss: 2.0697 -  
    val_acc: 0.6614  
61 Epoch 9/40  
62 - 59s - loss: 0.4293 - acc: 0.8385 - val_loss: 1.5646 -  
    val_acc: 0.7162  
63  
64 Epoch 00009: ReduceLROnPlateau reducing learning rate to 0  
    .000100000000474974513.  
65 Epoch 10/40  
66 - 53s - loss: 0.4487 - acc: 0.8281 - val_loss: 0.6725 -  
    val_acc: 0.8066  
67 Epoch 11/40  
68 - 57s - loss: 0.3466 - acc: 0.8521 - val_loss: 0.4834 -  
    val_acc: 0.8108  
69 Epoch 12/40  
70 - 55s - loss: 0.3225 - acc: 0.8583 - val_loss: 0.4117 -  
    val_acc: 0.8481  
71 Epoch 13/40  
72 - 51s - loss: 0.2928 - acc: 0.8813 - val_loss: 0.3524 -  
    val_acc: 0.8415  
73 Epoch 14/40  
74 - 48s - loss: 0.2960 - acc: 0.8865 - val_loss: 0.3702 -  
    val_acc: 0.8398  
75 Epoch 15/40  
76 - 48s - loss: 0.2707 - acc: 0.8781 - val_loss: 0.3489 -  
    val_acc: 0.8473  
77 Epoch 16/40  
78 - 59s - loss: 0.2438 - acc: 0.8948 - val_loss: 0.3469 -  
    val_acc: 0.8515  
79 Epoch 17/40  
80 - 59s - loss: 0.2275 - acc: 0.9052 - val_loss: 0.3430 -  
    val_acc: 0.8581  
81 Epoch 18/40  
82 - 49s - loss: 0.2520 - acc: 0.8990 - val_loss: 0.3285 -  
    val_acc: 0.8606  
83 Epoch 19/40
```

```
84 - 55s - loss: 0.2603 - acc: 0.9062 - val_loss: 0.3537 -  
    val_acc: 0.8539  
85 Epoch 20/40  
86 - 58s - loss: 0.2204 - acc: 0.9115 - val_loss: 0.3416 -  
    val_acc: 0.8548  
87 Epoch 21/40  
88 - 54s - loss: 0.2166 - acc: 0.9240 - val_loss: 0.3268 -  
    val_acc: 0.8647  
89 Epoch 22/40  
90 - 47s - loss: 0.2012 - acc: 0.9229 - val_loss: 0.3390 -  
    val_acc: 0.8589  
91 Epoch 23/40  
92 - 61s - loss: 0.2053 - acc: 0.9219 - val_loss: 0.3609 -  
    val_acc: 0.8556  
93 Epoch 24/40  
94 - 59s - loss: 0.1785 - acc: 0.9385 - val_loss: 0.3379 -  
    val_acc: 0.8680  
95 Epoch 25/40  
96 - 60s - loss: 0.2145 - acc: 0.9229 - val_loss: 0.3414 -  
    val_acc: 0.8730  
97 Epoch 26/40  
98 - 60s - loss: 0.2018 - acc: 0.9219 - val_loss: 0.3458 -  
    val_acc: 0.8739  
99  
100 Epoch 00026: ReduceLROnPlateau reducing learning rate to  
    1.00000000474974514e-05.  
101 Epoch 27/40  
102 - 59s - loss: 0.1597 - acc: 0.9385 - val_loss: 0.3448 -  
    val_acc: 0.8755  
103 Epoch 28/40  
104 - 58s - loss: 0.1942 - acc: 0.9229 - val_loss: 0.3451 -  
    val_acc: 0.8780  
105 Epoch 29/40  
106 - 61s - loss: 0.1538 - acc: 0.9406 - val_loss: 0.3481 -  
    val_acc: 0.8797  
107 Epoch 30/40  
108 - 62s - loss: 0.1830 - acc: 0.9302 - val_loss: 0.3480 -  
    val_acc: 0.8805  
109 Epoch 31/40  
110 - 63s - loss: 0.1653 - acc: 0.9344 - val_loss: 0.3491 -  
    val_acc: 0.8797  
111  
112 Epoch 00031: ReduceLROnPlateau reducing learning rate to  
    1.00000000656873453e-06.  
113 Entrenamiento completado, se procede al test final
```

114			
115	32/1506	[.....]	- ETA: 10s
116	64/1506	[>.....]	- ETA: 9s
117	96/1506	[>.....]	- ETA: 9s
118	128/1506	[=>.....]	- ETA: 9s
119	160/1506	[==>.....]	- ETA: 8s
120	192/1506	[==>.....]	- ETA: 8s
121	224/1506	[===>.....]	- ETA: 8s
122	256/1506	[===>.....]	- ETA: 8s
123	288/1506	[===>.....]	- ETA: 8s
124	320/1506	[===>.....]	- ETA: 7s
125	352/1506	[===>.....]	- ETA: 7s
126	384/1506	[===>.....]	- ETA: 7s
127	416/1506	[===>.....]	- ETA: 7s
128	448/1506	[===>.....]	- ETA: 6s
129	480/1506	[===>.....]	- ETA: 6s
130	512/1506	[===>.....]	- ETA: 6s
131	544/1506	[===>.....]	- ETA: 6s
132	576/1506	[===>.....]	- ETA: 6s
133	608/1506	[===>.....]	- ETA: 5s
134	640/1506	[===>.....]	- ETA: 5s
135	672/1506	[===>.....]	- ETA: 5s
136	704/1506	[===>.....]	- ETA: 5s
137	736/1506	[===>.....]	- ETA: 5s
138	768/1506	[===>.....]	- ETA: 4s
139	800/1506	[===>.....]	- ETA: 4s
140	832/1506	[===>.....]	- ETA: 4s
141	864/1506	[===>.....]	- ETA: 4s
142	896/1506	[===>.....]	- ETA: 3s
143	928/1506	[===>.....]	- ETA: 3s
144	960/1506	[===>.....]	- ETA: 3s
145	992/1506	[===>.....]	- ETA: 3s
146	1024/1506	[===>.....]	- ETA: 3s
147	1056/1506	[===>.....]	- ETA: 2s
148	1088/1506	[===>.....]	- ETA: 2s
149	1120/1506	[===>.....]	- ETA: 2s
150	1152/1506	[===>.....]	- ETA: 2s
151	1184/1506	[===>.....]	- ETA: 2s
152	1216/1506	[===>.....]	- ETA: 1s
153	1248/1506	[===>.....]	- ETA: 1s
154	1280/1506	[===>.....]	- ETA: 1s
155	1312/1506	[===>.....]	- ETA: 1s
156	1344/1506	[===>.....]	- ETA: 1s
157	1376/1506	[===>.....]	- ETA: 0s
158	1408/1506	[===>..]	- ETA: 0s

```
159 1440/1506 [=====>..] - ETA: 0s
160 1472/1506 [=====>..] - ETA: 0s
161 1504/1506 [=====>..] - ETA: 0s
162 1506/1506 [=====] - 10s 7ms/step
163 ['loss', 'acc']
164 [0.27193028700462535, 0.8891102257636122]
165 Ahora vamos a dibujar la matriz de confusion
166 ['benign', 'prealignant', 'malignant']
167 Normalized confusion matrix
168 [[0.838      0.148      0.014      ]
169  [0.13438735 0.84782609 0.01778656]
170  [0.01       0.008      0.982      ]]
171 El entrenamiento ha llevado : 2066.351056575775
172
```