

```
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=53265
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 2019-04-28 11:17:24.444270: I tensorflow/core/platform/
  cpu_feature_guard.cc:141] Your CPU supports instructions
  that this TensorFlow binary was not compiled to use: AVX2
32 2019-04-28 11:17:24.683787: 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
```

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34 pciBusID: 0000:26:00.0
35 totalMemory: 8.00GiB freeMemory: 6.64GiB
36 2019-04-28 11:17:24.683975: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:1511] Adding visible gpu
  devices: 0
37 2019-04-28 11:17:27.930087: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:982] Device interconnect
  StreamExecutor with strength 1 edge matrix:
38 2019-04-28 11:17:27.930188: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:988]      0
39 2019-04-28 11:17:27.930245: I tensorflow/core/
  common_runtime/gpu/gpu_device.cc:1001] 0:    N
40 2019-04-28 11:17:27.930422: 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 - 69s - loss: 0.2123 - acc: 0.5188 - val_loss: 0.2018 -
  val_acc: 0.6515
45 Epoch 2/40
46 - 71s - loss: 0.1442 - acc: 0.6708 - val_loss: 0.2918 -
  val_acc: 0.5485
47 Epoch 3/40
48 - 59s - loss: 0.1302 - acc: 0.7208 - val_loss: 0.1736 -
  val_acc: 0.6332
49 Epoch 4/40
50 - 61s - loss: 0.1305 - acc: 0.7198 - val_loss: 0.2193 -
  val_acc: 0.6390
51 Epoch 5/40
52 - 63s - loss: 0.1364 - acc: 0.6833 - val_loss: 0.3878 -
  val_acc: 0.3220
53 Epoch 6/40
54 - 59s - loss: 0.1210 - acc: 0.7510 - val_loss: 0.3706 -
  val_acc: 0.3967
55 Epoch 7/40
56 - 61s - loss: 0.1264 - acc: 0.7521 - val_loss: 0.3353 -
  val_acc: 0.4855
57 Epoch 8/40
58 - 59s - loss: 0.1311 - acc: 0.7156 - val_loss: 0.2272 -
  val_acc: 0.6257
59
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60 Epoch 00008: ReduceLROnPlateau reducing learning rate to
    0.000100000000474974513.
61 Epoch 9/40
62 - 63s - loss: 0.0977 - acc: 0.7979 - val_loss: 0.1604 -
    val_acc: 0.7145
63 Epoch 10/40
64 - 56s - loss: 0.1017 - acc: 0.7802 - val_loss: 0.1330 -
    val_acc: 0.7519
65 Epoch 11/40
66 - 57s - loss: 0.1009 - acc: 0.7948 - val_loss: 0.1223 -
    val_acc: 0.7618
67 Epoch 12/40
68 - 56s - loss: 0.0952 - acc: 0.8135 - val_loss: 0.0970 -
    val_acc: 0.8033
69 Epoch 13/40
70 - 64s - loss: 0.0941 - acc: 0.8146 - val_loss: 0.0989 -
    val_acc: 0.7992
71 Epoch 14/40
72 - 55s - loss: 0.0856 - acc: 0.8219 - val_loss: 0.0895 -
    val_acc: 0.8224
73 Epoch 15/40
74 - 47s - loss: 0.0942 - acc: 0.7990 - val_loss: 0.0870 -
    val_acc: 0.8108
75 Epoch 16/40
76 - 50s - loss: 0.0919 - acc: 0.8042 - val_loss: 0.0921 -
    val_acc: 0.8158
77 Epoch 17/40
78 - 57s - loss: 0.0908 - acc: 0.8104 - val_loss: 0.0869 -
    val_acc: 0.8216
79 Epoch 18/40
80 - 55s - loss: 0.0886 - acc: 0.8073 - val_loss: 0.1037 -
    val_acc: 0.7685
81 Epoch 19/40
82 - 53s - loss: 0.0882 - acc: 0.8323 - val_loss: 0.0926 -
    val_acc: 0.8008
83 Epoch 20/40
84 - 49s - loss: 0.0803 - acc: 0.8490 - val_loss: 0.0874 -
    val_acc: 0.8141
85 Epoch 21/40
86 - 46s - loss: 0.0832 - acc: 0.8229 - val_loss: 0.0908 -
    val_acc: 0.8066
87 Epoch 22/40
88 - 50s - loss: 0.0874 - acc: 0.8208 - val_loss: 0.0922 -
    val_acc: 0.7892
89
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90 Epoch 00022: ReduceLROnPlateau reducing learning rate to
    1.0000000474974514e-05.
91 Epoch 23/40
92   - 62s - loss: 0.0757 - acc: 0.8500 - val_loss: 0.0831 -
    val_acc: 0.8158
93 Epoch 24/40
94   - 45s - loss: 0.0775 - acc: 0.8385 - val_loss: 0.0785 -
    val_acc: 0.8324
95 Epoch 25/40
96   - 46s - loss: 0.0718 - acc: 0.8417 - val_loss: 0.0747 -
    val_acc: 0.8382
97 Epoch 26/40
98   - 41s - loss: 0.0826 - acc: 0.8385 - val_loss: 0.0730 -
    val_acc: 0.8481
99 Epoch 27/40
100  - 49s - loss: 0.0764 - acc: 0.8458 - val_loss: 0.0736 -
    val_acc: 0.8448
101 Epoch 28/40
102  - 47s - loss: 0.0748 - acc: 0.8458 - val_loss: 0.0724 -
    val_acc: 0.8481
103 Epoch 29/40
104  - 51s - loss: 0.0834 - acc: 0.8281 - val_loss: 0.0718 -
    val_acc: 0.8506
105 Epoch 30/40
106  - 52s - loss: 0.0779 - acc: 0.8344 - val_loss: 0.0725 -
    val_acc: 0.8523
107 Epoch 31/40
108  - 48s - loss: 0.0764 - acc: 0.8365 - val_loss: 0.0728 -
    val_acc: 0.8556
109 Epoch 32/40
110  - 52s - loss: 0.0733 - acc: 0.8302 - val_loss: 0.0731 -
    val_acc: 0.8490
111 Epoch 33/40
112  - 44s - loss: 0.0681 - acc: 0.8656 - val_loss: 0.0718 -
    val_acc: 0.8523
113 Epoch 34/40
114  - 52s - loss: 0.0768 - acc: 0.8417 - val_loss: 0.0718 -
    val_acc: 0.8515
115
116 Epoch 00034: ReduceLROnPlateau reducing learning rate to
    1.0000000656873453e-06.
117 Epoch 35/40
118  - 50s - loss: 0.0793 - acc: 0.8354 - val_loss: 0.0717 -
    val_acc: 0.8515
119 Epoch 36/40
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120 - 51s - loss: 0.0757 - acc: 0.8448 - val_loss: 0.0718 -  
    val_acc: 0.8515  
121 Epoch 37/40  
122 - 57s - loss: 0.0748 - acc: 0.8458 - val_loss: 0.0719 -  
    val_acc: 0.8523  
123 Epoch 38/40  
124 - 51s - loss: 0.0802 - acc: 0.8323 - val_loss: 0.0718 -  
    val_acc: 0.8515  
125 Epoch 39/40  
126 - 50s - loss: 0.0785 - acc: 0.8323 - val_loss: 0.0716 -  
    val_acc: 0.8515  
127 Epoch 40/40  
128 - 52s - loss: 0.0844 - acc: 0.8208 - val_loss: 0.0716 -  
    val_acc: 0.8523  
129 Entrenamiento completado, se procede al test final  
130  
131 32/1506 [.....] - ETA: 5s  
132 64/1506 [>.....] - ETA: 5s  
133 96/1506 [>.....] - ETA: 5s  
134 128/1506 [=>.....] - ETA: 5s  
135 160/1506 [==>.....] - ETA: 4s  
136 192/1506 [==>.....] - ETA: 4s  
137 224/1506 [===>.....] - ETA: 4s  
138 256/1506 [===>.....] - ETA: 4s  
139 288/1506 [===>.....] - ETA: 4s  
140 320/1506 [====>.....] - ETA: 4s  
141 352/1506 [====>.....] - ETA: 4s  
142 384/1506 [====>.....] - ETA: 3s  
143 416/1506 [====>.....] - ETA: 3s  
144 448/1506 [====>.....] - ETA: 3s  
145 480/1506 [====>.....] - ETA: 3s  
146 512/1506 [====>.....] - ETA: 3s  
147 544/1506 [====>.....] - ETA: 3s  
148 576/1506 [====>.....] - ETA: 3s  
149 608/1506 [====>.....] - ETA: 3s  
150 640/1506 [====>.....] - ETA: 2s  
151 672/1506 [====>.....] - ETA: 2s  
152 704/1506 [====>.....] - ETA: 2s  
153 736/1506 [====>.....] - ETA: 2s  
154 768/1506 [====>.....] - ETA: 2s  
155 800/1506 [====>.....] - ETA: 2s  
156 832/1506 [====>.....] - ETA: 2s  
157 864/1506 [====>.....] - ETA: 2s  
158 896/1506 [====>.....] - ETA: 2s  
159 928/1506 [====>.....] - ETA: 1s
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160 960/1506 [=====>.....] - ETA: 1s
161 992/1506 [=====>.....] - ETA: 1s
162 1024/1506 [=====>.....] - ETA: 1s
163 1056/1506 [=====>.....] - ETA: 1s
164 1088/1506 [=====>.....] - ETA: 1s
165 1120/1506 [=====>.....] - ETA: 1s
166 1152/1506 [=====>.....] - ETA: 1s
167 1184/1506 [=====>.....] - ETA: 1s
168 1216/1506 [=====>.....] - ETA: 0s
169 1248/1506 [=====>.....] - ETA: 0s
170 1280/1506 [=====>.....] - ETA: 0s
171 1312/1506 [=====>....] - ETA: 0s
172 1344/1506 [=====>....] - ETA: 0s
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 [=====] - 5s 4ms/step
179 ['loss', 'acc']
180 [0.08021423115752449, 0.8306772908366534]
181 Ahora vamos a dibujar la matriz de confusion
182 ['benign', 'prealignant', 'malignant']
183 Normalized confusion matrix
184 [[0.71653543 0.23622047 0.04724409]
185  [0.19560878 0.80239521 0.00199601]
186  [0.02012072 0.00402414 0.97585513]]
187 El entrenamiento ha llevado : 2421.7914485931396
188
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