

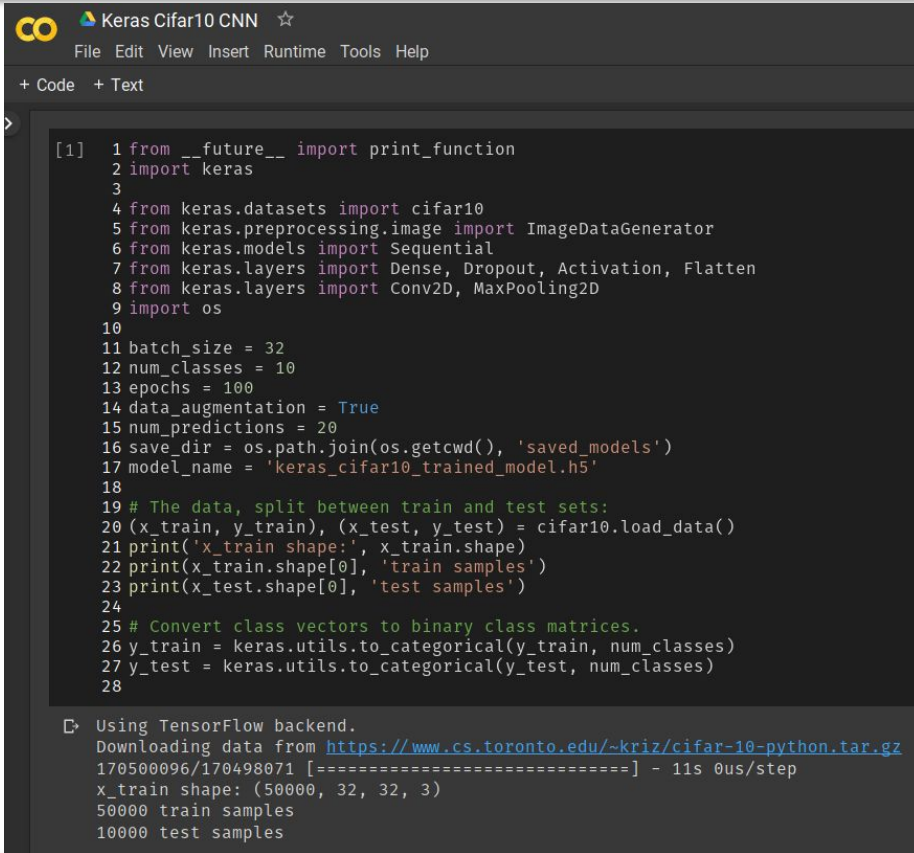
Entrenamiento con GPUs

Con Google Colab

GPU vs CPU

Tiempos de GPU vs CPU en entrenamiento [[1](#)]:

Modelo	Tipo	Ejemplos por segundo
2x Opteron 6168 (server)	CPU	440
i7 7500U (laptop)	CPU	415
GeForce 940mx (laptop)	GPU	1190
GeForce 1070 (discreta)	GPU	6500



```
[1] 1 from __future__ import print_function
2 import keras
3
4 from keras.datasets import cifar10
5 from keras.preprocessing.image import ImageDataGenerator
6 from keras.models import Sequential
7 from keras.layers import Dense, Dropout, Activation, Flatten
8 from keras.layers import Conv2D, MaxPooling2D
9 import os
10
11 batch_size = 32
12 num_classes = 10
13 epochs = 100
14 data_augmentation = True
15 num_predictions = 20
16 save_dir = os.path.join(os.getcwd(), 'saved_models')
17 model_name = 'keras_cifar10_trained_model.h5'
18
19 # The data, split between train and test sets:
20 (x_train, y_train), (x_test, y_test) = cifar10.load_data()
21 print('x_train shape:', x_train.shape)
22 print(x_train.shape[0], 'train samples')
23 print(x_test.shape[0], 'test samples')
24
25 # Convert class vectors to binary class matrices.
26 y_train = keras.utils.to_categorical(y_train, num_classes)
27 y_test = keras.utils.to_categorical(y_test, num_classes)
28
```

Using TensorFlow backend.

Downloading data from <https://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz>
170500096/170498071 [=====] - 11s 0us/step

x_train shape: (50000, 32, 32, 3)
50000 train samples
10000 test samples

- Interfaz similar a Jupyter Notebook
- Requiere cuenta de Google :(
- Notebooks se guardan en Google Drive
- <https://colab.research.google.com>
- Límite: 12 horas seguidas de uso
- No tenemos ninguna relación con Google (pero proveen tiempo de gpu gratis)

Google Colab

- Con “!” se pueden ejecutar comandos de bash/sh
- Permisos limitados



```
1 !ls  
2 !uname -a
```



sample_data

Linux 23dd95e0c505 4.14.137+ #1 SMP Thu Aug 8 02:47:02 PDT 2019 x86_64 x86_64 x86_64 GNU/Linux

Google Colab - Características

- 12gb de ram
- 300gb de disco
- GPU NVIDIA Tesla K80
 - 12gb vram
 - 2496 shading units
- CPU Intel Xeon @ 2.30ghz

```
1 !nvidia-smi
```

```
Sun Oct 6 13:04:20 2019
```

NVIDIA-SMI 430.40 Driver Version: 418.67 CUDA Version: 10.1									
GPU	Name	Persistence-M	Bus-Id	Disp.A	Volatile Uncorr. ECC				
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage	GPU-Util	Compute M.			
0	Tesla K80	Off	00000000:00:04.0	Off		0			
N/A	71C	P8	34W / 149W	0MiB / 11441MiB	0%	Default			

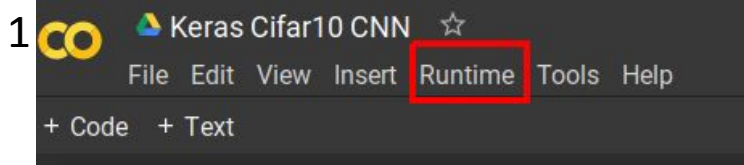
```
Processes:
```

GPU	PID	Type	Process name	GPU Memory Usage
No running processes found				

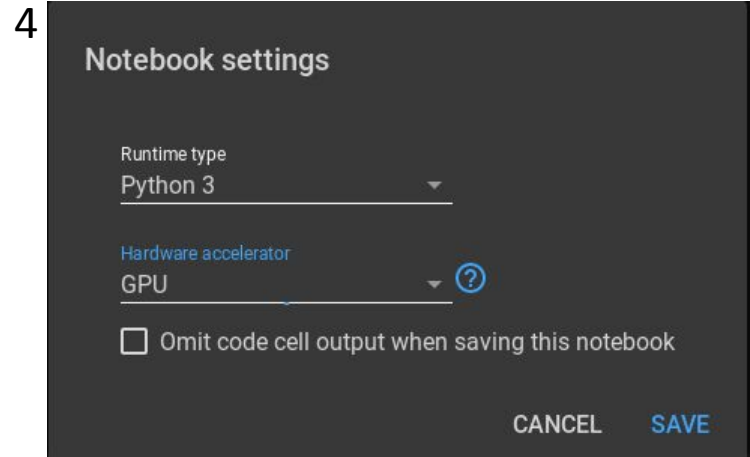
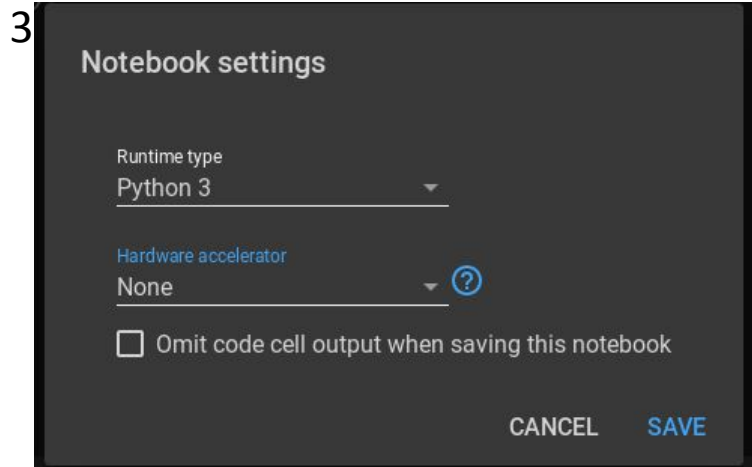
```
[1] 1 !cat /proc/cpuinfo
```

```
processor       : 0
vendor_id      : GenuineIntel
cpu family     : 6
model          : 63
model name     : Intel(R) Xeon(R) CPU @ 2.30GHz
stepping       : 0
microcode      : 0x1
cpu MHz        : 2299.998
cache size     : 46080 KB
```

Google Colab - Activar GPU



2 *Change runtime type*



Google Colab - Activar GPU

- Verificar que diga GPU en el mouseover
- Alternativamente, correr **!nvidia-smi**
 - Si encuentra la GPU es que está activada

