Detección_Objetos

June 2, 2021

[ ]:
```
# Montar sistema de archivos
from google.colab import drive
drive.mount('/content/drive')
%load_ext autoreload
%autoreload 2
```

```
Mounted at /content/drive
```

[ ]:
```
# Movernos a la carpeta
import os
#os.chdir("drive/My Drive/Colab Notebooks/Colab Notebooks/IOT/Practica 11/")
!ls
```

```
Detección_Objetos.ipynb  img
```

[ ]:
```
# Instalar API de TensorFlow
#!git clone https://github.com/pjreddie/darknet.git
#os.chdir("darknet")
!make
!nvcc --version
!nvidia-smi
os.getcwd()
```

```
mkdir -p obj
mkdir -p backup
mkdir -p results
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/gemm.c
-o obj/gemm.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/utils.c -o obj/utils.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/cuda.c
-o obj/cuda.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/deconvolutional_layer.c -o obj/deconvolutional_layer.o
```

```
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/convolutional_layer.c -o obj/convolutional_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/list.c
-o obj/list.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/image.c -o obj/image.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/activations.c -o obj/activations.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/im2col.c -o obj/im2col.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/col2im.c -o obj/col2im.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/blas.c
-o obj/blas.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/crop_layer.c -o obj/crop_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/dropout_layer.c -o obj/dropout_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/maxpool_layer.c -o obj/maxpool_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/softmax_layer.c -o obj/softmax_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/data.c
-o obj/data.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/matrix.c -o obj/matrix.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/network.c -o obj/network.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/connected_layer.c -o obj/connected_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/cost_layer.c -o obj/cost_layer.o
```

```
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/parser.c -o obj/parser.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/option_list.c -o obj/option_list.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/detection_layer.c -o obj/detection_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/route_layer.c -o obj/route_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/upsample_layer.c -o obj/upsample_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/box.c
-o obj/box.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/normalization_layer.c -o obj/normalization_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/avgpool_layer.c -o obj/avgpool_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/layer.c -o obj/layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/local_layer.c -o obj/local_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/shortcut_layer.c -o obj/shortcut_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/logistic_layer.c -o obj/logistic_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/activation_layer.c -o obj/activation_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/rnn_layer.c -o obj/rnn_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/gru_layer.c -o obj/gru_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/crnn_layer.c -o obj/crnn_layer.o
```

```
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/demo.c
-o obj/demo.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/batchnorm_layer.c -o obj/batchnorm_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/region_layer.c -o obj/region_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/reorg_layer.c -o obj/reorg_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c ./src/tree.c
-o obj/tree.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/lstm_layer.c -o obj/lstm_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/l2norm_layer.c -o obj/l2norm_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/yolo_layer.c -o obj/yolo_layer.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/iseg_layer.c -o obj/iseg_layer.o
g++ -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./src/image_opencv.cpp -o obj/image_opencv.o
gcc -Wall -Wno-unused-result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast
-DOPENCV -shared obj/gemm.o obj/utils.o obj/cuda.o obj/deconvolutional_layer.o
obj/convolutional_layer.o obj/list.o obj/image.o obj/activations.o obj/im2col.o
obj/col2im.o obj/blas.o obj/crop_layer.o obj/dropout_layer.o obj/maxpool_layer.o
obj/softmax_layer.o obj/data.o obj/matrix.o obj/network.o obj/connected_layer.o
obj/cost_layer.o obj/parser.o obj/option_list.o obj/detection_layer.o
obj/route_layer.o obj/upsample_layer.o obj/box.o obj/normalization_layer.o
obj/avgpool_layer.o obj/layer.o obj/local_layer.o obj/shortcut_layer.o
obj/logistic_layer.o obj/activation_layer.o obj/rnn_layer.o obj/gru_layer.o
obj/crnn_layer.o obj/demo.o obj/batchnorm_layer.o obj/region_layer.o
obj/reorg_layer.o obj/tree.o obj/lstm_layer.o obj/l2norm_layer.o
obj/yolo_layer.o obj/iseg_layer.o obj/image_opencv.o -o libdarknet.so -lm
-pthread  `pkg-config --libs opencv` -lstdc++
ar rcs libdarknet.a obj/gemm.o obj/utils.o obj/cuda.o
obj/deconvolutional_layer.o obj/convolutional_layer.o obj/list.o obj/image.o
obj/activations.o obj/im2col.o obj/col2im.o obj/blas.o obj/crop_layer.o
obj/dropout_layer.o obj/maxpool_layer.o obj/softmax_layer.o obj/data.o
obj/matrix.o obj/network.o obj/connected_layer.o obj/cost_layer.o obj/parser.o
```

```
obj/option_list.o obj/detection_layer.o obj/route_layer.o obj/upsample_layer.o
obj/box.o obj/normalization_layer.o obj/avgpool_layer.o obj/layer.o
obj/local_layer.o obj/shortcut_layer.o obj/logistic_layer.o
obj/activation_layer.o obj/rnn_layer.o obj/gru_layer.o obj/crnn_layer.o
obj/demo.o obj/batchnorm_layer.o obj/region_layer.o obj/reorg_layer.o obj/tree.o
obj/lstm_layer.o obj/l2norm_layer.o obj/yolo_layer.o obj/iseg_layer.o
obj/image_opencv.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/captcha.c -o obj/captcha.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/lsd.c -o obj/lsd.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/super.c -o obj/super.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/art.c -o obj/art.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/tag.c -o obj/tag.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/cifar.c -o obj/cifar.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/go.c -o obj/go.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/rnn.c -o obj/rnn.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/segmenter.c -o obj/segmenter.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/regressor.c -o obj/regressor.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/classifier.c -o obj/classifier.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/coco.c -o obj/coco.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/yolo.c -o obj/yolo.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
```

```
./examples/detector.c -o obj/detector.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/nightmare.c -o obj/nightmare.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/instance-segmenter.c -o obj/instance-segmenter.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV -c
./examples/darknet.c -o obj/darknet.o
gcc -Iinclude/ -Isrc/ -DOPENCV `pkg-config --cflags opencv`  -Wall -Wno-unused-
result -Wno-unknown-pragmas -Wfatal-errors -fPIC -Ofast -DOPENCV obj/captcha.o
obj/lsd.o obj/super.o obj/art.o obj/tag.o obj/cifar.o obj/go.o obj/rnn.o
obj/segmenter.o obj/regressor.o obj/classifier.o obj/coco.o obj/yolo.o
obj/detector.o obj/nightmare.o obj/instance-segmenter.o obj/darknet.o
libdarknet.a -o darknet -lm -pthread  `pkg-config --libs opencv` -lstdc++
libdarknet.a
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2020 NVIDIA Corporation
Built on Wed_Jul_22_19:09:09_PDT_2020
Cuda compilation tools, release 11.0, V11.0.221
Build cuda_11.0_bu.TC445_37.28845127_0
NVIDIA-SMI has failed because it couldn't communicate with the NVIDIA driver.
Make sure that the latest NVIDIA driver is installed and running.
```

[ ]:
```
'/content/drive/My Drive/Colab Notebooks/IOT/Practica 11/darknet'
```

[ ]:
```
# Descargar pesos de la red neuronal
os.chdir('..')
!wget https://pjreddie.com/media/files/yolov3.weights
!ls
os.chdir('darknet')
```

```
--2021-06-01 15:54:00--  https://pjreddie.com/media/files/yolov3.weights
Resolving pjreddie.com (pjreddie.com)… 128.208.4.108
Connecting to pjreddie.com (pjreddie.com)|128.208.4.108|:443… connected.
HTTP request sent, awaiting response… 200 OK
Length: 248007048 (237M) [application/octet-stream]
Saving to: ‘yolov3.weights.1’

yolov3.weights.1    100%[===================>] 236.52M  36.8MB/s    in 7.5s

2021-06-01 15:54:08 (31.7 MB/s) - ‘yolov3.weights.1’ saved [248007048/248007048]

darknet  Detección_Objetos.ipynb  img  yolov3.weights  yolov3.weights.1
```

[ ]:
```
# Ejecuion del Codigo
!./darknet  detect cfg/yolov3.cfg ../yolov3.weights ../img/gatitos.jpg
from IPython.display import Image
Image(filename='predictions.jpg')
```

```
layer     filters    size              input                output
    0 conv     32  3 x 3 / 1   608 x 608 x   3   ->   608 x 608 x  32  0.639
BFLOPs
    1 conv     64  3 x 3 / 2   608 x 608 x  32   ->   304 x 304 x  64  3.407
BFLOPs
    2 conv     32  1 x 1 / 1   304 x 304 x  64   ->   304 x 304 x  32  0.379
BFLOPs
    3 conv     64  3 x 3 / 1   304 x 304 x  32   ->   304 x 304 x  64  3.407
BFLOPs
    4 res    1                 304 x 304 x  64   ->   304 x 304 x  64
    5 conv    128  3 x 3 / 2   304 x 304 x  64   ->   152 x 152 x 128  3.407
BFLOPs
    6 conv     64  1 x 1 / 1   152 x 152 x 128   ->   152 x 152 x  64  0.379
BFLOPs
    7 conv    128  3 x 3 / 1   152 x 152 x  64   ->   152 x 152 x 128  3.407
BFLOPs
    8 res    5                 152 x 152 x 128   ->   152 x 152 x 128
    9 conv     64  1 x 1 / 1   152 x 152 x 128   ->   152 x 152 x  64  0.379
BFLOPs
   10 conv    128  3 x 3 / 1   152 x 152 x  64   ->   152 x 152 x 128  3.407
BFLOPs
   11 res    8                 152 x 152 x 128   ->   152 x 152 x 128
   12 conv    256  3 x 3 / 2   152 x 152 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   13 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   14 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   15 res   12                  76 x  76 x 256   ->    76 x  76 x 256
   16 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   17 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   18 res   15                  76 x  76 x 256   ->    76 x  76 x 256
   19 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   20 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   21 res   18                  76 x  76 x 256   ->    76 x  76 x 256
   22 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   23 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
```

```
BFLOPs
   24 res   21                  76 x  76 x 256   ->    76 x  76 x 256
   25 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   26 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   27 res   24                  76 x  76 x 256   ->    76 x  76 x 256
   28 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   29 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   30 res   27                  76 x  76 x 256   ->    76 x  76 x 256
   31 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   32 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   33 res   30                  76 x  76 x 256   ->    76 x  76 x 256
   34 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   35 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   36 res   33                  76 x  76 x 256   ->    76 x  76 x 256
   37 conv    512  3 x 3 / 2    76 x  76 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   38 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   39 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   40 res   37                  38 x  38 x 512   ->    38 x  38 x 512
   41 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   42 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   43 res   40                  38 x  38 x 512   ->    38 x  38 x 512
   44 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   45 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   46 res   43                  38 x  38 x 512   ->    38 x  38 x 512
   47 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   48 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   49 res   46                  38 x  38 x 512   ->    38 x  38 x 512
   50 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   51 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
```

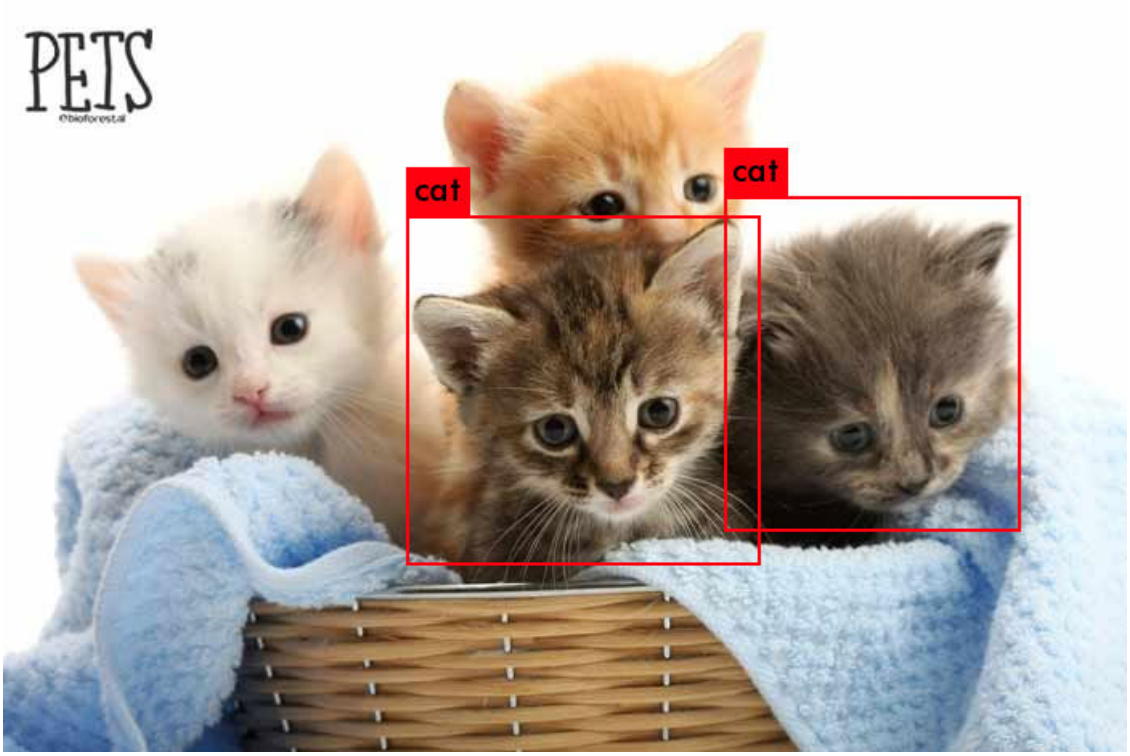
```
   52 res   49                38 x  38 x 512   ->    38 x  38 x 512
   53 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   54 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   55 res   52                38 x  38 x 512   ->    38 x  38 x 512
   56 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   57 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   58 res   55                38 x  38 x 512   ->    38 x  38 x 512
   59 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   60 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   61 res   58                38 x  38 x 512   ->    38 x  38 x 512
   62 conv   1024  3 x 3 / 2    38 x  38 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   63 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   64 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   65 res   62                19 x  19 x1024   ->    19 x  19 x1024
   66 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   67 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   68 res   65                19 x  19 x1024   ->    19 x  19 x1024
   69 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   70 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   71 res   68                19 x  19 x1024   ->    19 x  19 x1024
   72 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   73 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   74 res   71                19 x  19 x1024   ->    19 x  19 x1024
   75 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   76 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   77 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   78 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   79 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
```

```
   80 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   81 conv    255  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 255  0.189
BFLOPs
   82 yolo
   83 route  79
   84 conv    256  1 x 1 / 1    19 x  19 x 512   ->    19 x  19 x 256  0.095
BFLOPs
   85 upsample            2x    19 x  19 x 256   ->    38 x  38 x 256
   86 route  85 61
   87 conv    256  1 x 1 / 1    38 x  38 x 768   ->    38 x  38 x 256  0.568
BFLOPs
   88 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   89 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   90 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   91 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   92 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   93 conv    255  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 255  0.377
BFLOPs
   94 yolo
   95 route  91
   96 conv    128  1 x 1 / 1    38 x  38 x 256   ->    38 x  38 x 128  0.095
BFLOPs
   97 upsample            2x    38 x  38 x 128   ->    76 x  76 x 128
   98 route  97 36
   99 conv    128  1 x 1 / 1    76 x  76 x 384   ->    76 x  76 x 128  0.568
BFLOPs
  100 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  101 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
  102 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  103 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
  104 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  105 conv    255  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 255  0.754
BFLOPs
  106 yolo
Loading weights from ../yolov3.weights…Done!
../img/gatitos.jpg: Predicted in 31.063993 seconds.
cat: 99%
```

```
cat: 92%
Unable to init server: Could not connect: Connection refused

(predictions:883): Gtk-WARNING **: 16:02:13.488: cannot open
display:
```

[ ]:



[ ]:
```
# Si se abrio el archivo ejecutar desde aqui
import os
#from google.colab import drive
#drive.mount('/content/drive')
#%load_ext autoreload
#%autoreload 2
os.chdir("drive/My Drive/Colab Notebooks/IOT/Practica 11/darknet")
!ls
os.getcwd()
```

```
backup     examples       LICENSE.fuck  LICENSE.v1       python
bad.list   include        LICENSE.gen   Makefile         README.md
cfg        libdarknet.a   LICENSE.gpl   obj              results
darknet    libdarknet.so  LICENSE.meta  photo.jpg        scripts
data       LICENSE        LICENSE.mit   predictions.jpg  src
```

[ ]:
```
'/content/drive/My Drive/Colab Notebooks/IOT/Practica 11/darknet'
```

[ ]:
```
# Tomar Fotos
from IPython.display import display, Javascript
from google.colab.output import eval_js
from base64 import b64decode

def take_photo(filename='photo.jpg', quality=0.8):
  js = Javascript('''
    async function takePhoto(quality) {
      const div = document.createElement('div');
      const capture = document.createElement('button');
      capture.textContent = 'Capture';
      div.appendChild(capture);

      const video = document.createElement('video');
      video.style.display = 'block';
      const stream = await navigator.mediaDevices.getUserMedia({video: true});

      document.body.appendChild(div);
      div.appendChild(video);
      video.srcObject = stream;
      await video.play();

      // Resize the output to fit the video element.
      google.colab.output.setIframeHeight(document.documentElement.
 ↪scrollHeight, true);

      // Wait for Capture to be clicked.
      await new Promise((resolve) => capture.onclick = resolve);

      const canvas = document.createElement('canvas');
      canvas.width = video.videoWidth;
      canvas.height = video.videoHeight;
      canvas.getContext('2d').drawImage(video, 0, 0);
      stream.getVideoTracks()[0].stop();
      div.remove();
      return canvas.toDataURL('image/jpeg', quality);
    }
    ''')
  display(js)
  data = eval_js('takePhoto({})'.format(quality))
  binary = b64decode(data.split(',')[1])
  with open(filename, 'wb') as f:
    f.write(binary)
  return filename
```

[107]:
```
# Activar camara y tomar foto
from IPython.display import Image
```

```
try:
  filename = take_photo()
  print('Saved to {}'.format(filename))

  # Show the image which was just taken.
  display(Image(filename))
except Exception as err:
  print(str(err))
```

```
<IPython.core.display.Javascript object>
```

```
Saved to photo.jpg
```

[108]:
```
# Objetos detectados
!./darknet  detect cfg/yolov3.cfg ../yolov3.weights photo.jpg
#!chmod 755 -R .
```

```
layer     filters    size              input                output
    0 conv     32  3 x 3 / 1   608 x 608 x   3   ->   608 x 608 x  32  0.639
BFLOPs
    1 conv     64  3 x 3 / 2   608 x 608 x  32   ->   304 x 304 x  64  3.407
BFLOPs
```

```
    2 conv     32  1 x 1 / 1   304 x 304 x  64   ->   304 x 304 x  32  0.379
BFLOPs
    3 conv     64  3 x 3 / 1   304 x 304 x  32   ->   304 x 304 x  64  3.407
BFLOPs
    4 res    1                 304 x 304 x  64   ->   304 x 304 x  64
    5 conv    128  3 x 3 / 2   304 x 304 x  64   ->   152 x 152 x 128  3.407
BFLOPs
    6 conv     64  1 x 1 / 1   152 x 152 x 128   ->   152 x 152 x  64  0.379
BFLOPs
    7 conv    128  3 x 3 / 1   152 x 152 x  64   ->   152 x 152 x 128  3.407
BFLOPs
    8 res    5                 152 x 152 x 128   ->   152 x 152 x 128
    9 conv     64  1 x 1 / 1   152 x 152 x 128   ->   152 x 152 x  64  0.379
BFLOPs
   10 conv    128  3 x 3 / 1   152 x 152 x  64   ->   152 x 152 x 128  3.407
BFLOPs
   11 res    8                 152 x 152 x 128   ->   152 x 152 x 128
   12 conv    256  3 x 3 / 2   152 x 152 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   13 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   14 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   15 res   12                  76 x  76 x 256   ->    76 x  76 x 256
   16 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   17 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   18 res   15                  76 x  76 x 256   ->    76 x  76 x 256
   19 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   20 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   21 res   18                  76 x  76 x 256   ->    76 x  76 x 256
   22 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   23 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   24 res   21                  76 x  76 x 256   ->    76 x  76 x 256
   25 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   26 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   27 res   24                  76 x  76 x 256   ->    76 x  76 x 256
   28 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   29 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
```

```
   30 res   27                 76 x  76 x 256   ->    76 x  76 x 256
   31 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   32 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   33 res   30                 76 x  76 x 256   ->    76 x  76 x 256
   34 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
   35 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
   36 res   33                 76 x  76 x 256   ->    76 x  76 x 256
   37 conv    512  3 x 3 / 2    76 x  76 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   38 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   39 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   40 res   37                 38 x  38 x 512   ->    38 x  38 x 512
   41 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   42 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   43 res   40                 38 x  38 x 512   ->    38 x  38 x 512
   44 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   45 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   46 res   43                 38 x  38 x 512   ->    38 x  38 x 512
   47 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   48 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   49 res   46                 38 x  38 x 512   ->    38 x  38 x 512
   50 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   51 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   52 res   49                 38 x  38 x 512   ->    38 x  38 x 512
   53 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   54 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   55 res   52                 38 x  38 x 512   ->    38 x  38 x 512
   56 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   57 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   58 res   55                 38 x  38 x 512   ->    38 x  38 x 512
```

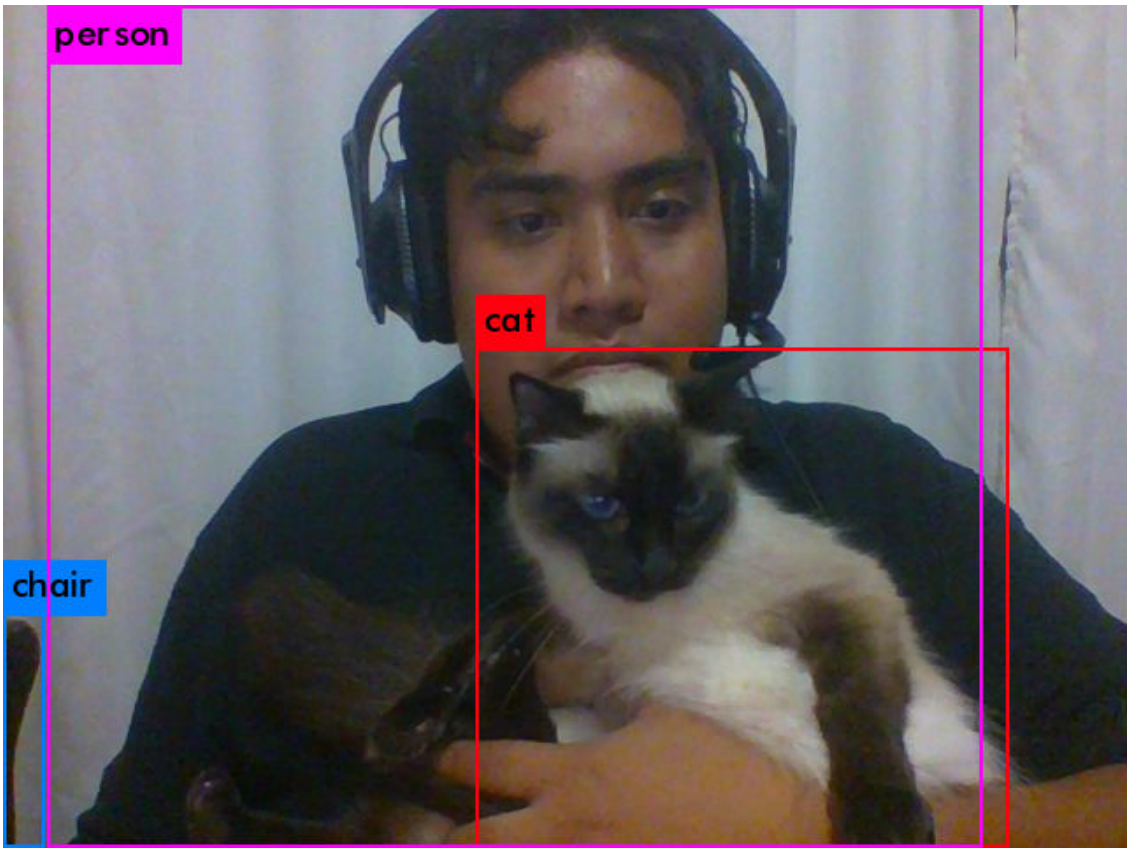
```
   59 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   60 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   61 res   58                  38 x  38 x 512   ->    38 x  38 x 512
   62 conv   1024  3 x 3 / 2    38 x  38 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   63 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   64 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   65 res   62                  19 x  19 x1024   ->    19 x  19 x1024
   66 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   67 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   68 res   65                  19 x  19 x1024   ->    19 x  19 x1024
   69 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   70 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   71 res   68                  19 x  19 x1024   ->    19 x  19 x1024
   72 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   73 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   74 res   71                  19 x  19 x1024   ->    19 x  19 x1024
   75 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   76 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   77 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   78 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   79 conv    512  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 512  0.379
BFLOPs
   80 conv   1024  3 x 3 / 1    19 x  19 x 512   ->    19 x  19 x1024  3.407
BFLOPs
   81 conv    255  1 x 1 / 1    19 x  19 x1024   ->    19 x  19 x 255  0.189
BFLOPs
   82 yolo
   83 route  79
   84 conv    256  1 x 1 / 1    19 x  19 x 512   ->    19 x  19 x 256  0.095
BFLOPs
   85 upsample            2x    19 x  19 x 256   ->    38 x  38 x 256
   86 route  85 61
   87 conv    256  1 x 1 / 1    38 x  38 x 768   ->    38 x  38 x 256  0.568
```

```
BFLOPs
   88 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   89 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   90 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   91 conv    256  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 256  0.379
BFLOPs
   92 conv    512  3 x 3 / 1    38 x  38 x 256   ->    38 x  38 x 512  3.407
BFLOPs
   93 conv    255  1 x 1 / 1    38 x  38 x 512   ->    38 x  38 x 255  0.377
BFLOPs
   94 yolo
   95 route  91
   96 conv    128  1 x 1 / 1    38 x  38 x 256   ->    38 x  38 x 128  0.095
BFLOPs
   97 upsample            2x    38 x  38 x 128   ->    76 x  76 x 128
   98 route  97 36
   99 conv    128  1 x 1 / 1    76 x  76 x 384   ->    76 x  76 x 128  0.568
BFLOPs
  100 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  101 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
  102 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  103 conv    128  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 128  0.379
BFLOPs
  104 conv    256  3 x 3 / 1    76 x  76 x 128   ->    76 x  76 x 256  3.407
BFLOPs
  105 conv    255  1 x 1 / 1    76 x  76 x 256   ->    76 x  76 x 255  0.754
BFLOPs
  106 yolo
Loading weights from ../yolov3.weights…Done!
photo.jpg: Predicted in 25.717637 seconds.
chair: 65%
cat: 93%
person: 100%
Unable to init server: Could not connect: Connection refused

(predictions:1366): Gtk-WARNING **: 02:02:50.763: cannot
open display:
```

[109]:
```
from IPython.display import Image
Image(filename='predictions.jpg')
```

[109]:


person
cat
chair