```python
from google.colab import drive
drive.mount('/content/drive')
```

```
Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?clie

Enter your authorization code:
..........
Mounted at /content/drive
```

```
!ls
!rm -fr darknet
!git clone https://github.com/AlexeyAB/darknet/
```

```
drive   sample_data
Cloning into 'darknet'...
remote: Enumerating objects: 9815, done.
remote: Total 9815 (delta 0), reused 0 (delta 0), pack-reused 9815
Receiving objects: 100% (9815/9815), 9.87 MiB | 16.59 MiB/s, done.
Resolving deltas: 100% (6557/6557), done.
```

```
cp drive/'My Drive'/helmet/data_for_colab.zip /content/darknet
```

```
cd darknet
```

```
/content/darknet
```

```
ls
```

```
3rdparty/       CMakeLists.txt          image_yolov2.sh*        README.md
appveyor.yml    CMakeSettings.json      image_yolov3.sh*        scripts/
build/          DarknetConfig.cmake.in  include/                src/
build.ps1*      darknet.py              json_mjpeg_streams.sh*  video_v2.sh*
build.sh*       darknet_video.py        LICENSE                 video_yolov3.
cfg/            data/                   Makefile
cmake/          data_for_colab.zip      net_cam_v3.sh*
```

```
!unzip data_for_colab
```

```
      inflating: __MACOSX/data_for_colab/data/._54.jpeg
      inflating: data_for_colab/data/54.txt
      inflating: data_for_colab/data/56.jpeg
      inflating: __MACOSX/data_for_colab/data/._56.jpeg
      inflating: data_for_colab/data/56.txt
      inflating: data_for_colab/data/57.jpg
      inflating: __MACOSX/data_for_colab/data/._57.jpg
      inflating: data_for_colab/data/57.txt
      inflating: data_for_colab/data/58.jpg
      inflating: __MACOSX/data_for_colab/data/._58.jpg
      inflating: data_for_colab/data/58.txt
      inflating: data_for_colab/data/59.jpg
      inflating: __MACOSX/data_for_colab/data/._59.jpg
      inflating: data_for_colab/data/59.txt
      inflating: data_for_colab/data/60.jpg
      inflating: __MACOSX/data_for_colab/data/._60.jpg
      inflating: data_for_colab/data/60.txt
      inflating: data_for_colab/data/61.jpg
      inflating: __MACOSX/data_for_colab/data/._61.jpg
      inflating: data_for_colab/data/61.txt
      inflating: data_for_colab/data/62.jpeg
      inflating: __MACOSX/data_for_colab/data/._62.jpeg
      inflating: data_for_colab/data/62.txt
      inflating: data_for_colab/data/63.jpeg
      inflating: __MACOSX/data_for_colab/data/._63.jpeg
      inflating: data_for_colab/data/63.txt
      inflating: data_for_colab/data/64.jpg
      inflating: __MACOSX/data_for_colab/data/._64.jpg
      inflating: data_for_colab/data/64.txt
      inflating: data_for_colab/data/65.jpg
      inflating: __MACOSX/data_for_colab/data/._65.jpg
      inflating: data_for_colab/data/65.txt
      inflating: data_for_colab/data/66.jpg
      inflating: __MACOSX/data_for_colab/data/._66.jpg
      inflating: data_for_colab/data/66.txt
      inflating: data_for_colab/data/67.jpg
      inflating: __MACOSX/data_for_colab/data/._67.jpg
      inflating: data_for_colab/data/67.txt
      inflating: data_for_colab/data/68.jpg
      inflating: __MACOSX/data_for_colab/data/._68.jpg
```

```python
#upload train test.txt files
from google.colab import files
uploaded = files.upload()
for name, data in uploaded.items():
  with open(name, 'wb') as f:
    f.write(data)
    print ('saved file', name)
```

⮡
```
Choose Files   test.txt
```
   • **test.txt**(text/plain) - 309 bytes, last modified: 4/3/2019 - 100% done
```
Saving test.txt to test.txt
saved file test.txt

inflating: data_for_colab/data/73.txt
```

```
!apt-get update
!apt-get upgrade
```

⮡

```
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Ign:2 https://developer.download.nvidia.com/compute/cuda/repos/ubuntu1804/x
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Hit:4 http://ppa.launchpad.net/graphics-drivers/ppa/ubuntu bionic InRelease
Get:5 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Ign:6 https://developer.download.nvidia.com/compute/machine-learning/repos/
Hit:7 https://developer.download.nvidia.com/compute/cuda/repos/ubuntu1804/x
Get:8 https://developer.download.nvidia.com/compute/machine-learning/repos/
Get:9 https://developer.download.nvidia.com/compute/machine-learning/repos/
Get:10 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB
Get:11 http://ppa.launchpad.net/marutter/c2d4u3.5/ubuntu bionic InRelease [
Get:12 https://cloud.r-project.org/bin/linux/ubuntu bionic-cran35/ InReleas
Get:13 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Package
Get:14 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Pac
Get:16 https://developer.download.nvidia.com/compute/machine-learning/repos
Get:17 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages
Get:18 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packa
Get:19 http://ppa.launchpad.net/marutter/c2d4u3.5/ubuntu bionic/main Source
Get:20 http://ppa.launchpad.net/marutter/c2d4u3.5/ubuntu bionic/main amd64
Fetched 4,930 kB in 8s (645 kB/s)
Reading package lists... Done
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required
  libnvidia-common-410
Use 'apt autoremove' to remove it.
The following packages have been kept back:
  libcudnn7 libcudnn7-dev libnccl-dev libnccl2 linux-headers-generic
The following packages will be upgraded:
  cuda-compat-10-0 libseccomp2 linux-libc-dev r-cran-gtable r-cran-rlang
5 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
Need to get 8,881 kB of archives.
After this operation, 2,000 kB of additional disk space will be used.
Get:1 https://developer.download.nvidia.com/compute/cuda/repos/ubuntu1804/x
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libseccomp
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 linux-libc
Get:4 http://ppa.launchpad.net/marutter/c2d4u3.5/ubuntu bionic/main amd64 r
Get:5 http://ppa.launchpad.net/marutter/c2d4u3.5/ubuntu bionic/main amd64 r
Fetched 8,881 kB in 5s (1,923 kB/s)
(Reading database ... 131294 files and directories currently installed.)
Preparing to unpack .../libseccomp2_2.3.1-2.1ubuntu4.1_amd64.deb ...
Unpacking libseccomp2:amd64 (2.3.1-2.1ubuntu4.1) over (2.3.1-2.1ubuntu4) ..
Setting up libseccomp2:amd64 (2.3.1-2.1ubuntu4.1) ...
(Reading database ... 131294 files and directories currently installed.)
Preparing to unpack .../cuda-compat-10-0_410.104-1_amd64.deb ...
Unpacking cuda-compat-10-0 (410.104-1) over (410.48-1) ...
Preparing to unpack .../linux-libc-dev_4.15.0-47.50_amd64.deb ...
Unpacking linux-libc-dev:amd64 (4.15.0-47.50) over (4.15.0-46.49) ...
Preparing to unpack .../r-cran-gtable_0.3.0-1cran1ppabionic0_all.deb ...
Unpacking r-cran-gtable (0.3.0-1cran1ppabionic0) over (0.2.0-3cran2ppa0bion
Preparing to unpack .../r-cran-rlang_0.3.3-1cran1ppabionic0_amd64.deb ...
```

```
!apt-get install build-essential
!apt-get install cmake git libgtk2.0-dev pkg-config libavcodec-dev libavformat-dev
```

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.4ubuntu1).
The following package was automatically installed and is no longer required
  libnvidia-common-410
Use 'apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
Reading package lists... Done
Building dependency tree
Reading state information... Done
cmake is already the newest version (3.10.2-1ubuntu2).
pkg-config is already the newest version (0.29.1-0ubuntu2).
git is already the newest version (1:2.17.1-1ubuntu0.4).
libavcodec-dev is already the newest version (7:3.4.4-0ubuntu0.18.04.1).
libavcodec-dev set to manually installed.
libavformat-dev is already the newest version (7:3.4.4-0ubuntu0.18.04.1).
libavformat-dev set to manually installed.
libswscale-dev is already the newest version (7:3.4.4-0ubuntu0.18.04.1).
libswscale-dev set to manually installed.
The following package was automatically installed and is no longer required
  libnvidia-common-410
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  autoconf automake autopoint autotools-dev debhelper dh-autoreconf
  dh-strip-nondeterminism file gettext gettext-base gir1.2-atk-1.0
  gir1.2-freedesktop gir1.2-gdkpixbuf-2.0 gir1.2-gtk-2.0 gir1.2-pango-1.0
  intltool-debian libarchive-cpio-perl libarchive-zip-perl libatk1.0-dev
  libcairo-script-interpreter2 libcairo2-dev libfile-stripnondeterminism-pe
  libgail-common libgail18 libgdk-pixbuf2.0-dev libgtk2.0-0 libgtk2.0-bin
  libgtk2.0-common libmagic-mgc libmagic1 libmail-sendmail-perl
  libpango1.0-dev libpangoxft-1.0-0 libpixman-1-dev libsigsegv2
  libsys-hostname-long-perl libtimedate-perl libtool libxcb-shm0-dev
  libxcomposite-dev libxcursor-dev libxinerama-dev libxml2-utils libxrandr-
  m4 po-debconf x11proto-composite-dev x11proto-randr-dev
  x11proto-xinerama-dev
Suggested packages:
  autoconf-archive gnu-standards autoconf-doc dh-make dwz gettext-doc
  libasprintf-dev libgettextpo-dev libcairo2-doc gvfs libgtk2.0-doc
  imagemagick libpango1.0-doc libtool-doc gcj-jdk m4-doc libmail-box-perl
The following NEW packages will be installed:
  autoconf automake autopoint autotools-dev debhelper dh-autoreconf
  dh-strip-nondeterminism file gettext gettext-base gir1.2-atk-1.0
  gir1.2-freedesktop gir1.2-gdkpixbuf-2.0 gir1.2-gtk-2.0 gir1.2-pango-1.0
  intltool-debian libarchive-cpio-perl libarchive-zip-perl libatk1.0-dev
  libcairo-script-interpreter2 libcairo2-dev libfile-stripnondeterminism-pe
  libgail-common libgail18 libgdk-pixbuf2.0-dev libgtk2.0-0 libgtk2.0-bin
  libgtk2.0-common libgtk2.0-dev libmagic-mgc libmagic1 libmail-sendmail-pe
  libpango1.0-dev libpangoxft-1.0-0 libpixman-1-dev libsigsegv2
  libsys-hostname-long-perl libtimedate-perl libtool libxcb-shm0-dev
  libxcomposite-dev libxcursor-dev libxinerama-dev libxml2-utils libxrandr-
  m4 po-debconf x11proto-composite-dev x11proto-randr-dev
  x11proto-xinerama-dev
```

```
!apt-get install libavcodec-dev libavformat-dev libswscale-d
```

```
    Reading package lists... Done
    Building dependency tree
    Reading state information... Done
```

```
!apt-get -y install cmake
!which cmake
```

```
!cmake --version
```

┌→ Reading package lists... Done
    Building dependency tree
    Reading state information... Done
    cmake is already the newest version (3.10.2-1ubuntu2).
    The following package was automatically installed and is no longer required
      libnvidia-common-410
    Use 'apt autoremove' to remove it.
    0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
    /usr/local/bin/cmake
    cmake version 3.12.0

    CMake suite maintained and supported by Kitware (kitware.com/cmake).

```
!apt-get install libopencv-dev
```

┌→ Reading package lists... Done
    Building dependency tree
    Reading state information... Done
    libopencv-dev is already the newest version (3.2.0+dfsg-4ubuntu0.1).
    The following package was automatically installed and is no longer required
      libnvidia-common-410
    Use 'apt autoremove' to remove it.
    0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.

```
!apt-get install vim
```

┌→

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required
  libnvidia-common-410
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  libgpm2 vim-common vim-runtime xxd
Suggested packages:
  gpm ctags vim-doc vim-scripts
The following NEW packages will be installed:
  libgpm2 vim vim-common vim-runtime xxd
0 upgraded, 5 newly installed, 0 to remove and 5 not upgraded.
Need to get 6,723 kB of archives.
After this operation, 32.6 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 xxd amd64 2:8.0.14
Get:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 vim-common all 2:8
Get:3 http://archive.ubuntu.com/ubuntu bionic/main amd64 libgpm2 amd64 1.20
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 vim-runtime all 2:
Get:5 http://archive.ubuntu.com/ubuntu bionic/main amd64 vim amd64 2:8.0.14
Fetched 6,723 kB in 0s (17.0 MB/s)
Selecting previously unselected package xxd.
(Reading database ... 133273 files and directories currently installed.)
Preparing to unpack .../xxd_2%3a8.0.1453-1ubuntu1_amd64.deb ...
Unpacking xxd (2:8.0.1453-1ubuntu1) ...
Selecting previously unselected package vim-common.
Preparing to unpack .../vim-common_2%3a8.0.1453-1ubuntu1_all.deb ...
Unpacking vim-common (2:8.0.1453-1ubuntu1) ...
Selecting previously unselected package libgpm2:amd64.
Preparing to unpack .../libgpm2_1.20.7-5_amd64.deb ...
Unpacking libgpm2:amd64 (1.20.7-5) ...
Selecting previously unselected package vim-runtime.
```

```
ls
```

```
3rdparty/              darknet.py              __MACOSX/
appveyor.yml           darknet_video.py        Makefile
build/                 data/                   net_cam_v3.sh*
build.ps1*             data_for_colab/         README.md
build.sh*              data_for_colab.zip      scripts/
cfg/                   image_yolov2.sh*        src/
cmake/                 image_yolov3.sh*        test.txt
CMakeLists.txt         include/                train.txt
CMakeSettings.json     json_mjpeg_streams.sh*  video_v2.sh*
DarknetConfig.cmake.in LICENSE                 video_yolov3.sh*
Setting up vim-runtime (2:8.0.1453-1ubuntu1) ...
```

```
#Now let's get some YOLOv3 weights from the official site
!ls
!wget https://pjreddie.com/media/files/yolov3.weights
```

```
3rdparty          CMakeSettings.json   image_yolov3.sh        README.md
build             darknet.py           include                scripts
build.ps1         darknet_video.py     json_mjpeg_streams.sh  src
build.sh          data                 LICENSE                test.txt
cfg               Dataset              __MACOSX               train.txt
cmake             Dataset.zip          Makefile               video_v2.sh
CMakeLists.txt    image_yolov2.sh      net_cam_v3.sh          video_yolov3.sh
--2019-02-25 21:32:22--  https://pjreddie.com/media/files/yolov3.weights
Resolving pjreddie.com (pjreddie.com)... 128.208.3.39
Connecting to pjreddie.com (pjreddie.com)|128.208.3.39|:443... connected.
HTTP request sent, awaiting response... 200 OK
```

```
#No here we're modifying the makefile to set OPENCV and GPU to 1
!ls
!sed -i 's/OPENCV=0/OPENCV=1/g' Makefile
!sed -i 's/GPU=0/GPU=1/g' Makefile
```

```
3rdparty          CMakeSettings.json   image_yolov3.sh        scripts
appveyor.yml      DarknetConfig.cmake.in   include            src
build             darknet.py           json_mjpeg_streams.sh  test.txt
build.ps1         darknet_video.py     LICENSE                train.txt
build.sh          data                 __MACOSX               video_v2.sh
cfg               data_for_colab       Makefile               video_yolov3
cmake             data_for_colab.zip   net_cam_v3.sh
CMakeLists.txt    image_yolov2.sh      README.md
```

```
!ls
%cd ../
!ls
```

```
3rdparty          CMakeSettings.json   image_yolov3.sh        scripts
appveyor.yml      DarknetConfig.cmake.in   include            src
build             darknet.py           json_mjpeg_streams.sh  test.txt
build.ps1         darknet_video.py     LICENSE                train.txt
build.sh          data                 __MACOSX               video_v2.sh
cfg               data_for_colab       Makefile               video_yolov3
cmake             data_for_colab.zip   net_cam_v3.sh
CMakeLists.txt    image_yolov2.sh      README.md
/content
darknet  drive  sample_data
```

```
!apt install g++-5
!apt install gcc-5

!update-alternatives --install /usr/bin/gcc gcc /usr/bin/gcc-5 10
!update-alternatives --install /usr/bin/gcc gcc /usr/bin/gcc-5 20
!update-alternatives --install /usr/bin/g++ g++ /usr/bin/g++-5 10
!update-alternatives --install /usr/bin/g++ g++ /usr/bin/g++-5 20
!update-alternatives --install /usr/bin/cc cc /usr/bin/gcc 30
!update-alternatives --set cc /usr/bin/gcc
!update-alternatives --install /usr/bin/c++ c++ /usr/bin/g++ 30
!update-alternatives --set c++ /usr/bin/g++
```

```
    Reading package lists... Done
    Building dependency tree
    Reading state information... Done
    The following package was automatically installed and is no longer required
      libnvidia-common-410
    Use 'apt autoremove' to remove it.
    The following additional packages will be installed:
      cpp-5 gcc-5 gcc-5-base libasan2 libgcc-5-dev libisl15 libmpx0
      libstdc++-5-dev
    Suggested packages:
      gcc-5-locales g++-5-multilib gcc-5-doc libstdc++6-5-dbg gcc-5-multilib
      libgcc1-dbg libgomp1-dbg libitm1-dbg libatomic1-dbg libasan2-dbg
      liblsan0-dbg libtsan0-dbg libubsan0-dbg libcilkrts5-dbg libmpx0-dbg
      libquadmath0-dbg libstdc++-5-doc
    The following NEW packages will be installed:
      cpp-5 g++-5 gcc-5 gcc-5-base libasan2 libgcc-5-dev libisl15 libmpx0
      libstdc++-5-dev
    0 upgraded, 9 newly installed, 0 to remove and 5 not upgraded.
    Need to get 29.1 MB of archives.
    After this operation, 100 MB of additional disk space will be used.
    Get:1 http://archive.ubuntu.com/ubuntu bionic/universe amd64 gcc-5-base amd
    Get:2 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libisl15 amd64
    Get:3 http://archive.ubuntu.com/ubuntu bionic/universe amd64 cpp-5 amd64 5.
    Get:4 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libasan2 amd64
    Get:5 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libmpx0 amd64
    Get:6 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libgcc-5-dev a
    Get:7 http://archive.ubuntu.com/ubuntu bionic/universe amd64 gcc-5 amd64 5.
    Get:8 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libstdc++-5-de
    Get:9 http://archive.ubuntu.com/ubuntu bionic/universe amd64 g++-5 amd64 5.
    Fetched 29.1 MB in 1s (41.2 MB/s)
    Selecting previously unselected package gcc-5-base:amd64.
    (Reading database ... 135116 files and directories currently installed.)
    Preparing to unpack .../0-gcc-5-base_5.5.0-12ubuntu1_amd64.deb ...
    Unpacking gcc-5-base:amd64 (5.5.0-12ubuntu1) ...
    Selecting previously unselected package libisl15:amd64.
    Preparing to unpack .../1-libisl15_0.18-4_amd64.deb ...
    Unpacking libisl15:amd64 (0.18-4) ...
    Selecting previously unselected package cpp-5.
    Preparing to unpack .../2-cpp-5_5.5.0-12ubuntu1_amd64.deb ...
    Unpacking cpp-5 (5.5.0-12ubuntu1) ...
    Selecting previously unselected package libasan2:amd64.
    Preparing to unpack .../3-libasan2_5.5.0-12ubuntu1_amd64.deb ...
    Unpacking libasan2:amd64 (5.5.0-12ubuntu1) ...
    Selecting previously unselected package libmpx0:amd64.
    Preparing to unpack .../4-libmpx0_5.5.0-12ubuntu1_amd64.deb ...
    Unpacking libmpx0:amd64 (5.5.0-12ubuntu1) ...
    Selecting previously unselected package libgcc-5-dev:amd64.
```

```
#Now, here's a bunch of code that takes the longest to execute here but
#It's about installing CUDA and using the beautiful Tesla K80 GPU, so that
#Will worth it

!apt update -qq;
!wget https://developer.nvidia.com/compute/cuda/8.0/Prod2/local_installers/cuda-re
!dpkg -i cuda-repo-ubuntu1604-8-0-local-ga2_8.0.61-1_amd64-deb
!apt-get update -qq

#Here were are installing compilers and creating some links
!apt-get install cuda -y -qq #gcc-5 g++-5
#!ln -s /usr/bin/gcc-5 /usr/local/cuda/bin/gcc
```

```
#!ln -s /usr/bin/g++-5 /usr/local/cuda/bin/g++
!apt update
!apt upgrade
!apt install cuda-8.0 -y
```

⮕

```
#!ln -s /usr/bin/g++-5 /usr/local/cuda/bin/g++
!apt update
!apt upgrade
!apt install cuda-8.0 -y
```

⮕

```
       Unpacking cuda-nvgraph-dev-8-0 (8.0.61-1) ...
       Selecting previously unselected package cuda-visual-tools-8-0.
```

```python
#Now let's see whether the GPU is here and CUDA was successfully installed!
import tensorflow as tf
device_name = tf.test.gpu_device_name()
print(device_name)

print("'sup!'")

!/usr/local/cuda/bin/nvcc --version
```

```
/device:GPU:0
'sup!'
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2016 NVIDIA Corporation
Built on Tue_Jan_10_13:22:03_CST_2017
Cuda compilation tools, release 8.0, V8.0.61
Setting up cuda-license-8-0 (8.0.61-1) ...
```

```
ls
```

```
cuda-repo-ubuntu1604-8-0-local-ga2_8.0.61-1_amd64-deb   drive/
darknet/                                                sample_data/
terms and conditions of the EULA  do not use the software
```

```
%cd darknet
!make
```

```
                  from ./src/layer.h:4,
                  from ./src/yolo_layer.h:5,
                  from ./src/yolo_layer.c:1:
   /usr/local/cuda/include/cuda_runtime_api.h:3316:39: note: expected 'void **
    extern __host__ cudaError_t CUDARTAPI cudaHostAlloc(void **pHost, size_t s
                                       ^
   gcc -Iinclude/ -I3rdparty/stb/include -DOPENCV `pkg-config --cflags opencv`
   gcc -Iinclude/ -I3rdparty/stb/include -DOPENCV `pkg-config --cflags opencv`
   nvcc -gencode arch=compute_30,code=sm_30 -gencode arch=compute_35,code=sm_3
   nvcc -gencode arch=compute_30,code=sm_30 -gencode arch=compute_35,code=sm_3
   nvcc -gencode arch=compute_30,code=sm_30 -gencode arch=compute_35,code=sm_3
   ./src/im2col_kernels.cu:125:18: warning: "/*" within comment [-Wcomment]
                  //*data_col_ptr = (h >= 0 && w >= 0 && h < height && w < w
                    ^
   ./src/im2col_kernels.cu:1178:6: warning: "/*" within comment [-Wcomment]
       //*((uint64_t *)(A_s + (local_i*lda + k) / 8)) = *((uint64_t *)(A + (i
        ^
   ./src/im2col_kernels.cu:125:18: warning: "/*" within comment [-Wcomment]
                  //*data_col_ptr = (h >= 0 && w >= 0 && h < height && w < w
                    ^
   ./src/im2col_kernels.cu:1178:6: warning: "/*" within comment [-Wcomment]
       //*((uint64_t *)(A_s + (local_i*lda + k) / 8)) = *((uint64_t *)(A + (i
        ^
```

```
!ls
#Now, let's see if everything works by running it on a test image
!./darknet detect cfg/yolov3.cfg yolov3.weights data/person.jpg
```

```
    2 conv     32   1 x 1 / 1    208 x 208 x  64   ->    208 x 208 x  32 0.177
    3 conv     64   3 x 3 / 1    208 x 208 x  32   ->    208 x 208 x  64 1.595
    4 Shortcut Layer: 1
    5 conv    128   3 x 3 / 2    208 x 208 x  64   ->    104 x 104 x 128 1.595
    6 conv     64   1 x 1 / 1    104 x 104 x 128   ->    104 x 104 x  64 0.177
    7 conv    128   3 x 3 / 1    104 x 104 x  64   ->    104 x 104 x 128 1.595
    8 Shortcut Layer: 5
    9 conv     64   1 x 1 / 1    104 x 104 x 128   ->    104 x 104 x  64 0.177
   10 conv    128   3 x 3 / 1    104 x 104 x  64   ->    104 x 104 x 128 1.595
   11 Shortcut Layer: 8
   12 conv    256   3 x 3 / 2    104 x 104 x 128   ->     52 x  52 x 256 1.595
   13 conv    128   1 x 1 / 1     52 x  52 x 256   ->     52 x  52 x 128 0.177
   14 conv    256   3 x 3 / 1     52 x  52 x 128   ->     52 x  52 x 256 1.595
   15 Shortcut Layer: 12
   16 conv    128   1 x 1 / 1     52 x  52 x 256   ->     52 x  52 x 128 0.177
   17 conv    256   3 x 3 / 1     52 x  52 x 128   ->     52 x  52 x 256 1.595
   18 Shortcut Layer: 15
   19 conv    128   1 x 1 / 1     52 x  52 x 256   ->     52 x  52 x 128 0.177
   20 conv    256   3 x 3 / 1     52 x  52 x 128   ->     52 x  52 x 256 1.595
   21 Shortcut Layer: 18
   22 conv    128   1 x 1 / 1     52 x  52 x 256   ->     52 x  52 x 128 0.177
   23 conv    256   3 x 3 / 1     52 x  52 x 128   ->     52 x  52 x 256 1.595
   24 Shortcut Layer: 21
   25 conv    128   1 x 1 / 1     52 x  52 x 256   ->     52 x  52 x 128 0.177
   26 conv    256   3 x 3 / 1     52 x  52 x 128   ->     52 x  52 x 256 1.595
```

```python
#Let's define some functions that will let us show images, and upload and
#download files
def imShow(path):
  import cv2
  import matplotlib.pyplot as plt
  %matplotlib inline

  image = cv2.imread(path)
  height, width = image.shape[:2]
  resized_image = cv2.resize(image,(3*width, 3*height), interpolation = cv2.INTER_

  fig = plt.gcf()
  fig.set_size_inches(18, 10)
  plt.axis("off")
  #plt.rcParams['figure.figsize'] = [10, 5]
  plt.imshow(cv2.cvtColor(resized_image, cv2.COLOR_BGR2RGB))
  plt.show()


def upload():
  from google.colab import files
  uploaded = files.upload()
  for name, data in uploaded.items():
    with open(name, 'wb') as f:
      f.write(data)
      print ('saved file', name)
def download(path):
  from google.colab import files
  files.download(path)
```
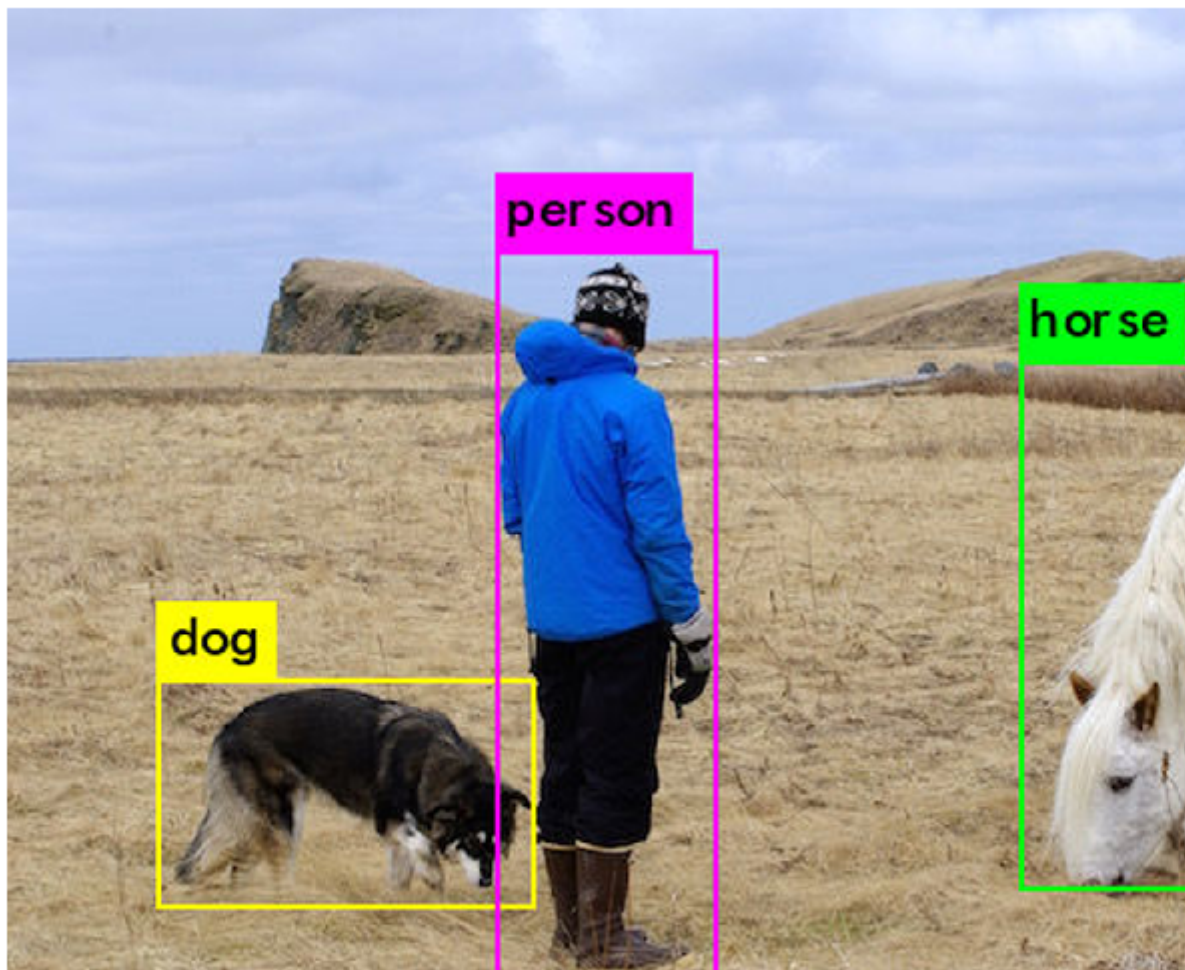
```
   51 conv    512   3 x 3 / 1     26 x  26 x 256   ->     26 x  26 x 512 1.595
```

```python
imShow('predictions.jpg')
```

```
ls
```

```
3rdparty/            darknet*               json_mjpeg_streams.sh*    scripts/
backup/              darknet.py             LICENSE                   src/
build/               darknet_video.py       __MACOSX/                 test.txt
build.ps1*           data/                  Makefile                  train.txt
build.sh*            Dataset/               net_cam_v3.sh*            video_v2.sh*
cfg/                 Dataset.zip            obj/                      video_yolov3.
cmake/               image_yolov2.sh*       predictions.jpg           yolov3.weight
CMakeLists.txt       image_yolov3.sh*       README.md
CMakeSettings.json   include/               results/
```

```
!./darknet detector train data_for_colab/obj.data data_for_colab/yolov3-tiny-obj.c
```

```
Loaded: 0.000041 seconds
Region 16 Avg IOU: 0.643294, Class: 0.997597, Obj: 0.769652, No Obj: 0.0040
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na
Region 16 Avg IOU: 0.538185, Class: 0.989740, Obj: 0.795451, No Obj: 0.0038
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na

 1028: 0.523537, 0.613464 avg loss, 0.001000 rate, 3.871261 seconds, 65792
Loaded: 0.000042 seconds
Region 16 Avg IOU: 0.655451, Class: 0.990496, Obj: 0.789515, No Obj: 0.0038
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na
Region 16 Avg IOU: 0.617845, Class: 0.996956, Obj: 0.737215, No Obj: 0.0046
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000014, .5R: -na

 1029: 0.491140, 0.601231 avg loss, 0.001000 rate, 3.839438 seconds, 65856
Loaded: 0.000041 seconds
Region 16 Avg IOU: 0.607546, Class: 0.990483, Obj: 0.815590, No Obj: 0.0040
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na
Region 16 Avg IOU: 0.619201, Class: 0.997689, Obj: 0.872836, No Obj: 0.0046
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na

 1030: 0.534044, 0.594512 avg loss, 0.001000 rate, 3.855601 seconds, 65920
Resizing
576 x 576
 try to allocate additional workspace_size = 47.78 MB
 CUDA allocate done!
Loaded: 0.000046 seconds
Region 16 Avg IOU: 0.658114, Class: 0.998380, Obj: 0.781720, No Obj: 0.0017
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000014, .5R: -na
Region 16 Avg IOU: 0.660579, Class: 0.997613, Obj: 0.795639, No Obj: 0.0023
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000012, .5R: -na

 1031: 0.704048, 0.605466 avg loss, 0.001000 rate, 5.632503 seconds, 65984
Loaded: 0.000045 seconds
Region 16 Avg IOU: 0.611443, Class: 0.997420, Obj: 0.614534, No Obj: 0.0019
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000012, .5R: -na
Region 16 Avg IOU: 0.669235, Class: 0.997353, Obj: 0.786697, No Obj: 0.0017
Region 23 Avg IOU: -nan, Class: -nan, Obj: -nan, No Obj: 0.000013, .5R: -na

 1032: 0.841511, 0.629071 avg loss, 0.001000 rate, 8.946135 seconds, 66048
Loaded: 0.000042 seconds
Region 16 Avg IOU: 0.684005, Class: 0.998303, Obj: 0.621675, No Obj: 0.0013

 1033: 0.890124, 0.635176 avg loss, 0.001000 rate, 9.016898 seconds, 66112
```

```
ls
```

```
3rdparty/       CMakeLists.txt          image_yolov2.sh*         README.md
appveyor.yml    CMakeSettings.json      image_yolov3.sh*         results/
backup/         darknet*                include/                 scripts/
build/          DarknetConfig.cmake.in  json_mjpeg_streams.sh*   src/
build.ps1*      darknet.py              LICENSE                  test.txt
build.sh*       darknet_video.py        __MACOSX/                train.txt
cfg/            data/                   Makefile                 video_v2.sh*
chart.png       data_for_colab/         net_cam_v3.sh*           video_yolov3.
cmake/          data_for_colab.zip      obj/
```

```
from google.colab import files
uploaded = files.upload()
for name, data in uploaded.items():
  with open(name, 'wb') as f:
    f.write(data)
    print ('saved file', name)
```

⟶   [Choose Files │ test.jpg]
- **test.jpg** (image/jpeg) - 158852 bytes, last modified: 4/3/2019 - 100% done
Saving test.jpg to test.jpg
saved file test.jpg

```
!./darknet detector test data_for_colab/obj.data data_for_colab/yolov3-tiny-obj.c
```

⟶   layer   filters   size   input   output
        0 conv   16   3 x 3 / 1   416 x 416 x   3   ->   416 x 416 x 16 0.150
        1 max   2 x 2 / 2   416 x 416 x 16   ->   208 x 208 x 16 0.003
        2 conv   32   3 x 3 / 1   208 x 208 x 16   ->   208 x 208 x 32 0.399
        3 max   2 x 2 / 2   208 x 208 x 32   ->   104 x 104 x 32 0.001
        4 conv   64   3 x 3 / 1   104 x 104 x 32   ->   104 x 104 x 64 0.399
        5 max   2 x 2 / 2   104 x 104 x 64   ->   52 x 52 x 64 0.001
        6 conv   128   3 x 3 / 1   52 x 52 x 64   ->   52 x 52 x 128 0.399
        7 max   2 x 2 / 2   52 x 52 x 128   ->   26 x 26 x 128 0.000
        8 conv   256   3 x 3 / 1   26 x 26 x 128   ->   26 x 26 x 256 0.399
        9 max   2 x 2 / 2   26 x 26 x 256   ->   13 x 13 x 256 0.000
       10 conv   512   3 x 3 / 1   13 x 13 x 256   ->   13 x 13 x 512 0.399
       11 max   2 x 2 / 1   13 x 13 x 512   ->   13 x 13 x 512 0.000
       12 conv   1024   3 x 3 / 1   13 x 13 x 512   ->   13 x 13 x1024 1.595
       13 conv   256   1 x 1 / 1   13 x 13 x1024   ->   13 x 13 x 256 0.089
       14 conv   512   3 x 3 / 1   13 x 13 x 256   ->   13 x 13 x 512 0.399
       15 conv   18   1 x 1 / 1   13 x 13 x 512   ->   13 x 13 x 18 0.003
       16 yolo
       17 route 13
       18 conv   128   1 x 1 / 1   13 x 13 x 256   ->   13 x 13 x 128 0.011
       19 upsample   2x   13 x 13 x 128   ->   26 x 26 x 128
       20 route 19 8
       21 conv   256   3 x 3 / 1   26 x 26 x 384   ->   26 x 26 x 256 1.196
       22 conv   18   1 x 1 / 1   26 x 26 x 256   ->   26 x 26 x 18 0.006
       23 yolo
    Total BFLOPS 5.448
     Allocate additional workspace_size = 24.92 MB
    Loading weights from backup/yolov3-tiny-obj_1000.weights...
     seen 64
    Done!
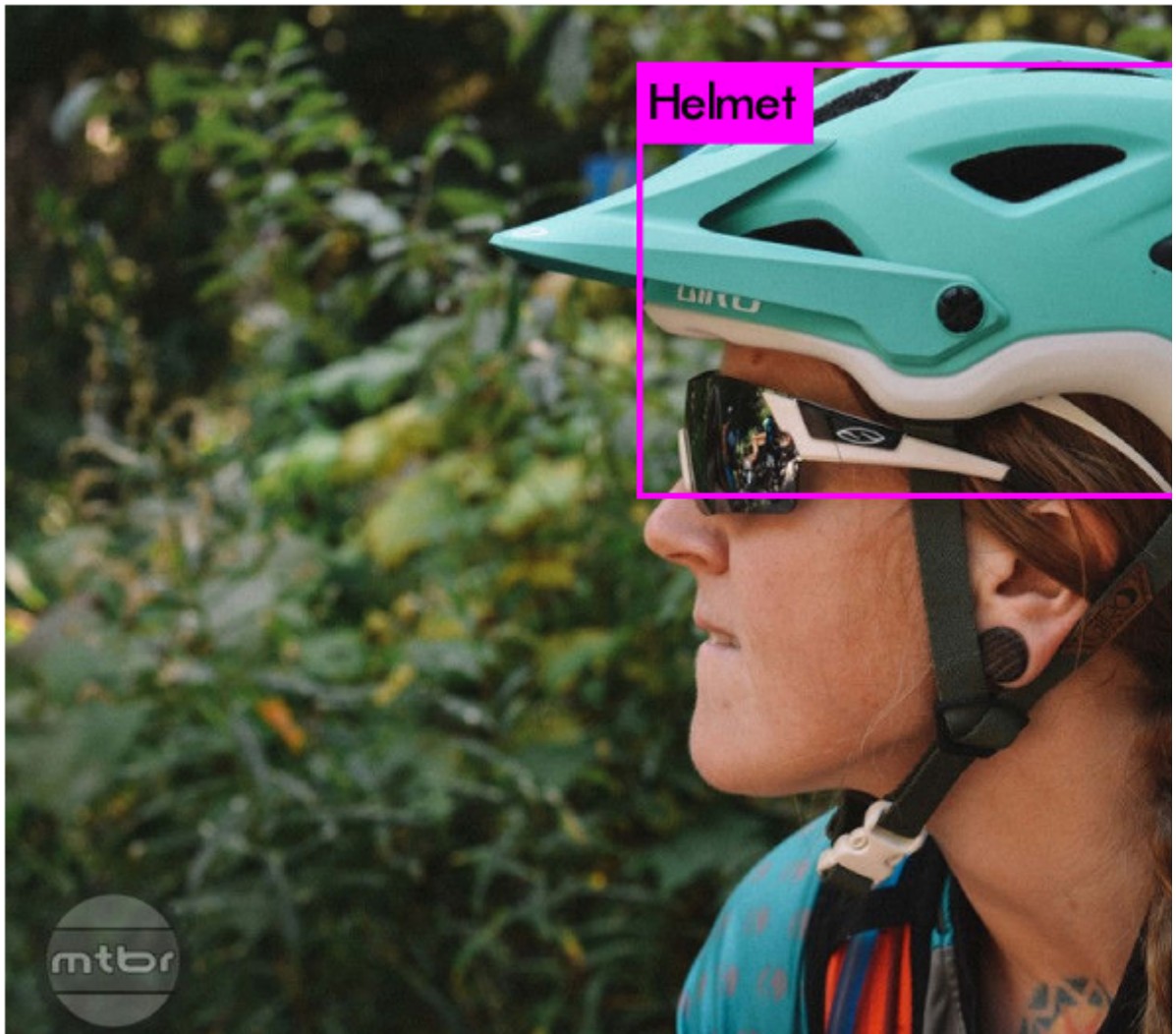   test.jpg: Predicted in 267.194000 milli-seconds.
    Helmet: 89%
    Unable to init server: Could not connect: Connection refused

    (predictions:21192): Gtk-**WARNING** **: 11:36:53.358: cannot open display:

```
imShow('predictions.jpg')
```

⟶

```
cd ..
```

> /content

```
cp drive/'My Drive'/helmet/bike1.mp4 /content/darknet
```

```
cd darknet
```

> /content/darknet

```
ls
```

>

```
    3rdparty/       CMakeLists.txt              image_yolov3.sh*              results/
    appveyor.yml   CMakeSettings.json           include/                     scripts/
```

```
_for_colab/obj.data data_for_colab/yolov3-tiny-obj.cfg backup/yolov3-tiny-obj_1000
```

➦

```
    3rdparty/       CMakeLists.txt              image_yolov3.sh*              results/
    appveyor.yml   CMakeSettings.json           include/                     scripts/
```

```
_for_colab/obj.data data_for_colab/yolov3-tiny-obj.cfg backup/yolov3-tiny-obj_1000
```

➦

```
Objects:

Helmet: 44%
```

```python
download('veout.avi')
```
```
1;1H
```

```
!./darknet detector calc_anchors Dataset/obj.data –num_of_clusters 5 –width 416 –h
```

```
num_of_clusters = 5, width = 416, height = 416
read labels from 237 images
loaded          image: 30        box: 30

Wrong label: /content/darknet/Dataset/nfpa/pos-130.txt – j = 0, x = 0.50833
loaded          image: 73        box: 74

Wrong label: /content/darknet/Dataset/nfpa/pos-173.txt – j = 2, x = 0.44062
loaded          image: 236       box: 298Can't open label file. (This can b

all loaded.

calculating k-means++ ...

iterations = 13


avg IoU = 69.58 %

Saving anchors to the file: anchors.txt
anchors =   8, 17,  57, 75, 160,154, 199,284, 354,364
^C


    .


FPS:52.1


Helmet: 61%


cvWriteFrame
1;1H
FPS:54.5
Objects:

Helmet: 55%

cvWriteFrame
1;1H
FPS:41.5
Objects:
```