

Screenshot Projek 5 dan Deskripsi Tiap Tahapannya

```
2009106100_AlyaniNoorSeptalia_PCD5.ipynb
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+ Code + Text

[ ] !nvidia-smi

Fri Jan 6 14:48:16 2023

+-----+
| NVIDIA-SMI 460.32.03   Driver Version: 460.32.03   CUDA Version: 11.2   |
+-----+-----+
| 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 T4           Off   | 00000000:00:04:0  Off   |    0
| N/A   65C    P0      20W / 70W |  6118 / 15109MiB |    0%      Default   |
+-----+-----+
| Processes:                                                       GPU Memory |
|  GPU   GI    CI     PID    Type   Process name                  Usage      |
|  ID   ID                                     |              |
+-----+-----+
| No running processes found                                     |              |
+-----+

[ ] from google.colab import drive
drive.mount('/content/gdrive')

Mounted at /content/gdrive

[ ] !ln -s /content/gdrive/My Drive/ /mydrive
!ls /mydrive/PCD

2009106100_AlyaniNoorSeptalia_PCD5.ipynb  data  train.txt
classes.txt                               data.zip

[ ] !git clone https://github.com/AlexeyAB/darknet

Cloning into 'darknet'...
remote: Enumerating objects: 15502, done.
remote: Total 15502 (delta 0), reused 0 (delta 0), pack-reused 15502
Receiving objects: 100% (15502/15502), 14.17 MiB | 24.56 MiB/s, done.
Resolving deltas: 100% (10403/10403), done.
```

Pertama, kita menggunakan command `nvidia-smi` untuk mengaktifkan `free-gpu` yang disediakan oleh Google Collab. Lalu, kita mount drive kita kedalam file `ipynb` yang kita gunakan untuk membuat projek. Setelah itu kita lihat direktori yang ada di drive menggunakan command `ls`. Kemudian, kita clone git `darknet` yang akan digunakan untuk training dataset.

```
2009106100_AlyaniNoorSeptalia_PCD5.ipynb
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+ Code + Text
%cd darknet
lsed -i '$PWDENCY=0/DOPENCV=1/' Makefile
lsed -i '$GPU=0/GPU=1/' Makefile
lsed -i '$CUDNN=0/CUDNN=1/' Makefile
make

gcc -Iinclude -Ithirdparty/stb/include -DOPENCV pkg-config --cflags opencv4 2> /dev/null || pkg-config --cflags opencv -DGPU -I/usr/local/cuda/include/ -DCUDNN -Wall -Wfatal-errors -Wno-unused-result -Wno-unknown-pragmas -fPIC -Ofast -std=c++11 -c ./src/convolutional_layer.c: In function 'forward_convolutional_layer':
./src/convolutional_layer.c:1342:32: warning: unused variable 't_input_size' [-Wunused-variable]
    size_t t_input_size = binary_transpose_align_input(k, n, state.workspace, &t_bit_input, ldb_align, 1-bit_align);
                                ^~~~~~

gcc -Iinclude -Ithirdparty/stb/include -DOPENCV pkg-config --cflags opencv4 2> /dev/null || pkg-config --cflags opencv -DGPU -I/usr/local/cuda/include/ -DCUDNN -Wall -Wfatal-errors -Wno-unused-result -Wno-unknown-pragmas -fPIC -Ofast -std=c++11 -c ./src/convolutional_layer.c: In function 'backward_convolutional_layer':
./src/activation.c: In function 'activate':
./src/activations.c:79:5: warning: enumeration value 'RELU6' not handled in switch [-Wswitch]
    switch(a) {
        ^~~~~
./src/activations.c:79:5: warning: enumeration value 'SMISH' not handled in switch [-Wswitch]
./src/activations.c:79:5: warning: enumeration value 'MISH' not handled in switch [-Wswitch]
./src/activations.c:79:5: warning: enumeration value 'HARD_MISH' not handled in switch [-Wswitch]
./src/activations.c:79:5: warning: enumeration value 'NORM_CHAN' not handled in switch [-Wswitch]
./src/activations.c:79:5: warning: enumeration value 'NORM_CHAN_SOFTMAX' not handled in switch [-Wswitch]
./src/activations.c:79:5: warning: enumeration value 'NORM_CHAN_SOFTMAX_MAXVAL' not handled in switch [-Wswitch]
./src/activations.c: In function 'gradient':
./src/activations.c:318:5: warning: enumeration value 'SMISH' not handled in switch [-Wswitch]
    switch(a) {
        ^~~~~
./src/activations.c:318:5: warning: enumeration value 'MISH' not handled in switch [-Wswitch]
./src/activations.c:318:5: warning: enumeration value 'HARD_MISH' not handled in switch [-Wswitch]
gcc -Iinclude -Ithirdparty/stb/include -DOPENCV pkg-config --cflags opencv4 2> /dev/null || pkg-config --cflags opencv -DGPU -I/usr/local/cuda/include/ -DCUDNN -Wall -Wfatal-errors -Wno-unused-result -Wno-unknown-pragmas -fPIC -Ofast -std=c++11 -c ./src/blas.c: In function 'backward_shortcut_multilayer_cpu':
./src/blas.c:207:21: warning: unused variable 'out_index' [-Wunused-variable]
    int out_index = id;
                        ^~~~~~
./src/blas.c: In function 'find_sim':
./src/blas.c:597:59: warning: format '%d' expects argument of type 'int', but argument 2 has type 'size_t {aka long unsigned int}' [-Wformat-]
    printf("Error: find_sim(): sim isn't found: i = %d, j = %d, z = %d\n", i, j, z);
                                                              ^~~~
                                                                xid
./src/blas.c:597:67: warning: format '%d' expects argument of type 'int', but argument 3 has type 'size_t {aka long unsigned int}' [-Wformat-]
    printf("Error: find_sim(): sim isn't found: i = %d, j = %d, z = %d\n", i, j, z);
                                                                    ^~~~
                                                                    xid
./src/blas.c:597:75: warning: format '%d' expects argument of type 'int', but argument 4 has type 'size_t {aka long unsigned int}' [-Wformat-]
```

Setelah berhasil clone darknet, kita pindah direktori menjadi darknet untuk membuat file GPU.

```
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[ ] lcp cfg/yolov3-tiny.cfg cfg/yolov3_training.cfg
lsed -i 's/batch=1/batch=64/' cfg/yolov3_training.cfg
lsed -i 's/subdivisions=1/subdivisions=16/' cfg/yolov3_training.cfg
lsed -i 's/max_batches = 500200/max_batches = 10000/' cfg/yolov3_training.cfg
lsed -i 's/618 s@classes=800/classes=64/' cfg/yolov3_training.cfg
lsed -i 's/606 s@classes=800/classes=64/' cfg/yolov3_training.cfg
lsed -i 's/783 s@classes=800/classes=64/' cfg/yolov3_training.cfg
lsed -i 's/603 s@filters=255/filters=207/' cfg/yolov3_training.cfg
lsed -i 's/689 s@filters=255/filters=207/' cfg/yolov3_training.cfg
lsed -i 's/776 s@filters=255/filters=207/' cfg/yolov3_training.cfg

[ ] !echo -e 'Berl Jalan\nStop\nTidak Boleh Masuk\nJalur Satu Arah\nTidak Boleh Ada Kendaraan Di Kedua Jalur\nSepeda Tidak Boleh Masuk\nTruk Muatan Tidak Boleh Masuk\nPejalan Kaki Tidak Boleh Masuk\nKereta Kuda Tidak Boleh Masuk\nGerobak'
!echo -e 'classes= 64\ntrain= data/train.txt\nvalid= data/test.txt\nnames= data/obj.names\nbackup= ./mydrive/PCD > data/obj.data

[ ] lcp data/obj.names ./mydrive/PCD/classes.txt

[ ] !mkdir ./mydrive/PCD/data/obj

mkdir: cannot create directory './mydrive/PCD/data/obj': File exists

[ ] !unzip ./mydrive/PCD/data.zip -d ./mydrive/PCD/data/obj

Inflating: ./mydrive/PCD/data/obj/data/sign08.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign08.txt
Inflating: ./mydrive/PCD/data/obj/data/sign59.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign59.txt
Inflating: ./mydrive/PCD/data/obj/data/sign6.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign6.txt
Inflating: ./mydrive/PCD/data/obj/data/sign60.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign60.txt
Inflating: ./mydrive/PCD/data/obj/data/sign61.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign61.txt
Inflating: ./mydrive/PCD/data/obj/data/sign62.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign62.txt
Inflating: ./mydrive/PCD/data/obj/data/sign63.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign63.txt
Inflating: ./mydrive/PCD/data/obj/data/sign64.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign64.txt
Inflating: ./mydrive/PCD/data/obj/data/sign65.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign65.txt
Inflating: ./mydrive/PCD/data/obj/data/sign66.jpg
Inflating: ./mydrive/PCD/data/obj/data/sign66.txt
Inflating: ./mydrive/PCD/data/obj/data/sign67.jpg
```

Setelah berhasil membuat file GPU di darknet, selanjutnya kita mengconfig file cfg yang ada di darknet, beberapa hal yang dirubah adalah jumlah batch, subdivision, maxbatch, classes, dan filters. Classes dan filters disesuaikan dengan jumlah class dataset kita. Untuk kasus ini, dataset saya menggunakan 64 classes dan 207 filters sesuai dengan rumus filter yakni: jumlah class + 5 x 3. Lalu kita masukkan nama-nama class yang kita gunakan pada dataset untuk ditaruh kedalam file. Lalu kita deklarasikan class, letak file train, letak file test untuk digunakan nantinya. Kemudian, kita unzip file dataset kedalam folder data/obj.

```
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[ ] import glob
images_list = glob.glob("data/obj/data/*.jpg")
with open("data/train.txt", "w") as f:
    f.write("\n".join(images_list))

[ ] !wget https://pjreddie.com/media/files/darknet53.conv.74

--2023-01-06 15:00:11-- https://pjreddie.com/media/files/darknet53.conv.74
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: 162482580 (153M) [application/octet-stream]
Saving to: 'darknet53.conv.74.1'

darknet53.conv.74.1 100%[=====] 154.90M 32.3MB/s in 4.7s

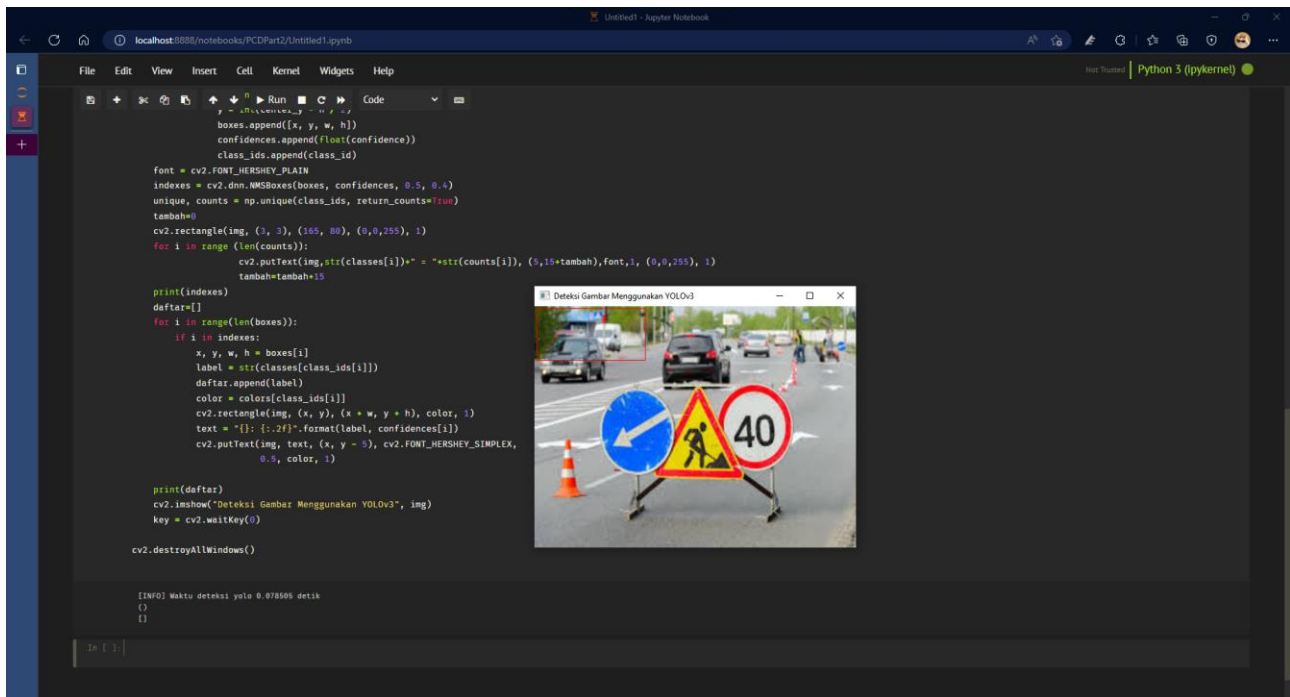
2023-01-06 15:00:16 (33.0 MB/s) - 'darknet53.conv.74.1' saved [162482580/162482580]

[ ] !./darknet detector train data/obj.data cfg/yolov3_training.cfg darknet53.conv.74 -dont_show
#./darknet detector train data/obj.data cfg/yolov3_training.cfg ./mydrive/PCD/yolov3_training_last.weights -dont_show

v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.146057, iou_loss = 0.000000, total_loss = 493.146057
total_box = 8869, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.782788), count: 4, class_loss = 144.993652, iou_loss = 0.228108, total_loss = 145.213760
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.146149, iou_loss = 0.000000, total_loss = 493.146149
total_box = 8870, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.790495), count: 4, class_loss = 144.621964, iou_loss = 0.175903, total_loss = 144.797867
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.145386, iou_loss = 0.000000, total_loss = 493.145386
total_box = 8874, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.770076), count: 4, class_loss = 144.497452, iou_loss = 0.235397, total_loss = 144.732849
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.145874, iou_loss = 0.000000, total_loss = 493.145874
total_box = 8878, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.736851), count: 4, class_loss = 145.188252, iou_loss = 0.158157, total_loss = 145.338489
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.146301, iou_loss = 0.000000, total_loss = 493.146301
total_box = 8882, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.738749), count: 4, class_loss = 144.993149, iou_loss = 0.095840, total_loss = 145.088989
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.147583, iou_loss = 0.000000, total_loss = 493.147583
total_box = 8880, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.774793), count: 4, class_loss = 144.588899, iou_loss = 0.121277, total_loss = 144.688176
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.146820, iou_loss = 0.000000, total_loss = 493.146820
total_box = 8890, rewritten_box = 0.000000 %
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 16 Avg (IOU: 0.762187), count: 4, class_loss = 144.931351, iou_loss = 0.169907, total_loss = 145.101257
v3 (mse loss, Normalizer: (iou: 0.75, obj: 1.00, cls: 1.00) Region 23 Avg (IOU: 0.000000), count: 1, class_loss = 493.145874, iou_loss = 0.000000, total_loss = 493.145874
```

Selanjutnya, kita import library glob untuk mengumpulkan semua nama file gambar yang ada di dataset menjadi 1 file txt yang akan digunakan untuk training data. Lalu kita import darknet53 untuk

proses training datanya, setelah iterasi ke 100 file weights akan muncul secara otomatis di drive kita yang akan digunakan untuk deteksi gambar.



Setelah melakukan training data, kita lakukan pendeteksian gambar menggunakan file python yang sudah diberikan. Kita hanya perlu mengganti file weights, cfg, dan gambar yang digunakan untuk deteksi. **Pada kasus saya, deteksi gambar belum berhasil karena rambu lalu lintas tidak terbaca.**