

Individual Lab Report #5

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Individual Progress

This week I basically worked on object detection algorithm, try to use SSD(single shot multibox detection) algorithm to detect the object in real-time.

First of all, I need to understand Caffe framework and install it on the computer. To better understand Caffe, I draw the basic framework(shown in figure1) of caffe from my understanding.

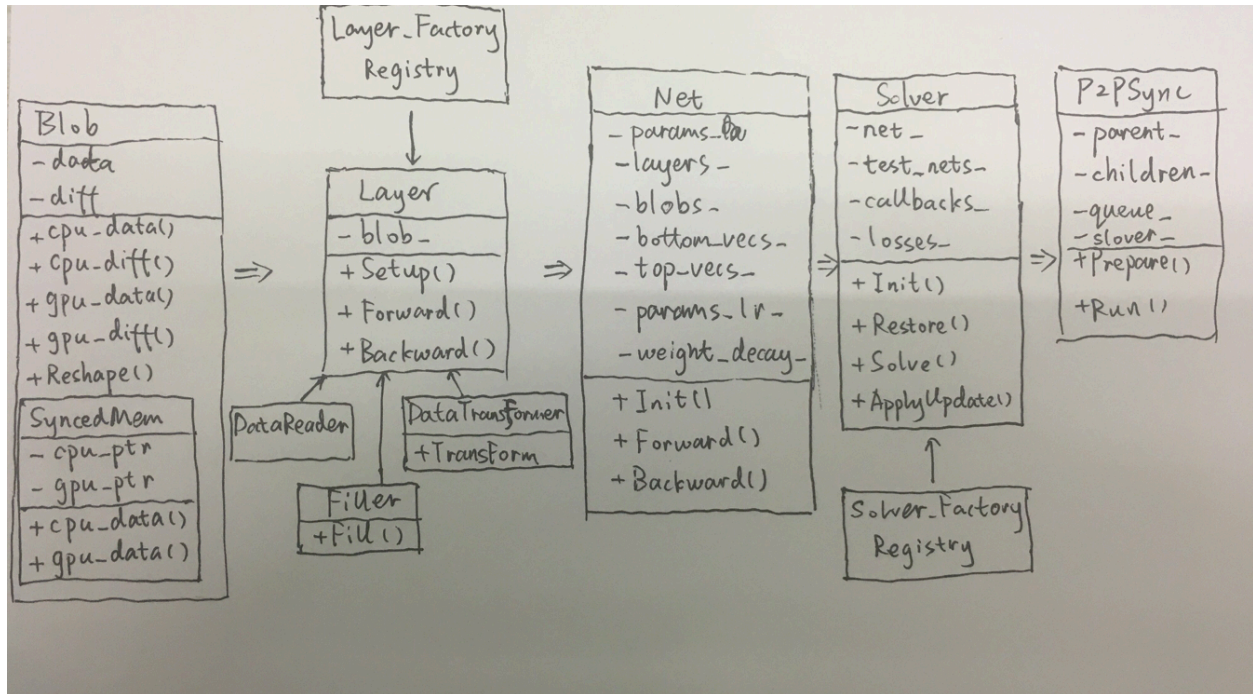


Figure 1 caffe model

Then about install and configure ssd on my computer, I followed the tutorial given by the author on github, but because of my computer only have cpu, I need to change some of the code and configuration.

- 1) Comment the GPU part of both examples/ssd/ssd_pascal.py && examples/ssd/score_ssd_pascal.py

```
#Ifnum_gpus >0:
    # batch_size_per_device =int(math.ceil(float(batch_size) / num_gpus))
    #iter_size =int(math.ceil(float(accum_batch_size) / (batch_size_per_device *
    num_gpus)))
    # solver_mode =P.Solver.GPU
    # device_id =int(gpulist[0])
```

- 2) If there is any error said no module named caffe, export python path to caffe python.
- 3) Type in terminal: `export $PYTHONPATH=/home/menghan/objectdetection/caffe/python`

Then load a video in this model and the algorithm is able to detect the objects in the video in 0.28FPS use only CPU, the result is shown in figure 2.

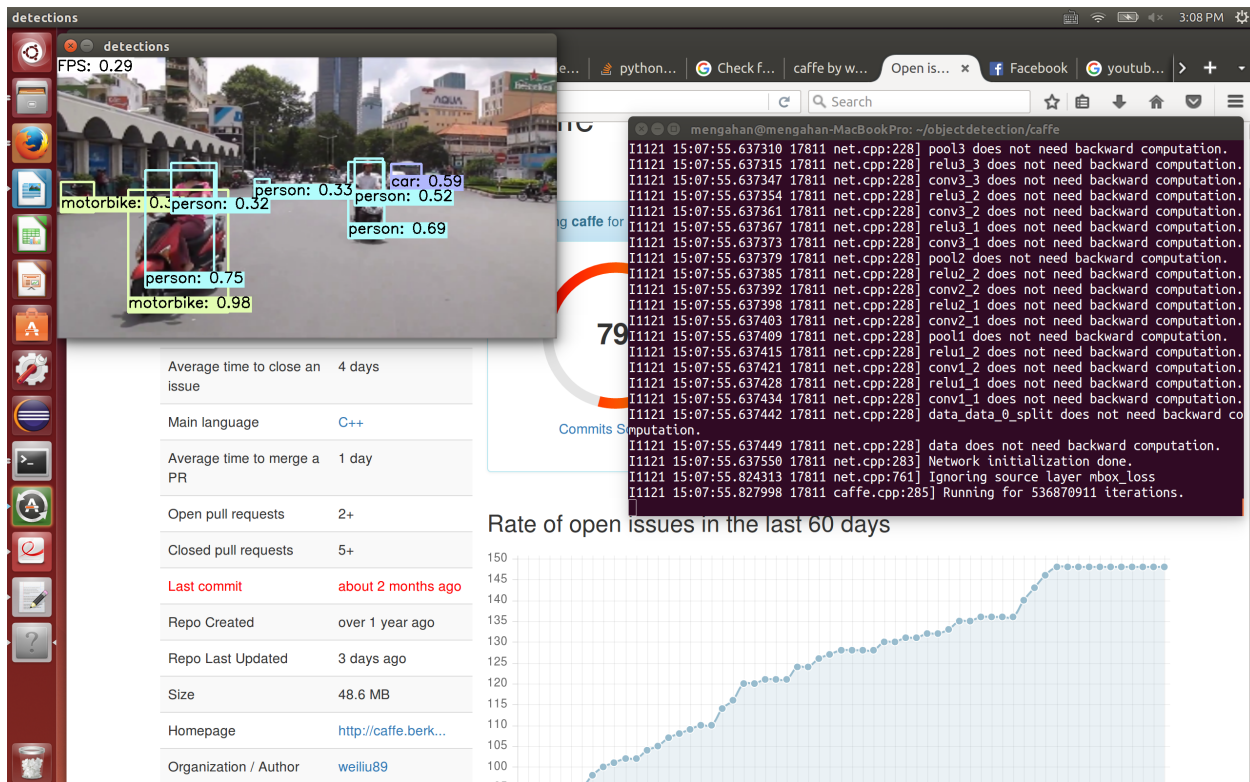


Figure 2. SSD detection result

Then I try to install and configure in Yihao's computer which have GPU of NVIDIA Quadro FX 370M, it is ten times fast than only use CPU of Macbook Pro, the detection speed can achieve 2.88FPS. The algorithm should have 50FPS if we using NVIDIA TitanX GPU, so it is reliable to make realtime detection.

Challenge

The challenge this week is using the algorithm to process the information collected by our camera directly, I can not find the device ID of our camera. I have tried several method, try to use flycap(SDK provided by point grey) to find the serial number, try to use lsusb to get the ID(shown in Figure 3), tried the number from 1 to 200 using for loop in the python script to find the correct ID, I start to doubt about my computer, I wonder there are some kind of hardware compatible problems between Ubuntu and Macbook. I'll try these methods on another computer.

```

[1121 13:32:12.697751 15181 layer_factory.hpp:77] Creating layer data
[1121 13:32:12.697787 15181 net.cpp:100] Creating Layer data
[1121 13:32:12.697795 15181 net.cpp:408] data -> data
[1121 13:32:12.697890 15181 video_data_layer.cpp:44] Failed to open webcam: 0
*** Check failure stack trace: ***
@ 0x7f532834adaa (unknown)
@ 0x7f532834ace4 (unknown)
@ 0x7f532834a6e6 (unknown)
@ 0x7f532834d687 (unknown)
@ 0x7f532885688f caffe::VideoDataLayer<>::DataLayerSetUp()
@ 0x7f53288c09ba caffe::BasePrefetchingDataLayer<>::LayerSetUp()
@ 0x7f532881b8bc caffe::Net<>::Init()
@ 0x7f532881cefb caffe::Net<>::Net()
@ 0x4078f9 test()
@ 0x405fdc main
@ 0x7f5327356f45 (unknown)
@ 0x40684b (unknown)
@ (nil) (unknown)
Aborted (core dumped)
mengahan@mengahan-MacBookPro:~/objectdetection/caffe$

```

Figure 3. Error information

```

mengahan@mengahan-MacBookPro:~$ sudo lsusb
Bus 002 Device 003: ID 05ac:8406 Apple, Inc.
Bus 002 Device 004: ID 1e10:3300 Point Grey Research, Inc.
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 05ac:0273 Apple, Inc.
Bus 001 Device 002: ID 05ac:8290 Apple, Inc.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

```

Figure 4. Lsusb information

Team work

This week I basically worked by myself, then helped Yihao about stereo camera calibration, used Yihao's computer test the algorithm. At the same time, harry was working on hardware part to trigger both camera simultaneously, Zihao and Amit were working on Radar use Polysyn.

Plan

I'll go deep in find the device ID of the camera, then try to detect the objects in both camera simultaneously and try to learn how to use the point cloud data(provided by radar) to detect the objects.

If I have more time, I'll try to use OpenCV to build the stereo vision.