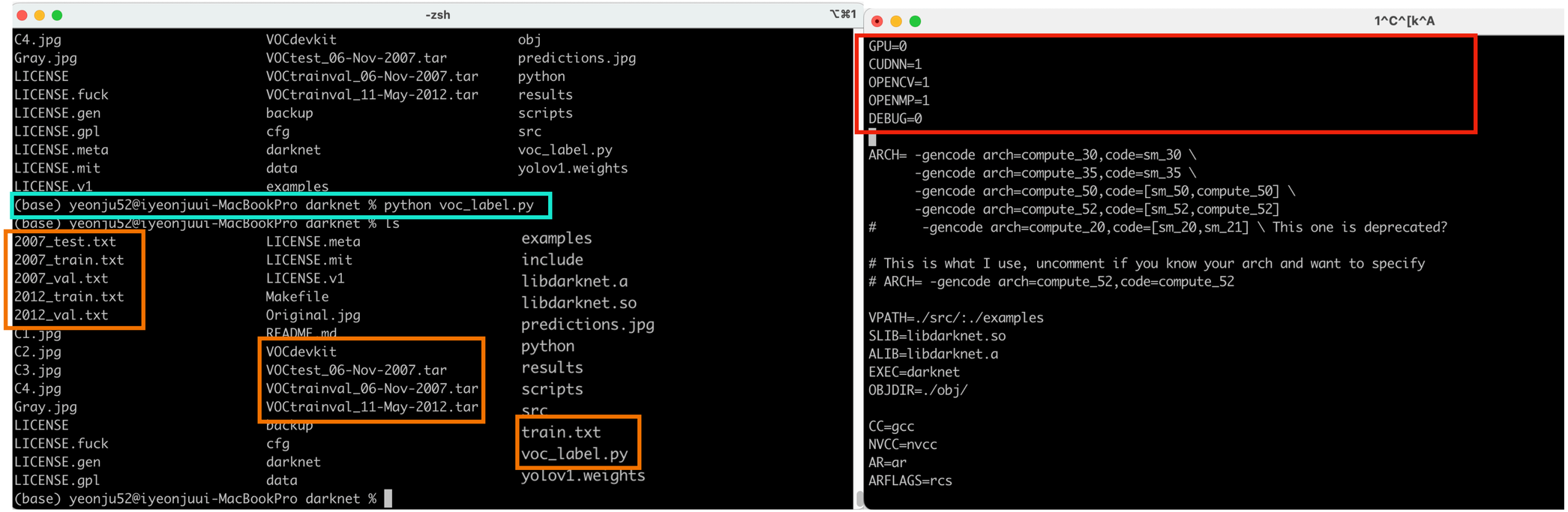
Setting & Get Pascal VOC Data

yolo v1 설치 후 데이터 처리

- **train dataset: 2007 (train, val), 2012 (train, val)**
- **test dataset: 2007 (test)**
- **Makefile: GPU=1 -> GPU = 0으로 변경 (개인컴이므로 ! 서버컴에서는 GPU=1로 돌려야 함)**

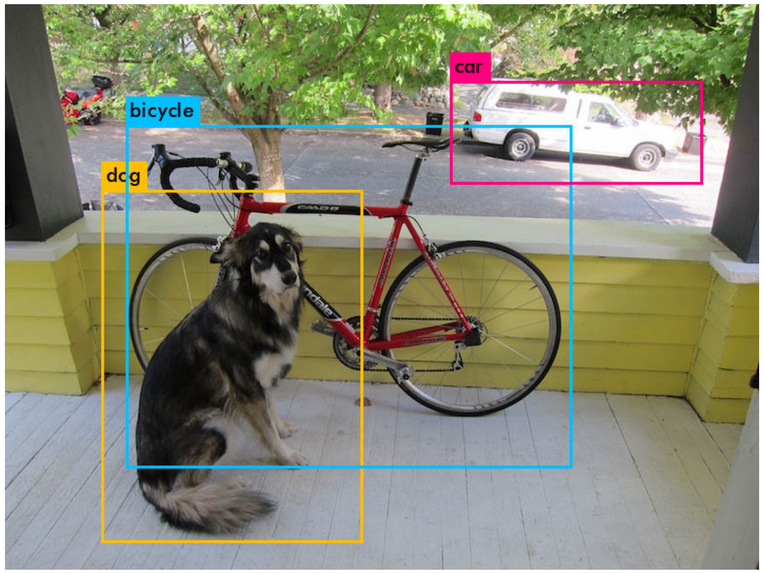


(좌) python voc_label.py (우) Makefile

Test Result with pre-trained weight

yolo v1 test 실행 1

```
./darknet yolo test cfg/yolov1.cfg
yolov1.weights data/dog.jpg
```

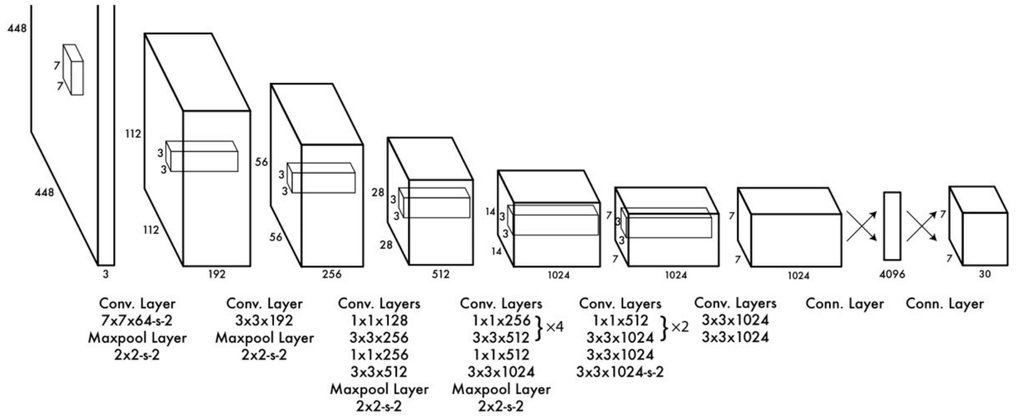



```
-zsh                                                                    ⌥⌘1
(base) yeonju52@iyeonjuui-MacBookPro darknet % ./darknet yolo test cfg/yolov1/yolo.cfg yolov1.weights data/dog.jpg
Couldn't open file: cfg/yolov1/yolo.cfg
(base) yeonju52@iyeonjuui-MacBookPro darknet % ./darknet yolo test cfg/yolov1.cfg yolov1.weights data/dog.jpg
layer     filters    size              input                output
    0 conv     64  7 x 7 / 2   448 x 448 x   3   ->   224 x 224 x  64  0.944 BFLOPs
    1 max          2 x 2 / 2   224 x 224 x  64   ->   112 x 112 x  64
    2 conv    192  3 x 3 / 1   112 x 112 x  64   ->   112 x 112 x 192  2.775 BFLOPs
    3 max          2 x 2 / 2   112 x 112 x 192   ->    56 x  56 x 192
    4 conv    128  1 x 1 / 1    56 x  56 x 192   ->    56 x  56 x 128  0.154 BFLOPs
    5 conv    256  3 x 3 / 1    56 x  56 x 128   ->    56 x  56 x 256  1.850 BFLOPs
    6 conv    256  1 x 1 / 1    56 x  56 x 256   ->    56 x  56 x 256  0.411 BFLOPs
    7 conv    512  3 x 3 / 1    56 x  56 x 256   ->    56 x  56 x 512  7.399 BFLOPs
    8 max          2 x 2 / 2    56 x  56 x 512   ->    28 x  28 x 512
    9 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   10 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   11 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   12 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   13 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   14 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   15 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   16 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   17 conv    512  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 512  0.411 BFLOPs
   18 conv   1024  3 x 3 / 1    28 x  28 x 512   ->    28 x  28 x1024  7.399 BFLOPs
   19 max          2 x 2 / 2    28 x  28 x1024   ->    14 x  14 x1024
   20 conv    512  1 x 1 / 1    14 x  14 x1024   ->    14 x  14 x 512  0.206 BFLOPs
   21 conv   1024  3 x 3 / 1    14 x  14 x 512   ->    14 x  14 x1024  1.850 BFLOPs
   22 conv    512  1 x 1 / 1    14 x  14 x1024   ->    14 x  14 x 512  0.206 BFLOPs
   23 conv   1024  3 x 3 / 1    14 x  14 x 512   ->    14 x  14 x1024  1.850 BFLOPs
   24 conv   1024  3 x 3 / 1    14 x  14 x1024   ->    14 x  14 x1024  3.699 BFLOPs
   25 conv   1024  3 x 3 / 2    14 x  14 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   26 conv   1024  3 x 3 / 1     7 x   7 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   27 conv   1024  3 x 3 / 1     7 x   7 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   28 Local Layer: 7 x 7 x 1024 image, 256 filters -> 7 x 7 x 256 image
   29 dropout       p = 0.50              12544  ->  12544
   30 connected                           12544  ->  1715
   31 Detection Layer
forced: Using default '0'
Loading weights from yolov1.weights...Done!
data/dog.jpg: Predicted in 2.222997 seconds.
dog: 26%
bicycle: 39%
car: 74%
Not compiled with OpenCV, saving to predictions.png instead
```

Test Result with pre-trained weight

논문 내 네트워크과 코드 결과 비교

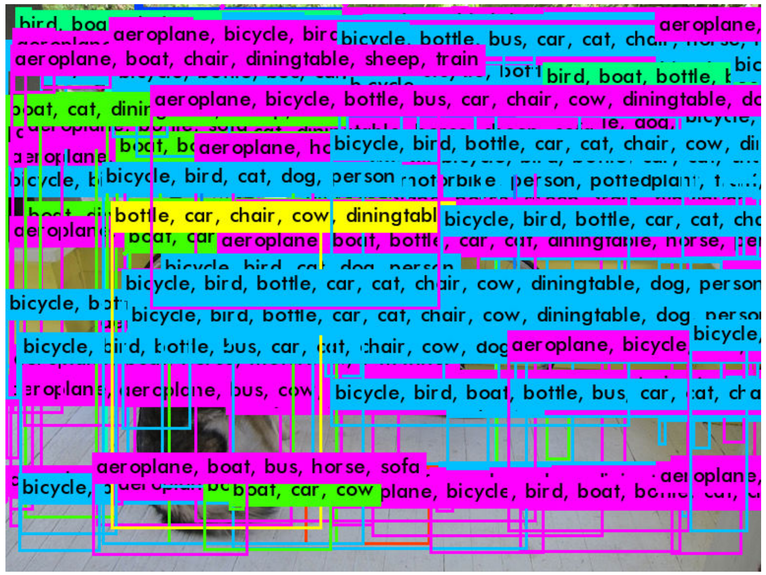
```
(base) yeonju52@iyeonjuui-MacBookPro darknet % ./darknet yolo test cfg/yolov1.cfg yol
layer     filters    size              input                output
    0 conv     64  7 x 7 / 2   448 x 448 x   3   ->   224 x 224 x  64  0.944 BFLOPs
    1 max          2 x 2 / 2   224 x 224 x  64   ->   112 x 112 x  64
    2 conv    192  3 x 3 / 1   112 x 112 x  64   ->   112 x 112 x 192  2.775 BFLOPs
    3 max          2 x 2 / 2   112 x 112 x 192   ->    56 x  56 x 192
    4 conv    128  1 x 1 / 1    56 x  56 x 192   ->    56 x  56 x 128  0.154 BFLOPs
    5 conv    256  3 x 3 / 1    56 x  56 x 128   ->    56 x  56 x 256  1.850 BFLOPs
    6 conv    256  1 x 1 / 1    56 x  56 x 256   ->    56 x  56 x 256  0.411 BFLOPs
    7 conv    512  3 x 3 / 1    56 x  56 x 256   ->    56 x  56 x 512  7.399 BFLOPs
    8 max          2 x 2 / 2    56 x  56 x 512   ->    28 x  28 x 512
    9 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   10 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   11 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   12 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   13 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   14 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   15 conv    256  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 256  0.206 BFLOPs
   16 conv    512  3 x 3 / 1    28 x  28 x 256   ->    28 x  28 x 512  1.850 BFLOPs
   17 conv    512  1 x 1 / 1    28 x  28 x 512   ->    28 x  28 x 512  0.411 BFLOPs
   18 conv   1024  3 x 3 / 1    28 x  28 x 512   ->    28 x  28 x1024  7.399 BFLOPs
   19 max          2 x 2 / 2    28 x  28 x1024   ->    14 x  14 x1024
   20 conv    512  1 x 1 / 1    14 x  14 x1024   ->    14 x  14 x 512  0.206 BFLOPs
   21 conv   1024  3 x 3 / 1    14 x  14 x 512   ->    14 x  14 x1024  1.850 BFLOPs
   22 conv    512  1 x 1 / 1    14 x  14 x1024   ->    14 x  14 x 512  0.206 BFLOPs
   23 conv   1024  3 x 3 / 1    14 x  14 x 512   ->    14 x  14 x1024  1.850 BFLOPs
   24 conv   1024  3 x 3 / 1    14 x  14 x1024   ->    14 x  14 x1024  3.699 BFLOPs
   25 conv   1024  3 x 3 / 2    14 x  14 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   26 conv   1024  3 x 3 / 1     7 x   7 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   27 conv   1024  3 x 3 / 1     7 x   7 x1024   ->     7 x   7 x1024  0.925 BFLOPs
   28 Local Layer: 7 x 7 x 1024 image, 256 filters -> 7 x 7 x 256 image
   29 dropout       p = 0.50               12544  ->  12544
   30 connected                            12544  ->  1715
   31 Detection Layer
```

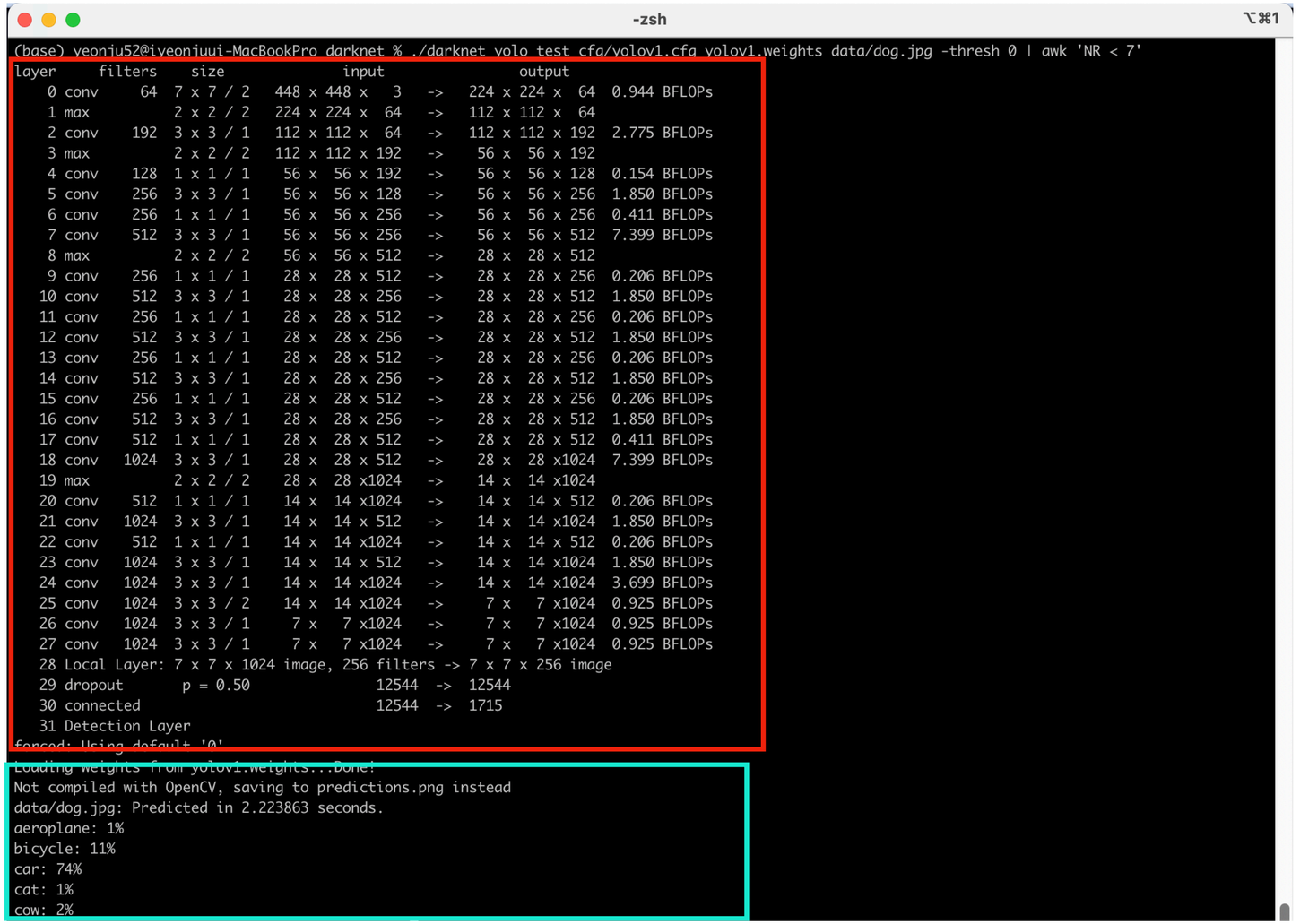


Test Result (thresh = 0)

yolo v1 test 실행 2

```
./darknet yolo test cfg/yolov1.cfg
yolov1.weights data/dog.jpg -thresh 0 |
awk 'NR < 7'
```





Train 실행 시도 -> 실패

- pre-trained model 말고 직접 test를 시도

```
./darknet yolo train cfg/yolov1/yolo.train.cfg extraction.conv.weights
```

  - 실패: extraction.conv.weights 찾을 수 없음 > 버전이 업데이트 되면서 주소가 달라지거나 아예 삭제된 것으로 추정
  - yolo v3 이나 yolo v5를 재설치 시도 중
    - yolo v3 설치 시도 ⟹ make 명령어 오류

```
clang: fatal error: unsupported option '-fopenmp'
```

Anchor Box

- 종횡비(w, h)가 정해진 bounding box
- b.w, b.h: 사전에 크기와 비율이 모두 결정되어 있는 박스임을 알 수 있음 (Anchor Box)
  - 이 박스를 전제로, 학습을 통해서 이 박스의 위치나 크기를 세부 조정함
- Anchor Box는 object detection에 큰 영향을 끼침 -> 다음주 계산식 해석

```
83  box get_yolo_box(float *x, float *biases, int n, int index, int i, int j, int lw, int lh, int w, int h, int stride)
84  {
85      box b;
86      b.x = (i + x[index + 0*stride]) / lw;
87      b.y = (j + x[index + 1*stride]) / lh;
88      b.w = exp(x[index + 2*stride]) * biases[2*n]   / w;
89      b.h = exp(x[index + 3*stride]) * biases[2*n+1] / h;
90      return b;
91  }
```