YOLO V3

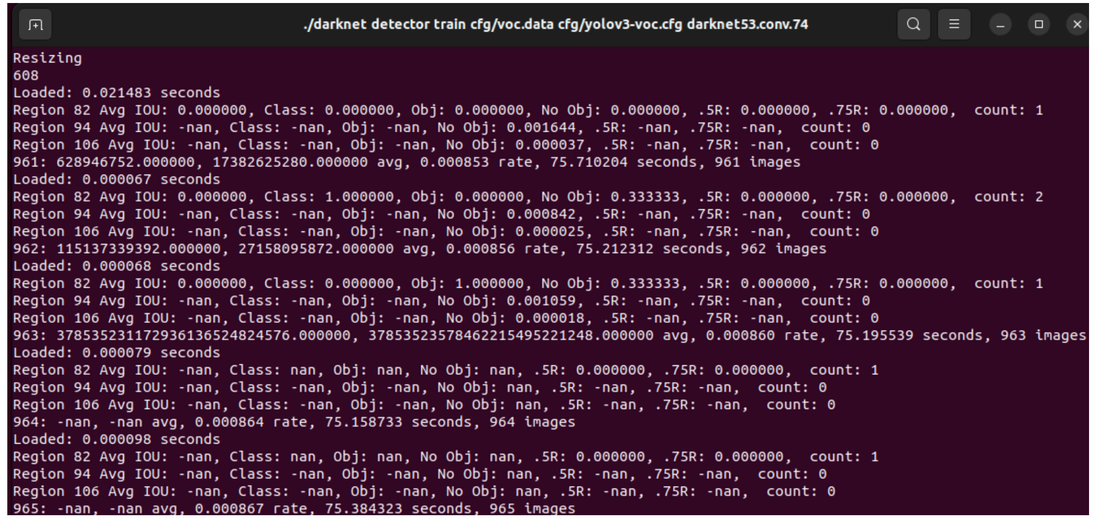
~23.02.28

Yolo v3 - train (0)

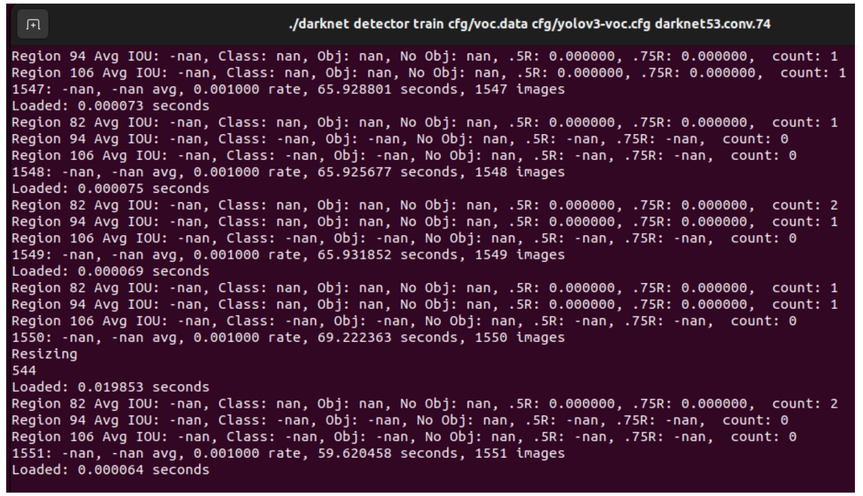
먼저, VOC 데이터로 train 잘 되는지 테스트함

```
./darknet detector train cfg/voc.data cfg/yolov3-voc.cfg darknet53.conv.74
```

- 학습 시, 과적합을 막는 세팅을 따로 해야함. 모든 값이 nan이 나와도 계속 학습되고 있음.
- Yolo 학습 자체는 잘 진행되고 있음을 확인.



964번째부터 모든 값이 nan이 나오기 시작



Train 24시간 경과 후

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Yolo v3 - train (1)

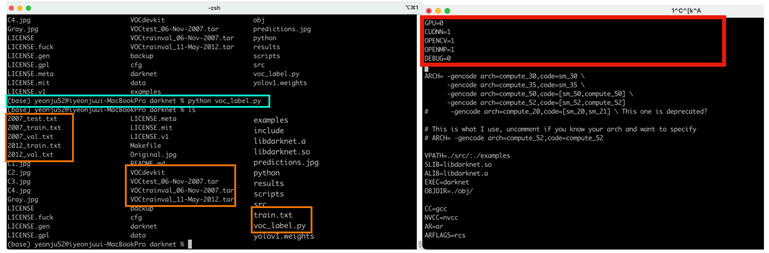
문제 발생 - 해결 시도

- (문제) Yolo v3 train 시도: (800 batch = 8시간)
  -> Too Long !
- (가정) Makefile에서 GPU=1로 설정했음에도 불구하고 GPU가 활성화가 안 된 걸까? Why?
- (해결1) MakeFile과 Make명령어에 대한 오해가 있었음
  - Make 명령어 후, ./darknet (실행파일) 생성됨
  - MakeFile 바꾼 설정을 적용하기 위해선,
    Make 명령어 실행 전에 MakeFile을 수정해야함.
- (해결2) CUDA arch & gencode를 nvidia 버전에 매칭해야함
  https://arnon.dk/matching-sm-architectures-arch-and-gencode-for-various-nvidia-cards/
  (현버전:
```
user ~ nvidia-smi --query | fgrep 'Product Name'
    Product Name                          : NVIDIA GeForce RTX 3090
```
)

Setting & Get Pascal VOC Data

yolo v1 설치 후 데이터 처리

- train dataset (15680개): 2007 (train, val), 2012 (train, val)
- test dataset (4952개): 2007 (test)
- Makefile: GPU=1 -> GPU = 0으로 변경 (개인컴이므로 ! 서버컴에서는 GPU=1로 돌려야 함)



(좌) python voc_label.py (우) Makefile

[발표자료 230214 1p] 오개념

```
if(avg_loss == -1) avg_loss = loss;
avg_loss = avg_loss*.9 + loss*.1;
printf("%ld, %.3f: %f, %f avg, %f rate, %lf seconds, %ld images\n", get_current_batch(net), (float)(*net.seen)
free_data(train);
if(get_current_batch(net)%100 == 0){
    char buff[256];
    sprintf(buff, "%s/%s_batch_%ld.weights", backup_directory, base, get_current_batch(net));
    save_weights(net, buff);
}
if(*net.seen/N > epoch){
    epoch = *net.seen/N;
    char buff[256];
    sprintf(buff, "%s/%s_%d.weights",backup_directory,base, epoch);
    save_weights(net, buff);
```

batch라고 생각한 이유 (iteration, epoch x)

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Yolo v3 - train (2)

Train을 위한 추가 설정

- (추가) yolov3.cfg
  - Test -> Train 모드로 변경 시, 수정 필요

```
[net]
# Testing
# batch=1
# subdivisions=1
# Training
batch=64
subdivisions=16
width=608
height=608
channels=3
momentum=0.9
decay=0.0005
angle=0
saturation = 1.5
exposure = 1.5
hue=.1

learning_rate=0.001
burn_in=1000
max_batches = 500200
policy=steps
steps=400000,450000
scales=.1,.1

"yolov3.cfg" 789L, 8342B
```

```
LICENSE         LICENSE.gen     LICENSE.meta    LICENSE.v1      README.md       data            include         scripts
LICENSE.fuck    LICENSE.gpl     LICENSE.mit     Makefile        cfg             examples        python          src
```

Make 명령어 실행 전 모습

```
(base) yeonju52@iyeonjuui-MacBookPro yolov3 % ls
LICENSE         LICENSE.meta    README.md       examples        results
LICENSE.fuck    LICENSE.mit     backup          include         scripts
LICENSE.gen     LICENSE.v1      cfg             obj             src
LICENSE.gpl     Makefile        data            python
```

Make 명령어 실행 후 모습

```
(base) yeonju52@iyeonjuui-MacBookPro darknet % ls
2007_test.txt                   LICENSE.meta                    examples
2007_train.txt                  LICENSE.mit                     include
2007_val.txt                    LICENSE.v1                      libdarknet.a
2012_train.txt                  Makefile                        libdarknet.so
2012_val.txt                    Original.jpg                    obj
C1.jpg                          README.md                       predictions.jpg
C2.jpg                          VOCdevkit                       python
C3.jpg                          VOCtest_06-Nov-2007.tar         results
C4.jpg                          VOCtrainval_06-Nov-2007.tar     scripts
Gray.jpg                        VOCtrainval_11-May-2012.tar     src
LICENSE                         backup                          voc_label.py
LICENSE.fuck                    cfg                             yolov1.weights
LICENSE.gen                     darknet
LICENSE.gpl                     data
(base) yeonju52@iyeonjuui-MacBookPro darknet %
```

데이터 세팅 및 ./darknet 실행 후 모습

OpenCV 설치

make 명령어 실행 전

- sudo apt-get install g++
- sudo apt-get install cmake
- 기존 설치된 패키지 업그레이드
  - sudo apt-get update
  - sudo apt-get upgrade
- opencv 설치 방법 2개 중 부가 패키지 일일히 설치

```
 1026  sudo apt-get install build-essential cmake
 1027  sudo apt-get install pkg-config
 1028  sudo apt-get install libjpeg-dev libtiff5-dev libpng-dev
 1029  sudo apt-get install ffmpeg libavcodec-dev libavformat-dev libswscale-dev
libxvidcore-dev libx264-dev libxine2-dev
 1030  sudo apt-get install libv4l-dev v4l-utils
 1031  sudo apt-get install libgstreamer1.0-dev libgstreamer-plugins-base1.0-dev
 1032  sudo apt-get install libgtk-3-dev
 1033  sudo apt-get install libatlas-base-dev gfortran libeigen3-dev
 1034  sudo apt-get install python3-dev python3-numpy
 1035  sudo apt install unzip
```

```
 1038  mkdir opencv-342
 1039  cd opencv-342
 1040  ls
 1041  wget -O opencv.zip https://github.com/opencv/opencv/archive/3.4.2.zip
 1042  unzip opencv.zip
 1043  wget -O opencv_contrib.zip https://github.com/opencv/opencv_contrib/archive/3.4.2.zip
 1044  unzip opencv_contrib.zip
```

cmake 명령어 실패

```
--
--   OpenCL:                         YES (no extra features)
--     Include path:                 /home/user/opencv-342/opencv-3.4.2/3rdparty/include/opencl/1.2
--     Link libraries:               Dynamic load
--
--   Python 3:
--     Interpreter:                  /usr/bin/python3 (ver 3.10.6)
--     Libraries:                    /usr/lib/x86_64-linux-gnu/libpython3.10m.so
--     numpy:                        /usr/lib/python3/dist-packages/numpy/core/include (ver 1.21.5)
--     packages path:                /usr/lib/python3/dist-packages
--
--   Python (for build):             /usr/bin/python3
--
--   Java:
--     ant:                          NO
--     JNI:                          NO
--     Java wrappers:                NO
--     Java tests:                   NO
--
--   Matlab:                         NO
--
--   Install to:                     /usr/local
-- -----------------------------------------------------------------
--
-- Configuring done
-- Generating done
-- Build files have been written to: /home/user/opencv-342/opencv-3.4.2/build
```

```
 1106  cmake -D CMAKE_BUILD_TYPE=RELEASE \\n-D CMAKE_INSTALL_PREFIX=/usr/local \\n-D WITH_TBB=OFF \\n-D WITH_IPP=OFF \\n-D WITH_1
394=OFF \\n-D BUILD_WITH_DEBUG_INFO=OFF \\n-D BUILD_DOCS=OFF \\n-D INSTALL_C_EXAMPLES=ON \\n-D INSTALL_PYTHON_EXAMPLES=ON \\n-D B
UILD_EXAMPLES=OFF \\n-D BUILD_TESTS=OFF \\n-D BUILD_PERF_TESTS=OFF \\n-D WITH_QT=OFF \\n-D WITH_GTK=ON \\n-D WITH_OPENGL=ON \\n-D
 OPENCV_EXTRA_MODULES_PATH=../../opencv_contrib-3.4.2/modules \\n-D WITH_V4L=ON  \\n-D WITH_FFMPEG=ON \\n-D WITH_XINE=ON \\n-D BU
ILD_NEW_PYTHON_SUPPORT=ON \\n-D OPENCV_GENERATE_PKGCONFIG=ON \\n-D PYTHON2_INCLUDE_DIR=/usr/include/python2.7 \\n-D PYTHON2_NUMPY
_INCLUDE_DIRS=/usr/lib/python2.7/dist-packages/numpy/core/include/ \\n-D PYTHON2_PACKAGES_PATH=/usr/lib/python2.7/dist-packages \
\n-D PYTHON2_LIBRARY=/usr/lib/x86_64-linux-gnu/libpython2.7.so \\n-D PYTHON3_INCLUDE_DIR=/usr/include/python3.10m \\n-D PYTHON3_N
UMPY_INCLUDE_DIRS=/usr/lib/python3/dist-packages/numpy/core/include/  \\n-D PYTHON3_PACKAGES_PATH=/usr/lib/python3/dist-packages
\\n-D PYTHON3_LIBRARY=/usr/lib/x86_64-linux-gnu/libpython3.10m.so \\n../
```

cmake 명령어 - option too much & 일일이 추가해야함