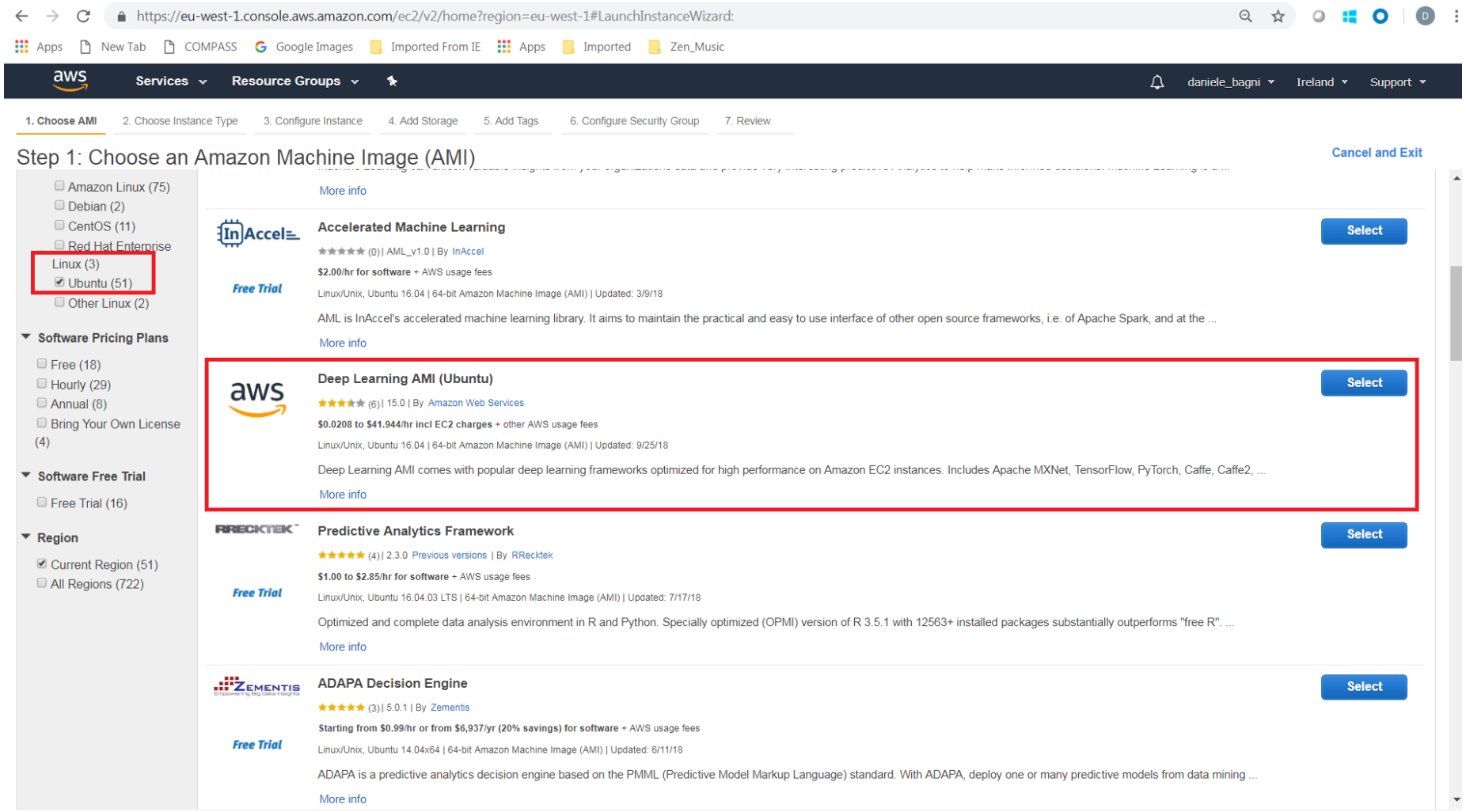
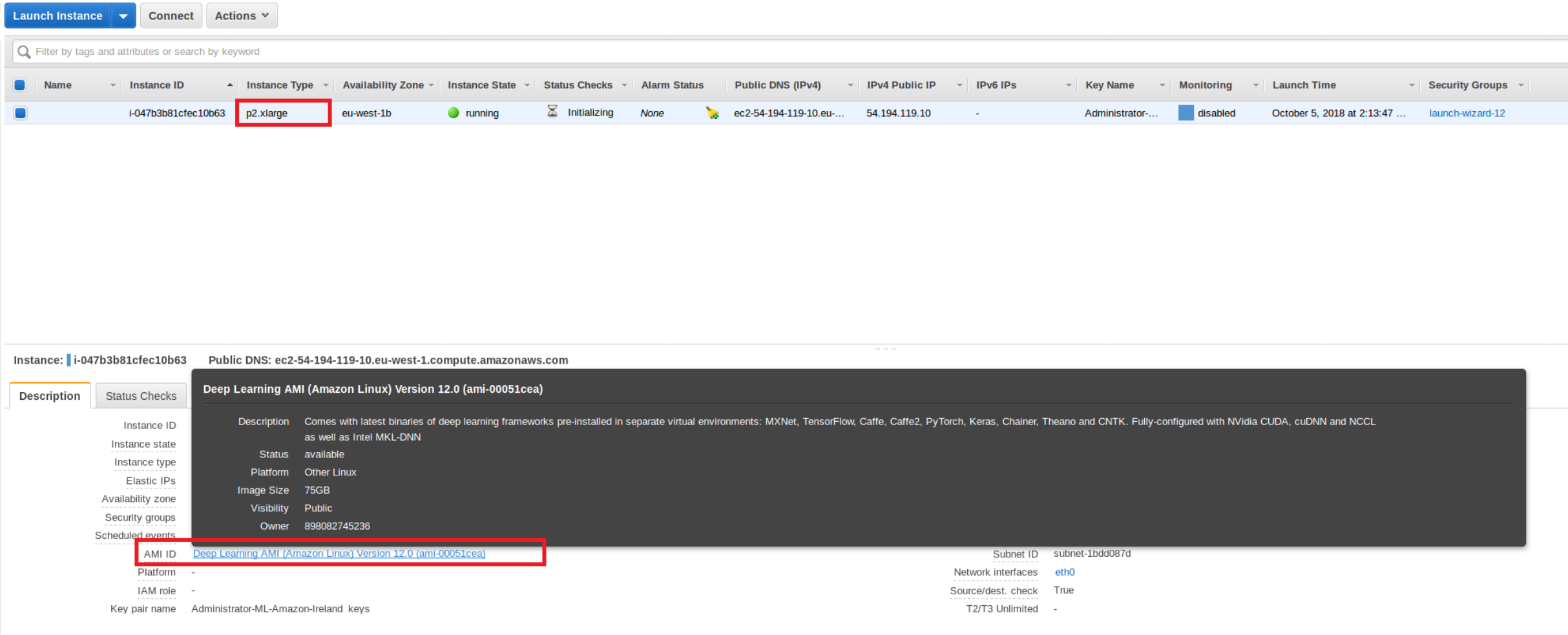
AWS AMI for ML

Select either **Deep Learning AMI (Ubuntu)** or **Deep Learning AMI (Amazon Linux)**



AWS EC2 instance



WARNING: pathnames (on your local PC or on the AWS)

- The best solution to avoid editing all the path names in the shell and python scripts is to set a soft link to my pathnames, either you work in your account or on the AWS.
- For example, assuming you are on an **AWS EC2** and have username "**ubuntu**":
  - create your working directory with name `/home/ubuntu/ML`
  - your caffe root directory is named `/home/ubuntu/src/caffe_python_2`
  - run the following commands (**`ln -s target_name link_name`**):
  - **`sudo mkdir /home/danieleb`**
  - **`sudo ln -s /home/ubuntu/ML /home/danieleb/ML`**
  - **`sudo mkdir /home/danieleb/caffe_tools`**
  - **`sudo ln -s /home/ubuntu/src/caffe_python_2 /home/danieleb/caffe_tools/Caffe-SSD-Ristretto`**

WARNING: pathnames (valid only on the AWS)

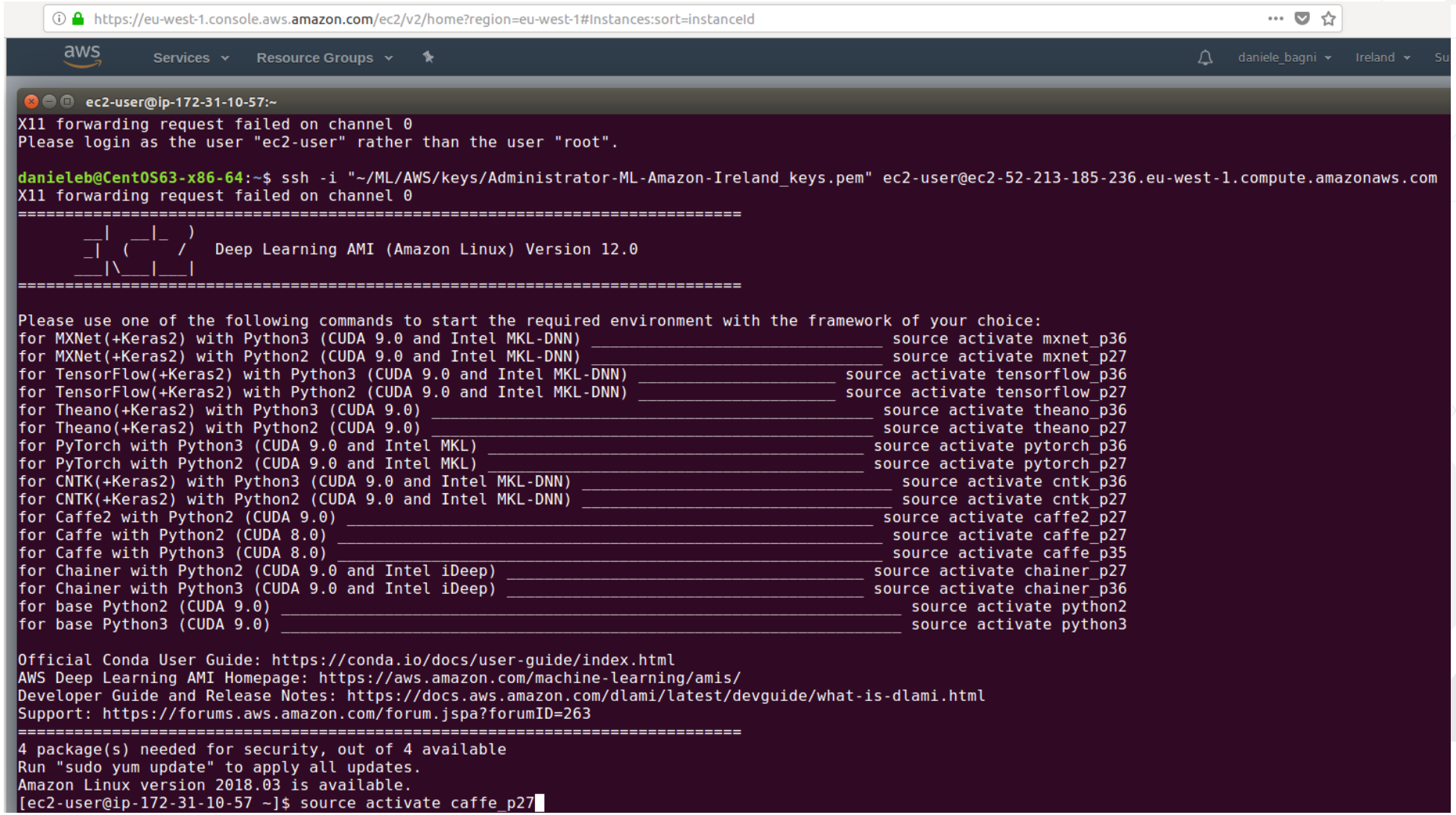
- Once you have done the settings of previous page, you also have to run the following only in case of AWS:

```
sudo ln -s /home/ubuntu/src/caffe_python_2/build/install \
/home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distributesudo
```

```
ln -s /home/ubuntu/src/caffe_python_2/build/install/bin/caffe \
/home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distribute/bin/caffe.binsudo
```

```
ln -s /home/ubuntu/src/caffe_python_2/build/install/bin/compute_image_mean \
/home/ubuntu/src/caffe_python_2/build/install/bin/compute_image_mean.bin
```

Logging in into AWS Ubuntu AMI



replace

The various soft links

```
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$  ls -l /home/danieleb/caffe_tools
total 0
lrwxrwxrwx 1 root root 33 12 ago 12.44 Caffe-SSD-Ristretto -> /home/ec2-user/src/caffe_python_2
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ ls -l /home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distribute/bin/caffe.bin
lrwxrwxrwx 1 root root 5 12 ago 14.07 /home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distribute/bin/caffe.bin -> caffe
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ ls -l /home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distribute
lrwxrwxrwx 1 root root 15 12 ago 12.58 /home/danieleb/caffe_tools/Caffe-SSD-Ristretto/distribute -> ./build/install
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ ls -l src/caffe_python_2/
total 124
drwxrwxr-x 14 ec2-user ec2-user  4096 19 lug 20.02 build
-rw-rw-r--  1 ec2-user ec2-user  1180 19 lug 20.01 caffe.cloc
drwxrwxr-x  5 ec2-user ec2-user  4096 19 lug 20.01 cmake
-rw-rw-r--  1 ec2-user ec2-user  4197 19 lug 20.01 CMakeLists.txt
-rw-rw-r--  1 ec2-user ec2-user  1917 19 lug 20.01 CONTRIBUTING.md
-rw-rw-r--  1 ec2-user ec2-user   620 19 lug 20.01 CONTRIBUTORS.md
drwxrwxr-x  5 ec2-user ec2-user  4096 19 lug 20.01 data
lrwxrwxrwx  1 root     root        15 12 ago 12.58 distribute -> ./build/install
drwxrwxr-x  4 ec2-user ec2-user  4096 19 lug 20.01 docker
drwxrwxr-x  6 ec2-user ec2-user  4096 19 lug 20.01 docs
drwxrwxr-x 15 ec2-user ec2-user  4096 19 lug 20.01 examples
drwxrwxr-x  3 ec2-user ec2-user  4096 19 lug 20.01 include
-rw-rw-r--  1 ec2-user ec2-user   210 19 lug 20.01 INSTALL.md
-rw-rw-r--  1 ec2-user ec2-user  2092 19 lug 20.01 LICENSE
-rw-rw-r--  1 ec2-user ec2-user 24041 19 lug 20.01 Makefile
-rw-rw-r--  1 ec2-user ec2-user  4634 19 lug 20.01 Makefile.config
-rw-rw-r--  1 ec2-user ec2-user  4631 19 lug 20.01 Makefile.config.example
drwxrwxr-x  5 ec2-user ec2-user  4096 19 lug 20.01 matlab
drwxrwxr-x  7 ec2-user ec2-user  4096 19 lug 20.01 models
drwxrwxr-x  3 ec2-user ec2-user  4096 19 lug 20.01 python
-rw-rw-r--  1 ec2-user ec2-user  2130 19 lug 20.01 README.md
drwxrwxr-x  3 ec2-user ec2-user  4096 19 lug 20.01 scripts
drwxrwxr-x  4 ec2-user ec2-user  4096 19 lug 20.01 src
drwxrwxr-x  3 ec2-user ec2-user  4096 19 lug 20.01 tools
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$
```

replace

The 2 environment variables just setup

replace

```
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ echo $PYTHONPATH
/home/ec2-user/src/caffe python 2/python


(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ echo $LD_LIBRARY_PATH
/usr/local/cuda-8.0/lib64:/usr/local/cuda-8.0/extras/CUPTI/lib64:/lib/nccl/cuda-8.0/lib:/usr/lib64/openmpi/lib/:/usr/local/lib:/usr/lib:/usr/local/mpi/lib:/lib/:/usr/lib64/openmpi/lib/
:/usr/local/lib:/usr/lib:/usr/local/mpi/lib:/lib/::/home/ec2-user/anaconda3/envs/caffe_p27/lib/


(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ export PYTHONPATH=/usr/local/lib/python2.7/dist-packages/:$PYTHONPATH
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ export LD_LIBRARY_PATH=/home/ec2-user/src/caffe_python_2/build/install/lib64/:$LD_LIBRARY_PATH


(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ echo $PYTHONPATH
/usr/local/lib/python2.7/dist-packages/:/home/ec2-user/src/caffe_python_2/python

(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$ echo $LD_LIBRARY_PATH
/home/ec2-user/src/caffe_python_2/build/install/lib64/:/usr/local/cuda-8.0/lib64:/usr/local/cuda-8.0/extras/CUPTI/lib64:/lib/nccl/cuda-8.0/lib:/usr/lib64/openmpi/lib/:/usr/local/lib:/u
sr/lib:/usr/local/mpi/lib:/lib/:/usr/lib64/openmpi/lib/:/usr/local/lib:/usr/lib:/usr/local/mpi/lib:/lib/::/home/ec2-user/anaconda3/envs/caffe_p27/lib/
(caffe_p27) [ec2-user@ip-172-31-10-57 ~]$
```

Launch the first python script…

```
> cd ~/ML/cats-vs-dogs

> source activate caffe_p27

> export LD_LIBRARY_PATH=/home/ec2-
  user/src/caffe_python_2/build/install/lib64/:$LD_LIBRARY_PATH

> export PYTHONPATH=/usr/local/lib/python2.7/dist-packages/:$PYTHONPATH

> python set_the_CATSvsDOGS_prj.py –i ~/ML/cats-vs-dogs
```

aws_caffe_flow_AlexNet.sh script

emacs@Prec5820Tow

File Edit Options Buffers Tools Sh-Script Help

Save Undo

```
#/bin/sh

CAFFE_ROOT=/home/danieleb/caffe_tools/Caffe-SSD-Ristretto
CAFFE_TOOLS_DIR=$CAFFE_ROOT/distribute
#working dir
WORK_DIR=/home/danieleb/ML/cats-vs-dogs/caffe

NUMIT=12000  # number of iterations
NET=alexnetBNnoLRN
MOD_NUM=2   # model number


# ##############################################################################################################
# # create the project directories for input images and hiddenly call SCRIPTS 1 2 3 (DATABASES)

source activate caffe_p27
export PYTHONPATH=/usr/local/lib/python2.7/dist-packages/:$PYTHONPATH
export LD_LIBRARY_PATH=/home/ec2-user/src/caffe_python_2/build/install/lib64/:$LD_LIBRARY_PATH

# WARNING: the below script must be called only once, at the first time
# WARNING: you must have the file train.zip placed below ~/ML/cats-vs-dogs!
python ~/ML/cats-vs-dogs/set_the_CATSvsDOGS_prj.py -i ~/ML/cats-vs-dogs


# ##############################################################################################################
# SCRIPT 4  (SOLVER AND TRAINING AND LEARNING CURVE)
echo "TRAINING. Remember that: <Epoch_index = floor((iteration_index * batch_size) / (# data_samples))>"

#$CAFFE_TOOLS_DIR/bin/caffe.bin train --solver ./models/$NET/m$MOD_NUM/solver_$MOD_NUM\_$NET.prototxt \
#                             2>&1 | tee ./models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log

python $WORK_DIR/code/4_training.py -s ./models/$NET/m$MOD_NUM/solver_$MOD_NUM\_$NET.prototxt -l ./models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log

# print image of CNN architecture
echo "PRINT CNN BLOCK DIAGRAM"
python $CAFFE_TOOLS_DIR/python/draw_net.py $WORK_DIR/models/$NET/m$MOD_NUM/train_val_$MOD_NUM\_$NET.prototxt $WORK_DIR/models/$NET/m$MOD_NUM/bd_$MOD_NUM\_$NET.png

# ##############################################################################################################
# SCRIPT 5: plot the learning curve
echo "PLOT LEARNING CURVERS"
python ./code/5_plot_learning_curve.py $WORK_DIR/models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log $WORK_DIR/models/$NET/m$MOD_NUM/plt_train_val_$MOD_NUM\_$NET.png

python ./code/plot_training_log.py 6 $WORK_DIR/models/$NET/m$MOD_NUM/plt_trainLoss_$MOD_NUM\_$NET.png     $WORK_DIR/models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log
python ./code/plot_training_log.py 2 $WORK_DIR/models/$NET/m$MOD_NUM/plt_testLoss_$MOD_NUM\_$NET.png      $WORK_DIR/models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log
python ./code/plot_training_log.py 0 $WORK_DIR/models/$NET/m$MOD_NUM/plt_testAccuracy_$MOD_NUM\_$NET.png  $WORK_DIR/models/$NET/m$MOD_NUM/logfile_$MOD_NUM\_$NET.log

# ##############################################################################################################
# SCRIPT 6 (PREDICTION)
echo "COMPUTE PREDICTIONS"
python ./code/6_make_predictions.py -d ./models/$NET/m$MOD_NUM/deploy_$MOD_NUM\_$NET.prototxt -w ./models/$NET/m$MOD_NUM/snapshot_$MOD_NUM\_$NET\__iter_$NUMIT.caffem
odel 2>&1 | tee ./models/$NET/m$MOD_NUM/predictions_$MOD_NUM\_$NET.txt
```

-:**- aws_caffe_flow_AlexNet.sh   Top L47   (Shell-script[sh])

…you should get something like this:

replace

```
ec2-user@ip-172-31-10-57:~/ML/cats-vs-dogs
(caffe_p27) [ec2-user@ip-172-31-10-57 caffe]$ cd ~/ML
(caffe_p27) [ec2-user@ip-172-31-10-57 ML]$ cd cats-vs-dogs/
(caffe_p27) [ec2-user@ip-172-31-10-57 cats-vs-dogs]$ ls -l *
-rw-rw-r-- 1 ec2-user ec2-user 2271  8 set 13.12 set_the_CATSvsDOGS_prj.py

caffe:
total 104
-rw-rw-r-- 1 ec2-user ec2-user  4185 10 set 17.11 aws_caffe_flow_AlexNet.sh
-rwxrwxr-x 1 ec2-user ec2-user  4442 10 set 16.22 caffe_flow_AlexNet.sh
drwxrwxr-x 2 ec2-user ec2-user  4096  8 set 13.03 code
drwxrwxr-x 3 ec2-user ec2-user  4096 10 set 16.13 models

deephi:
drwxrwxr-x 5 ec2-user ec2-user 4096 10 set 13.43 pruning
drwxrwxr-x 6 ec2-user ec2-user 4096 10 set 09.19 quantiz
drwxrwxr-x 5 ec2-user ec2-user 4096 31 ago 08.52 zcu102

input:
total 1552
drwxr-xr-x 5 ec2-user ec2-user 790528 10 set 16.37 jpg
drwxrwxr-x 4 ec2-user ec2-user   4096 10 set 16.34 lmdb
-rw-rw-r-- 1 ec2-user ec2-user 786446  8 set 13.31 mean.binaryproto
(caffe_p27) [ec2-user@ip-172-31-10-57 cats-vs-dogs]$ ls -l input/*
-rw-rw-r-- 1 ec2-user ec2-user 786446  8 set 13.31 input/mean.binaryproto

input/jpg:
total 12
drwxrwxr-x 4 ec2-user ec2-user 4096 10 set 16.33 calib
drwxrwxr-x 4 ec2-user ec2-user 4096 10 set 16.32 test
drwxrwxr-x 4 ec2-user ec2-user 4096 10 set 16.31 val

input/lmdb:
total 8
drwxrwxr-x 2 ec2-user ec2-user 4096 10 set 16.34 train_lmdb
drwxrwxr-x 2 ec2-user ec2-user 4096 10 set 16.35 valid_lmdb
(caffe_p27) [ec2-user@ip-172-31-10-57 cats-vs-dogs]$
```