Issues faced so far in Internship

- Location of implementation of Max Pool Padding in codebase
    - Hao helped me locate it

```
operator/operatorname-inl.h
```

- Import MXNet error
- Needs a symbol got a 2d array
    - Due to lack of knowledge of symbolic vs (ndarray) imperative
- Confusion between symbolic and imperative (Why doesn't my execution go into Pooling-inl.h)
    - Using symbolic api and not binding it
    - Started using imperative (NDArray) so no need to create a graph and bind it
- VSCode debug doesn't enter C++ code
    - debug mode is 1
    - coding, debugging in right files
    - 'make' is done
    - Somehow randomly, it started working!
- Python debug, LLDB debug attach on VSCode
- LLDB attach shows multiple processes (unable to kill after exception)
- Pooling function was never called
    - Debug showed incomplete error -
        - File "/Users/bapac/workspace/incubator-mxnet/tests/python/unittest/test_operator.py", line 4363, in test_1d_max_pool
        - exp_out=mx.nd.Pooling(data, kernel=(1, 3), pool_type='max',name='pooling')
        - File "<string>", line 121, in Pooling
        - File "/Users/bapac/workspace/incubator-mxnet/python/mxnet/_ctypes/ndarray.py", line 92, in _imperative_invoke
        - ctypes.byref(out_stypes)))
        - File "/Users/bapac/workspace/incubator-mxnet/python/mxnet/base.py", line 252, in check_call
        - raise MXNetError(py_str(_LIB.MXGetLastError()))
    - Running it on Jupyter showed entire error, it had to do with shapes (confused it with kernel shape realized it was **input shape issue** that needed 3d instead of just 2d)
- Exact execution flow
    - Test_operator (python) calls Operator (Pooling)
    - How does it calculate the output shape
- Check NE wasn't getting triggered
    - Make after every change made to the code (rebuild it)
- (Solved) Invalid syntax on commented line

```
File "/Users/bapac/workspace/incubator-mxnet/src/operator/nn/pool.h", line 1
/*!
```

```
^
SyntaxError: invalid syntax
```

    - That's when you try to run Python debug in header file(non-Python, C/C++)
- (Solved) Clean repo clone and make doesn't work
    - Tried this in various other locations . Always gives issues on make saying no such file
        - make clean

```
Makefile:74: /Users/bapac/Desktop/incubator-mxnet/3rdparty/mshadow/make/mshadow.mk: No
Makefile:75: /Users/bapac/Desktop/incubator-mxnet/3rdparty/dmlc-core/make/dmlc.mk: No
Makefile:284: WARNING: Significant performance increases can be achieved by installing
Makefile:355: /Users/bapac/Desktop/incubator-mxnet/3rdparty/ps-lite/make/ps.mk: No suc
make: *** No rule to make target `/Users/bapac/Desktop/incubator-mxnet/3rdparty/ps-lit
```

    - Solution - git clone without recursive, doesn't copy all 3rd party files and hence No such file (error says It all)
- When you dont have make file to make

```
make -j $(nproc) USE_OPENCV=1 USE_BLAS=openblas USE_CUDA=1 USE_CUDA_PATH=/usr/local/cu
Makefile:74: /home/ubuntu/incubator-mxnet-1.3.1.rc0/3rdparty/mshadow/make/mshadow.mk:
Makefile:75: /home/ubuntu/incubator-mxnet-1.3.1.rc0/3rdparty/dmlc-core/make/dmlc.mk: N
INFO: nvcc was not found on your path
INFO: Using /usr/local/cuda-9.0/bin/nvcc as nvcc path
Running CUDA_ARCH: -gencode arch=compute_30,code=sm_30 -gencode arch=compute_35,code=s
Makefile:355: /home/ubuntu/incubator-mxnet-1.3.1.rc0/3rdparty/ps-lite/make/ps.mk: No s
make: *** No rule to make target '/home/ubuntu/incubator-mxnet-1.3.1.rc0/3rdparty/ps-l
```

- There were still debug issues of not going into the C/C++ backend code even after lldb attach
    - had to ensure right breakpoints were placed and attached to the right python file process and all Ghost processes are killed
    - At times
    - `Ps -al | grep python` doesn't show all ghost processes
    - `Ps aux` shows
    - For some random reason, even after killing process, ps aux was still showing the ghost process

```
$ ps aux | grep python
bapac 41144 1.0 1.6 107737084 137624 ?? SX 4:35PM 0:03.31 /anaconda3/bin/python -m ptv
root 48 0.1 0.2 2570660 17404 ?? Ss Tue02PM 3:01.68 /usr/bin/python /usr/local/amazon/
bapac 1237 0.1 0.2 2656448 13036 ?? S Tue02PM 2:50.72 /usr/bin/python /usr/local/amazo
bapac 41143 0.0 0.4 3211648 35080 ?? S 4:35PM 0:00.30 /Applications/Visual Studio Code
bapac 18776 0.0 0.0 2473160 540 ?? Ss Tue05PM 0:02.79 /anaconda3/bin/python -m ipykerr
bapac 3114 0.0 0.1 2468608 5148 s000 S+ Tue02PM 0:10.06 /anaconda3/bin/python /anaconc
bapac 3043 0.0 0.0 2509608 4080 ?? S Tue02PM 0:03.48 /usr/bin/python /usr/local/amazor
bapac 41531 0.0 0.0 2432804 780 s003 S+ 4:37PM 0:00.00 grep python
bapac 41465 0.0 0.4 3207928 37040 ?? S 4:36PM 0:00.33 /Applications/Visual Studio Code
bapac 41325 0.0 0.2 2427064 17032 ?? S 4:36PM 0:00.28 /anaconda3/bin/python3.6 /Users/
bapac 41264 0.0 0.4 2439508 32492 ?? S 4:36PM 0:00.97 python completion.py
8c8590ad8b03:incubator-mxnet bapac$ kill -9 41144
8c8590ad8b03:incubator-mxnet bapac$
```

```
8c8590ad8b03:incubator-mxnet bapac$
8c8590ad8b03:incubator-mxnet bapac$
8c8590ad8b03:incubator-mxnet bapac$ ps aux | grep python
root 48 0.1 0.2 2570660 17404 ?? Ss Tue02PM 3:01.71 /usr/bin/python /usr/local/amazon/
bapac 41144 0.0 1.6 107737084 137624 ?? TX 4:35PM 0:03.39 /anaconda3/bin/python -m ptv
bapac 41143 0.0 0.4 3211648 35080 ?? S 4:35PM 0:00.30 /Applications/Visual Studio Code
bapac 18776 0.0 0.0 2473160 540 ?? Ss Tue05PM 0:02.79 /anaconda3/bin/python -m ipykerr
bapac 3114 0.0 0.1 2468608 5148 s000 S+ Tue02PM 0:10.07 /anaconda3/bin/python /anaconc
bapac 3043 0.0 0.0 2509608 4080 ?? S Tue02PM 0:03.48 /usr/bin/python /usr/local/amazor
bapac 1237 0.0 0.2 2656448 13036 ?? S Tue02PM 2:50.74 /usr/bin/python /usr/local/amazc
bapac 41546 0.0 0.0 2432804 780 s003 S+ 4:37PM 0:00.00 grep python
bapac 41465 0.0 0.4 3207928 37040 ?? S 4:36PM 0:00.33 /Applications/Visual Studio Code
bapac 41325 0.0 0.2 2427064 17032 ?? S 4:36PM 0:00.28 /anaconda3/bin/python3.6 /Users/
bapac 41264 0.0 0.4 2439508 32492 ?? S 4:36PM 0:00.97 python completion.py
```

- Unable to see how pool is called in pool.h
  - Tried to find the backtrace
  - In Debug console -exec bt but still not helpful
- Randomly the test_random.py wasn't debugging but test_operator.py was
- Error
  - ERROR: __main__.test_helper
  - --
  - Traceback (most recent call last):
  - File "/anaconda3/lib/python3.6/site-packages/nose/case.py", line 197, in runTest
  - self.test(*self.arg)
  - File "/anaconda3/lib/python3.6/site-packages/nose/util.py", line 620, in newfunc
  - return func(*arg, **kw)
  - TypeError: test_helper() missing 1 required positional argument: 'orig_test'
  - -------------------- >> begin captured logging << --------------------
  - common: INFO: Setting module np/mx/python random seeds, use MXNET_MODULE_SEED=889454358 to reproduce.
  - -------------------- >> end captured logging << --------------------
- Error error: use of undeclared identifier 'kInt16'
- .add_enum("int16", kInt16)
  - Meaning kInt16 issue
    - Close look other 3 dtypes Float16,32,64 had 2 definitions (acc to VSCode)
      - `base.h`
        - In `mshadow`
      - `tensor.h`
        - In `tvm/nnvm`
    - Why does enum Typeflag exist in both directories and does it have to be defined in both
- Unable to print LOG(INFO)
  - `LOG(INFO) << "lower" << *lower;`
  - How do you run this?
  - VSCode

- Terminal inside VSCode
- `python tests/python/unittest/test_random.py`

AWS issues

1. Getting into instance creation
    a. isengaard
    b. MXNet engineering → admin (opens the aws console)
2. Amazon Linux 2 (has Centos) didn't know (Centos vs Ubuntu)
3. Max Security groups reached for your VPC issue
    a. Hence, unable to create new security group
    b. Thus used some already existing Amazon Linux SG
4. Unable to ssh
    a. unnecessarily created a new key file
        i. could use same existing bapac.pem.txt
    b. Unnecessarily changed bapac.pem.txt to bapac.pem
        i. Solution let pem.txt be as it is
5. Centos prebuilt needed yum update, git to be installed
6. -bash: pip: command not found
    a. yum -y update
        i. `Loaded plugins: extras_suggestions, langpacks, priorities, update-motd`
        ii. `You need to be root to perform this command.`
    b. yum -y install python-pip
        i. `Loaded plugins: extras_suggestions, langpacks, priorities, update-motd`
        ii. `You need to be root to perform this command.`
    c. sudo yum -y install python-pip
7. all pip gave issue “OSError: [Errno 13] Permission denied: '/usr/lib/python2.7/site-packages/graphviz'”
    a. sudo pip install graphviz,
8. `make` issue
    a. install all development tools
        i. `sudo yum –setopt=group_package_types=mandatory,default,optional groupinstall "Development Tools"` (needs root user)
9. upon making opencv
    a. error
        i. /home/ec2-user/opencv-3.3.0/build/modules/stitching/perf_precomp.hpp:34:1: fatal error: can’t write PCH file: No space left on device
    b. Solution
        i. Add a new volume
        ii. Create new volume
        iii. attach it to existing instance

iv. mount it

v. https://devopscube.com/mount-ebs-volume-ec2-instance/

vi. I had to move all of the downloaded and installed shit to that instance

10. despite using sudo with echo it was giving permission denied.
    a. Reason echo “” >> a.conf → shell does output redirection, not sudo or echo, so this is being done as your regular user.
    b. Solution - `sudo sh -c "echo 'something' >> /etc/privilegedfile"`

MXNet Python

1. No module named randint
    a. Cause - Despite coding everything on frontend,backend, make build and doing python bindg still it was giving error. So issue was with environment.
    b. Solution
        i. pip freeze | grep mxnet
        ii. pip uninstall mxnet
        iii. pip uninstall mkldnn

Make build issue

- clang

```
make -j8
c++ -std=c++11 -c -DMSHADOW_FORCE_STREAM -Wall -Wsign-compare -O3 -DNDEBUG=1 -I/Users/
c++ -std=c++11 -c -DMSHADOW_FORCE_STREAM -Wall -Wsign-compare -O3 -DNDEBUG=1 -I/Users/
clang: error: unsupported option '-fopenmp'
clang: error: unsupported option '-fopenmp'
c++ -std=c++11 -c -DMSHADOW_FORCE_STREAM -Wall -Wsign-compare -O3 -DNDEBUG=1 -I/Users/
make: *** [build/src/operator/nn/cudnn/cudnn_batch_norm.o] Error 1
make: *** Waiting for unfinished jobs....
make: *** [build/src/operator/nn/cudnn/cudnn_algoreg.o] Error 1
clang: error: unsupported option '-fopenmp'
make: *** [build/src/operator/nn/mkldnn/mkldnn_act.o] Error 1
```

- Solution

```
cp make/osx.mk ./config.mk
vi config.mk
# Set/update USE_PROFILER, DEBUG compile flags with below values and leave the rest as
# This setting is required for enabling handles for developers.

# Enable profiling
USE_PROFILER = 1

# whether compile with debug
DEBUG = 1

# choose the version of blas you want to use
# can be: mkl, blas, atlas, openblas
USE_BLAS = apple
```

```
# Build MXNet (-j8 => use 8 threads to compile and build)
# Optimal number of threads is typically the number of cores available on your Mac. To
make -j8
```

Github

- Pull request issue
  - Had merge conflicts since used rebase
    - Solution
      - [ ] Found the last correct commit and copied its commit id
        - git reset --hard 14b3a0cb8004fef2f36c473f8b6a9b73cd265120
      - [ ] git status
      - [ ] git remote -v (to ensure upstream is set to base repo)
      - [ ] git fetch upstream
      - [ ] git rebase upstream/master
      - [ ] git log (to verify correct commits are made)
      - [ ] git push --force (does the trick)
      - [ ] git status
    - Acc to Lin (use merge instead of rebase)
- `error: There was a problem with the editor 'vi'.`
  `Not committing merge; use 'git commit' to complete the merge.`
  - Solution
  - `git config --global core.editor $(which vim)`
-

Testing on pip install mxnet

CREATE A VIRTUAL ENVIRONMENT

```
$ mkdir pipmxnet_venv
8c8590ad8b03:~ bapac$ cd pipmxnet_venv/
8c8590ad8b03:pipmxnet_venv bapac$ pipenv install mxnet
-bash: pipenv: command not found
```

INSTALL PIPENV

```
pip install --user pipenv
The script virtualenv is installed in '/Users/bapac/.local/bin' which is not on PATH.
  Consider adding this directory to PATH
```

```
pipenv install mxnet
-bash: pipenv: command not found
```

Add a New Path to PATH at Command Line

```
export PATH=$PATH:/Users/bapac/.local/bin
8c8590ad8b03:pipmxnet_venv bapac$ echo $PATH
/anaconda3/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin:/Users/bapac/.local/bin
```

However, this would have to be done everytime, hence put it in bashrc/bashprofile

```
vim ~/.bash_profile
```

Now use pipenv

```
pipenv install mxnet
Creating a virtualenv for this project…
Pipfile: /Users/bapac/pipmxnet_venv/Pipfile
Using /anaconda3/bin/python (3.6.5) to create virtualenv…
⠹Already using interpreter /anaconda3/bin/python
Using base prefix '/anaconda3'
New python executable in /Users/bapac/.local/share/virtualenvs/pipmxnet_venv-B18DvrxM/
Installing setuptools, pip, wheel...done.

Virtualenv location: /Users/bapac/.local/share/virtualenvs/pipmxnet_venv-B18DvrxM
Creating a Pipfile for this project…
Installing mxnet…
```

Use environment

```
To activate this projects virtualenv, run pipenv shell.
Alternatively, run a command inside the virtualenv with pipenv run.
8c8590ad8b03:pipmxnet_venv bapac$ pipenv shell
```

Now if you use mxnet (it will pick up from pip rather than build)

```
Launching subshell in virtual environment…
bash-3.2$ . /Users/bapac/.local/share/virtualenvs/pipmxnet_venv-B18DvrxM/bin/activate
(pipmxnet_venv) bash-3.2$ python
Python 3.6.5 |Anaconda, Inc.| (default, Apr 26 2018, 08:42:37)
[GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> import mxnet
>>> mxnet
<module 'mxnet' from '/Users/bapac/.local/share/virtualenvs/pipmxnet_venv-B18DvrxM/lib
```

```
clang: error: unsupported option '-fopenmp'
make: *** [build/src/operator/nn/cudnn/cudnn_batch_norm.o] Error 1
make: *** Waiting for unfinished jobs....
make: *** [build/src/operator/nn/cudnn/cudnn_algoreg.o] Error 1
clang: error: unsupported option '-fopenmp'
make: *** [build/src/operator/nn/mkldnn/mkldnn_act.o] Error 1
```