**Experimental Results**

* Prepare the GPU Environment

1) Path of the files used to build the experiments

holger2022@DESKTOP-HAT96CV:~$ tree /home/holger2022/SDE-Net-program

/home/holger2022/SDE-Net-program

├── LICENSE

├── MNIST

│   ├── calculate\_log.py

│   ├── data\_loader.py

│   ├── models

│   │   ├── \_\_init\_\_.py

│   │   ├── \_\_pycache\_\_

│   │   │   ├── \_\_init\_\_.cpython-36.pyc

│   │   │   ├── resnet.cpython-36.pyc

│   │   │   ├── resnet\_dropout.cpython-36.pyc

│   │   │   └── sdenet\_mnist.cpython-36.pyc

│   │   ├── resnet.py

│   │   ├── resnet\_dropout.py

│   │   └── sdenet\_mnist.py

│   ├── resnet\_dropout\_mnist.py

│   ├── resnet\_mnist.py

│   ├── sdenet\_mnist.py

│   └── test\_detection.py

├── README.md

├── SVHN

│   ├── calculate\_log.py

│   ├── data\_loader.py

│   ├── models

│   │   ├── \_\_init\_\_.py

│   │   ├── \_\_pycache\_\_

│   │   │   ├── \_\_init\_\_.cpython-36.pyc

│   │   │   ├── \_\_init\_\_.cpython-37.pyc

│   │   │   ├── resnet.cpython-36.pyc

│   │   │   ├── resnet.cpython-37.pyc

│   │   │   ├── resnet\_dropout.cpython-36.pyc

│   │   │   ├── resnet\_dropout.cpython-37.pyc

│   │   │   ├── sdenet.cpython-36.pyc

│   │   │   ├── sdenet\_mnist.cpython-36.pyc

│   │   │   └── sdenet\_mnist.cpython-37.pyc

│   │   ├── resnet.py

│   │   ├── resnet\_dropout.py

│   │   └── sdenet.py

│   ├── resnet\_dropout\_svhn.py

│   ├── resnet\_svhn.py

│   ├── sdenet\_svhn.py

│   └── test\_detection.py

├── YearMSD

│   ├── DNN\_mc.py

│   ├── SDE\_regression.py

│   ├── calculate\_log.py

│   ├── data\_loader.py

│   ├── models

│   │   ├── DNN.py

│   │   ├── DNN\_mcdropout.py

│   │   ├── \_\_init\_\_.py

│   │   ├── \_\_pycache\_\_

│   │   │   ├── DNN.cpython-36.pyc

│   │   │   ├── \_\_init\_\_.cpython-36.pyc

│   │   │   └── sdenet.cpython-36.pyc

│   │   └── sdenet.py

│   ├── test\_detection\_mc.py

│   └── test\_detection\_sde.py

└── figure

└── illustration.png

2) Copy files to storage of Polytech’s University Supercomputer Center



Figure 1. Linux command to copy all files and directories of project to supercomputer

3) Connection via SSH with the supercomputer

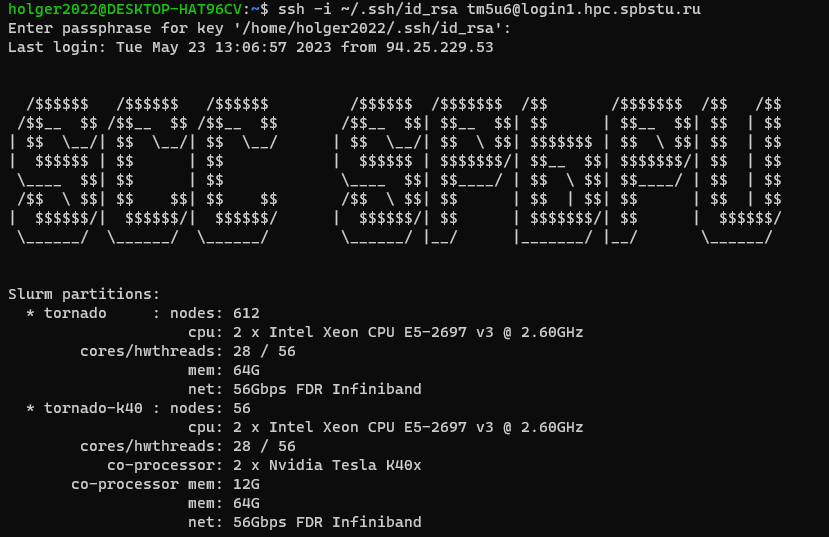


Figure 2. Linux command to make SSH connection with SCC SPBPU

4) Allocate 1 node for GPU-cluster in SCC

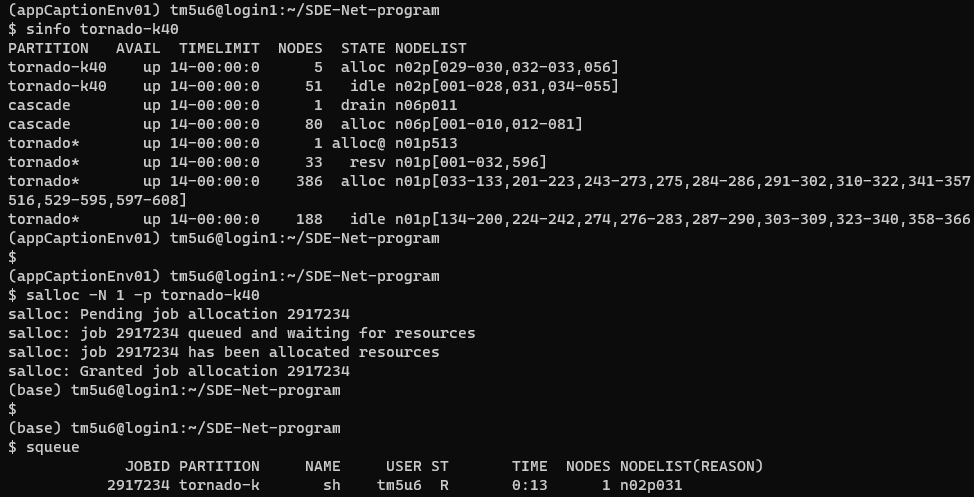
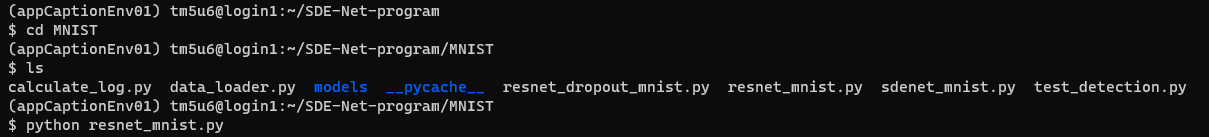


Figure 3. Allocation of node in GPU Tesla k-40

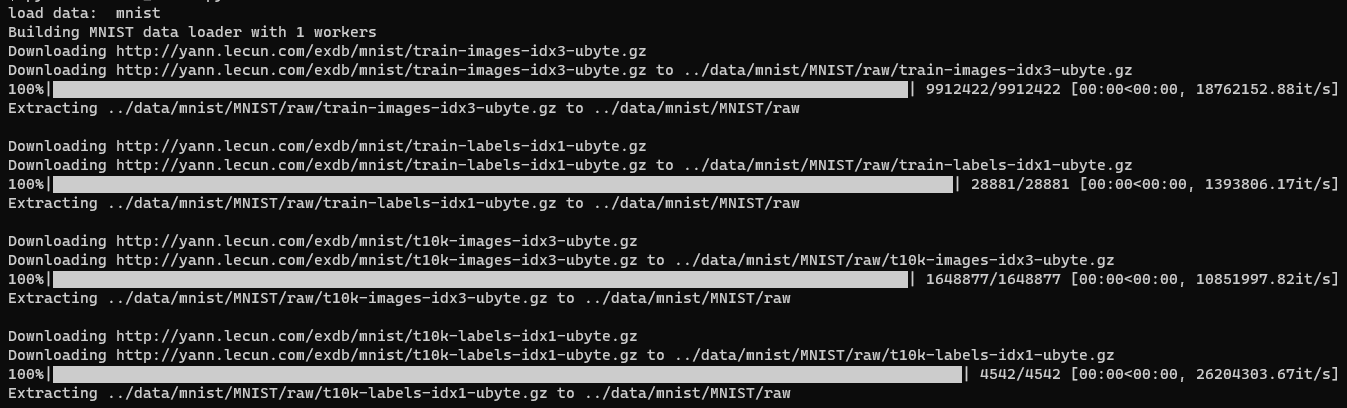
**EXPERIMENTS WITH MNIST**

* Experiment with MNIST – Training Resnet

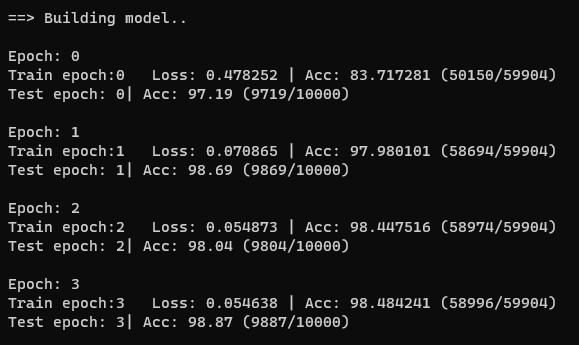
Command: $ python resnet\_mnist.py



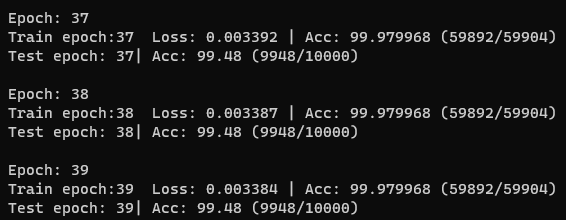
Loading of dataset



Building and training of the model



40 epochs after…



* Experiment with MNIST - Evaluating Resnet

Command: $ python test\_detection.py --pre\_trained\_net save\_resnet\_mnist/final\_model --network resnet --dataset mnist --out\_dataset svhn

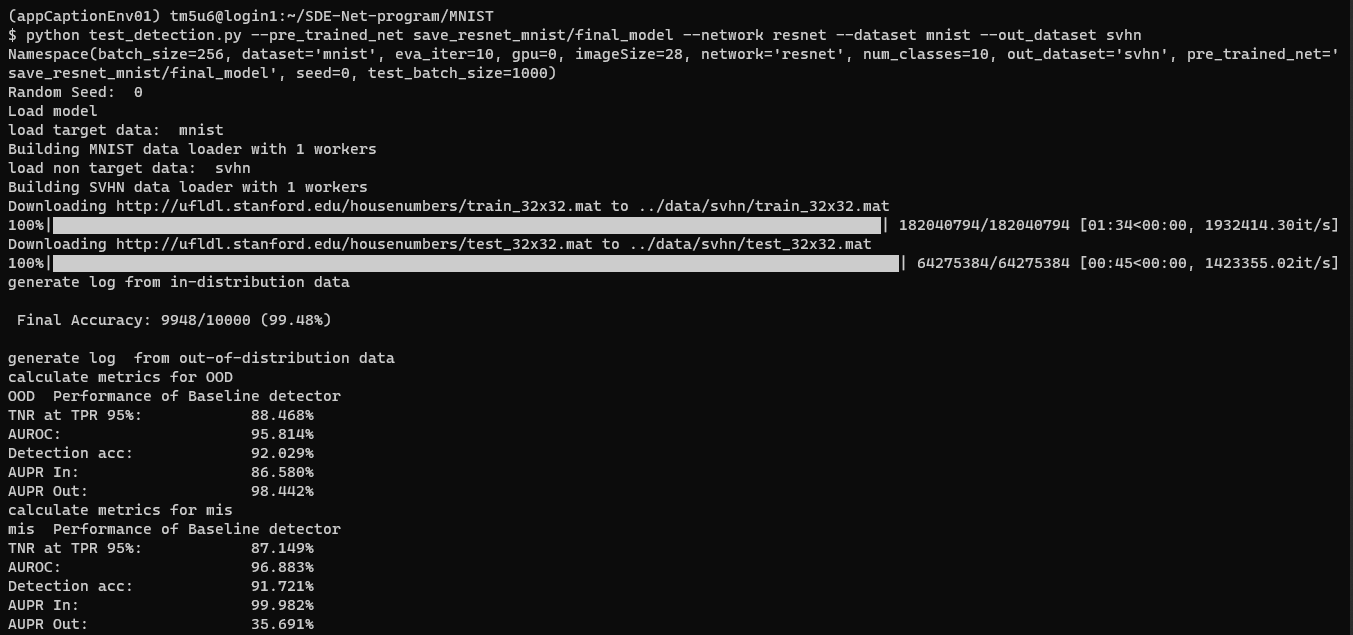
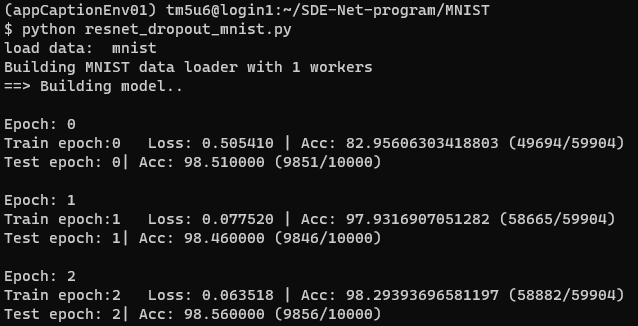


Figure 4. Final Performance results for Resnet in MNIST

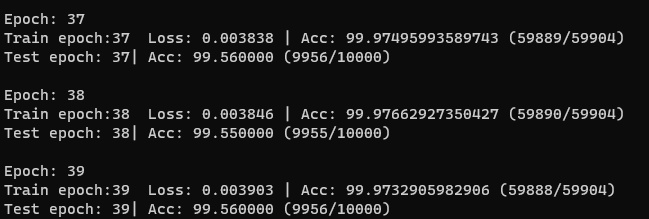
* Experiment with MNIST – Training MC-dropout

Command: $ python resnet\_dropout\_mnist.py

Building and training the model



40 epochs after…



* Experiment with MNIST – Evaluating MC-Dropout

Command: $ python test\_detection.py --pre\_trained\_net save\_resnet\_dropout\_mnist/final\_model --network mc\_dropout --dataset mnist --out\_dataset svhn

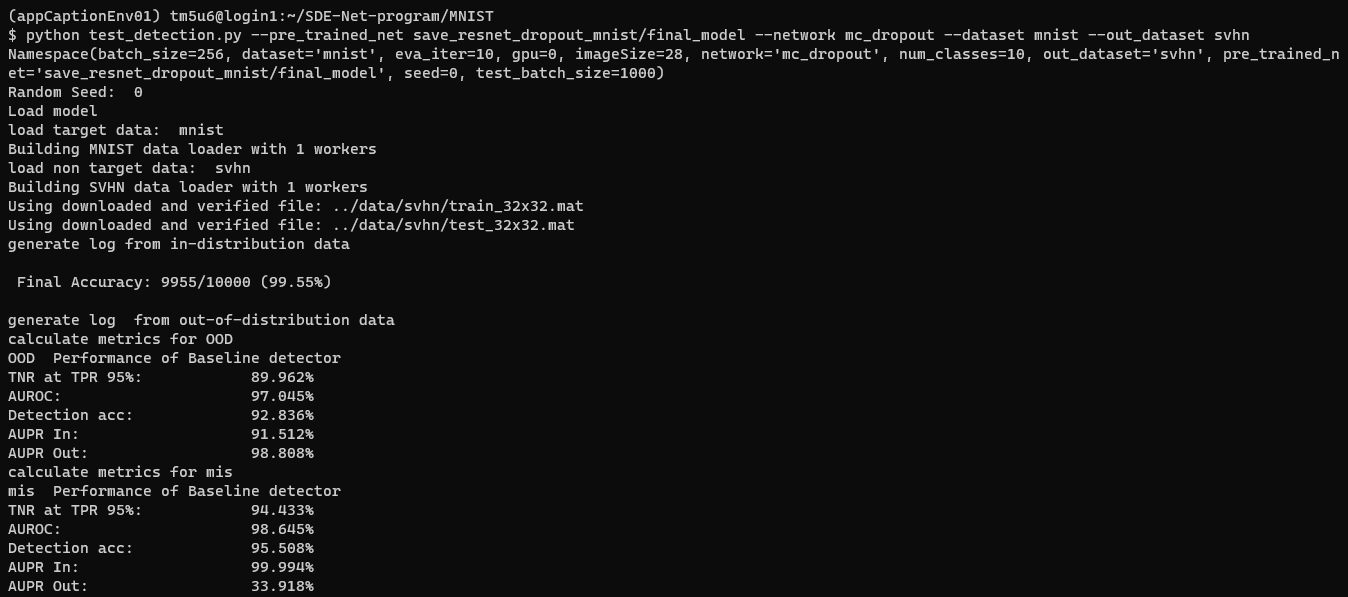
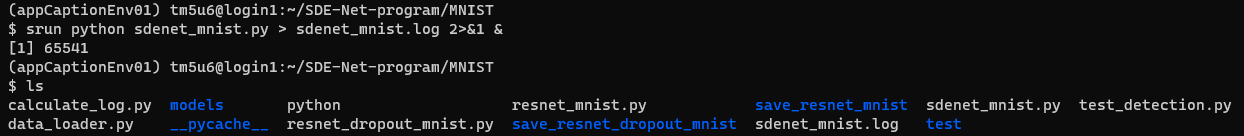


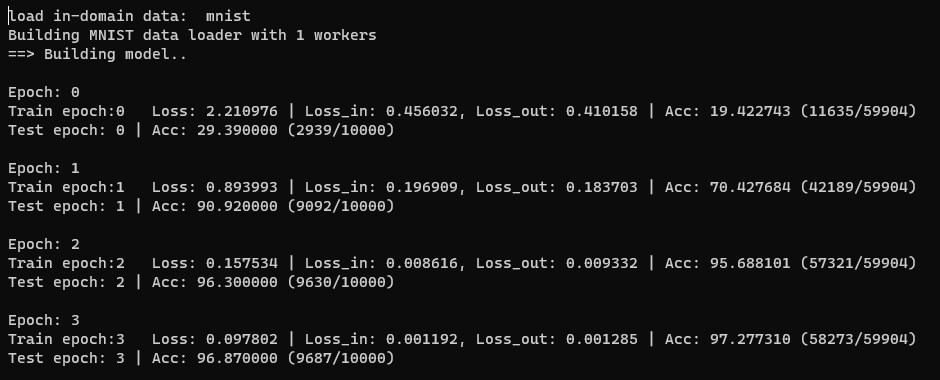
Figure 5. Final Performance results for MC-Dropout in MNIST

* Experiment with MNIST – Training the SDE-Net

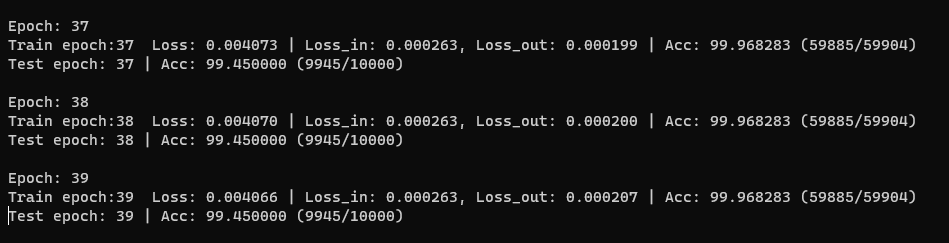
Command: $ srun python sdenet\_mnist.py > sdenet\_mnist.log 2>&1 &



Building and training the model



40 epochs after…



* Experiment with MNIST – Evaluating SDE-Net

Command: $ python test\_detection.py --pre\_trained\_net save\_sdenet\_mnist/final\_model --network sdenet --dataset mnist --out\_dataset svhn

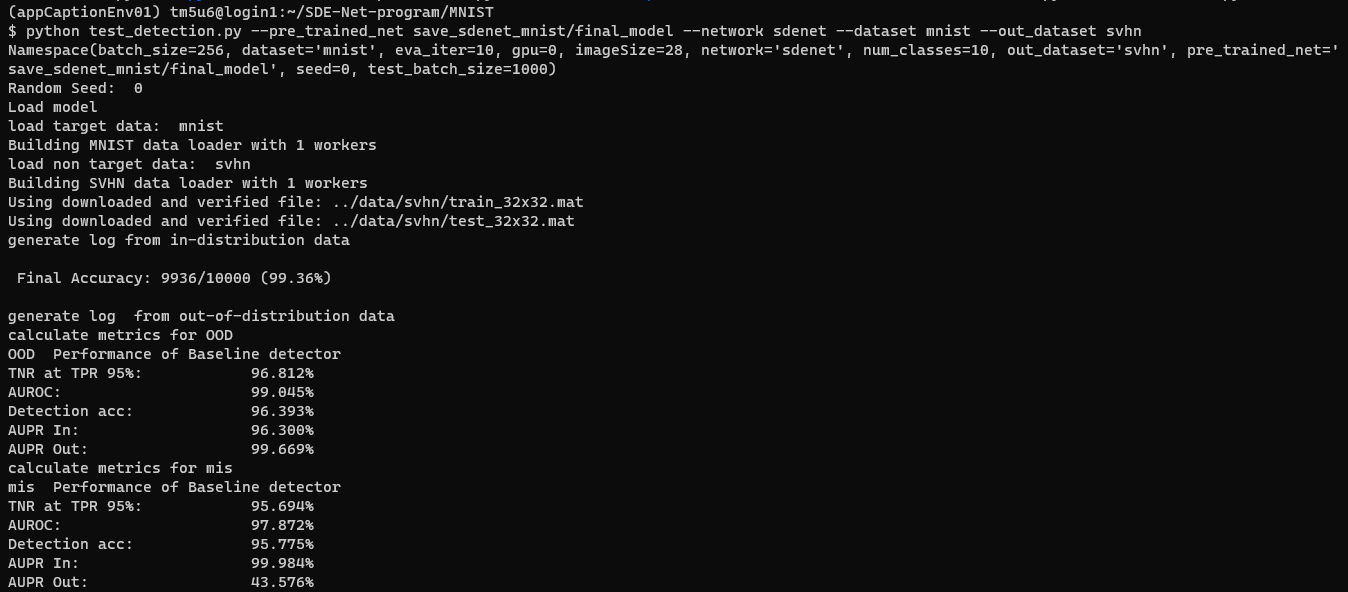


Fig 6. Final performance of SDE-Net in MNIST

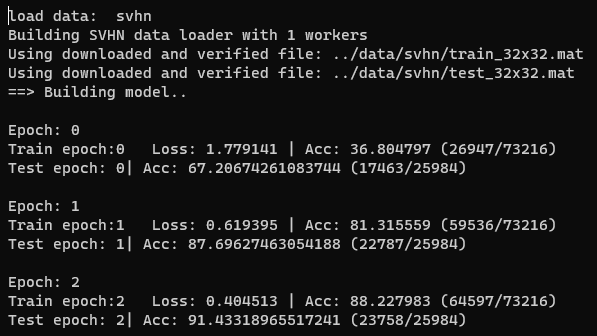
**EXPERIMENTS WITH SVHN**

* Experiment with SVHN – Training the Resnet

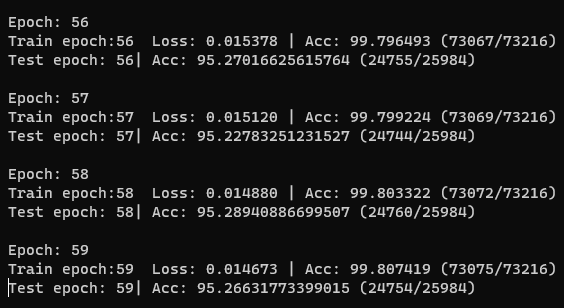
Command: $ srun python resnet\_svhn.py > resnet\_svhn.log 2>&1 &



Building and training the model



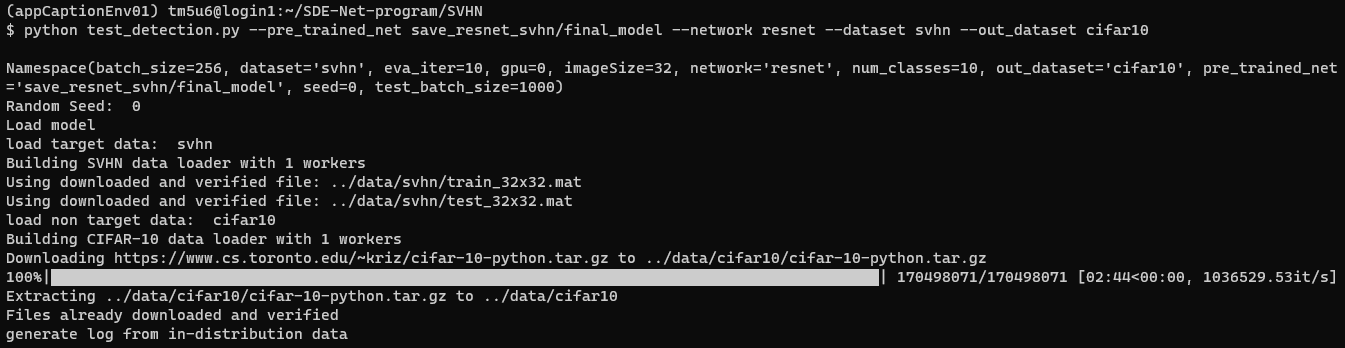
After 60 epochs…



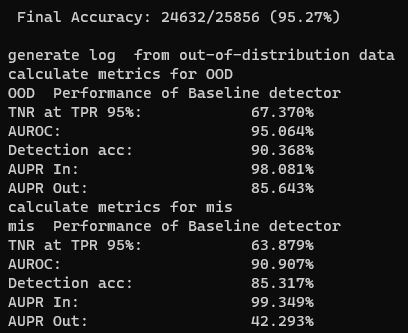
* Experiment with SVHN – Evaluating Resnet

Command: $ python test\_detection.py --pre\_trained\_net save\_resnet\_svhn/final\_model --network resnet --dataset svhn --out\_dataset cifar10

Loading CIFAR-10 dataset

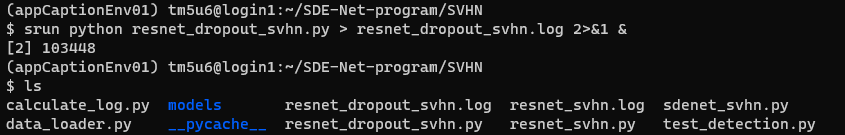


Evaluation

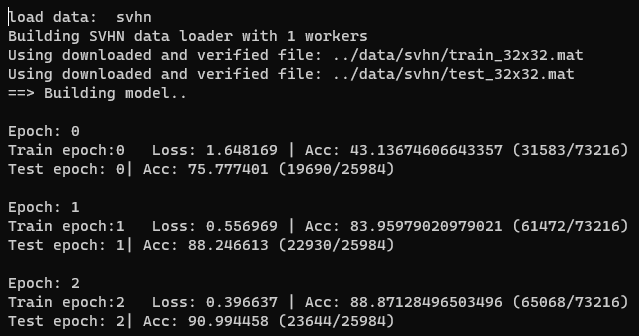


* Experiment with SVHN – Training the MC-dropout

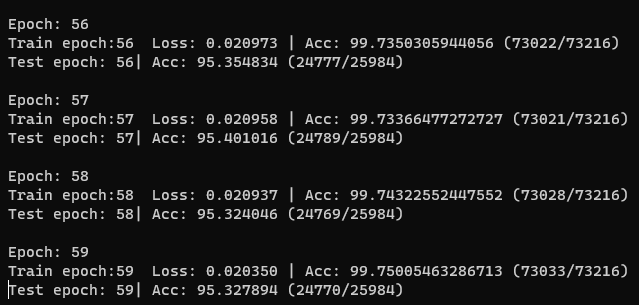
Command: $ srun python resnet\_dropout\_svhn.py > resnet\_dropout\_svhn.log 2>&1 &



Building and training the model

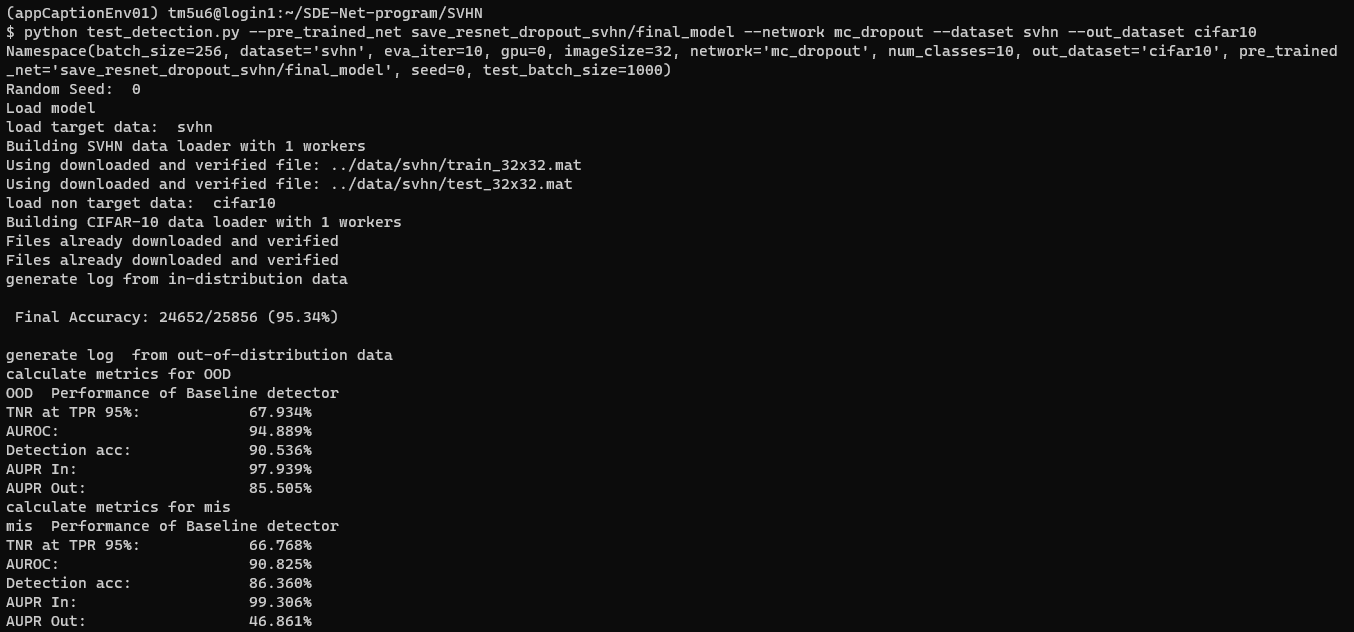


After 60 epochs…



* Experiment with SVHN – Evaluating MC-dropout

Command: $ python test\_detection.py --pre\_trained\_net save\_resnet\_dropout\_svhn/final\_model --network mc\_dropout --dataset svhn --out\_dataset cifar10

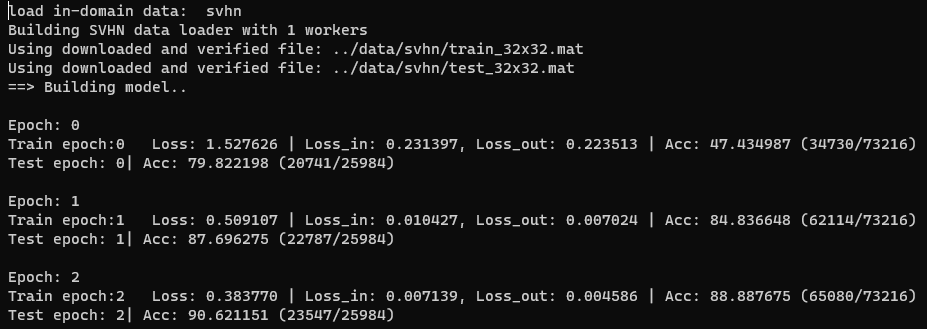


* Experiment with SVHN – Training the SDE-Net

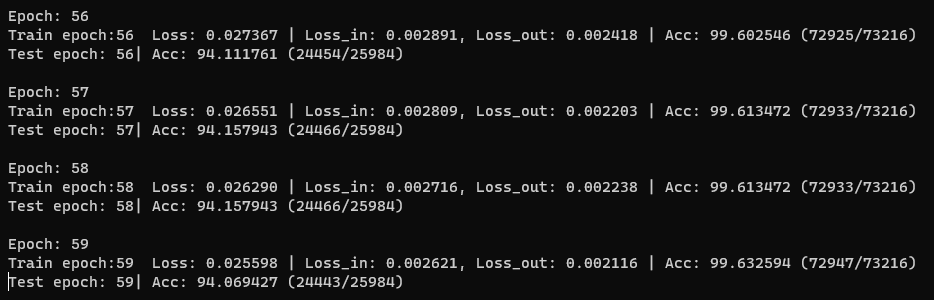
Command: $ srun python sdenet\_svhn.py > sdenet\_svhn.log 2>&1 &



Building and training the model



After 60 epochs…



* Experiment with SVHN – Evaluating SDE-Net

Command: $ python test\_detection.py --pre\_trained\_net save\_sdenet\_svhn\_0/final\_model --network sdenet --dataset svhn --out\_dataset cifar10

