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Lab 1: Pytorch setup & Introduction

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Tayyibah Khanam

Contact: tayyibah@nyu.edu

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Agenda

- Virtual Environments
- Conda Environments
- Setting up the Environment
- Pytorch
- Walkthrough jupyter notebook
  - Generating Tensors
  - Tensor Operations
  - Numpy Conversions
  - Device
  - Gradient Descent with Autograd
  - A simple model in Pytorch!

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Virtual Environments

- Useful to maintain dependencies of different projects.
- Essentially just a directory!
- Two popular packaging systems - Conda & Pip.
- Pip is focused around python and neglects non-python library dependencies. Conda becomes useful when you are working with non-python dependencies.

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Conda Environments

- Conda is a directory that contains a specific collection of Conda packages that you have installed.
- Handles dependencies outside of python packages & python packages themselves.
- Not interchangeable with pip, but you can install pip packages in conda environments.
- Anaconda installs over 150 scientific packages, however Miniconda installs basic packages.

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Environment setup

- Install Anaconda/Miniconda environments
  - https://docs.anaconda.com/anaconda/install
  - https://docs.conda.io/en/latest/miniconda.html
- Create a conda environment with the following commands:
  - **`conda create --name dlm-2023 python=3.8.8`** (PyTorch is not compatible with the latest version of Python 3.10. For now, version3.9.7 or below would do just fine.)
  - **`conda activate dlm-2023`** (Feel free to use other names instead of dlm-2023)
  - **`pip3 install torch torchvision torchaudio`**
  - **`pip3 install notebook`**
  - **`jupyter notebook`**

Pytorch

- Tensorflow works on lazy computing, pytorch is dynamic and imperative, hence eager.
- Python performance is faster in Pytorch.
- Easier to learn, more memory efficient, and lighter to work with.
- Consists of Tensors as building blocks, basically numpy on GPU.

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Useful Links

1. Learn the basics of Pytorch
   (https://pytorch.org/tutorials/beginner/basics/intro.html)
2. Virtual Environments in Python
   (https://rcpedia.stanford.edu/topicGuides/pythonEnv.html)
3. Managing environments in Conda
   (https://conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html)