Math 6373 PyTorch tutorial

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Week 1

Outline

Why PyTorch?

- PyTorch is a Python library for building deep learning projects
- PyTorch is recommended for its simplicity, ease of learning, and Pythonic nature
  - offers accelerated computation using GPUs, yielding significant speedups
  - facilities for numerical optimization on generic mathematical expressions

Outline

Hardware and software requirements

- Full training run for advanced examples may require a CUDA-capable GPU. Default parameters assume a GPU with 8 GB of RAM (e.g., NVIDIA RTX/GTX $\geq$ 4GB).
- PyTorch supports Linux, macOS, and Windows

Installation

- PyTorch installation
  - CUDA toolkit installation for Windows and Linux users,
  - CUDA toolkit installation for macOS users

Outline

Introduction to Tensors

- What are Tensors?
  - Tensors are fundamental data structures in PyTorch
  - They are multi-dimensional arrays, similar to NumPy arrays but optimized for GPU acceleration
- Key Features
  - **Data Storage**: Tensors store data of the same type (e.g., float, int) in a contiguous block of memory.
  - **Dimensions**: Tensors can have any number of dimensions, making them versatile for various applications