CodeLabs - PyTorch

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Program

1. PyTorch introduction

2. PyTorch workflow

BASICS

PyTorch Basics

Tensors are the building blocks of Machine Learning

- Exercise:

  ⇒ Download the tutorial `pytorch_101`.
  ⇒ Go through it, line-by-line, modify everything and observe the effects.

WORKFLOWS

A typical workflow

Note

This workflow is for general training of any machine learning algorithm.

- We present, in detail a PyTorch workflow for learning a straight line using a stochastic gradient algorithm.

- In later examples, we will code the optimization manually, since this will be needed for solving other optimization problems arising in inverse paroblems, data assimilation and scientific ML.

- Exercise:

  ⇒ Download the tutorial `pytorch_102`.
  ⇒ Go through the linear regression workflow, line-by-line, and note carefully ALL the steps of the workflow. WE will be seeeing this, again and again, in the later examples.

Tip

ALL your machine learning, whatever the context, should rigorously follow the steps of this workflow.

GPUs

Use of GPUs in PyTorch

- GPUs, or Graphics Processing Units, are important pieces of hardware originally designed for rendering computer graphics, primarily for games and movies.

- In recent years, GPUs have gained recognition for significantly enhancing the speed of computational processes involving neural networks.

- GPUs now play a pivotal role in the AI revolution, predominantly driving rapid advancements in deep learning, computer vision, large language models, and Scientific ML, among others.

- PyTorch is written for user-transparent exploitation of GPUs and will perform all tensor-based computations directly on them, if asked to do so.

- Using GPUs in Pytorch is easy - please follow the example `Torch_test_GPU_CPU`

References

1. Please consult the list provided on the website: CODE REFERENCES