

# How to install PyTorch and CUDA

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*This document is adopted from this blog (<https://zhuanlan.zhihu.com/p/412838545>).*

## Operation system

For Windows users, just follow all the steps and finally you can use CUDA accelerated PyTorch.

If you are using macOS system with an Intel CPU, it is hardly possible to use CUDA elegantly. If so, you can only use the CPU version of PyTorch, which might be slow for large projects. Otherwise, you are encouraged to use *Colab* (refer to Python tutorial 3). If you are using macOS system with M series chips (M1/M2...), you can directly install the latest version (**default** option) and use GPU acceleration by the build-in machine learning acceleration unit on Apple silicon. Just skip Step 1 to Step 5.

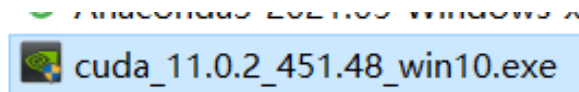
## Version of PyTorch, CUDA, cuDNN

The version number will be specified the following steps, but the pictures of this instructional document will be based on PyTorch 1.9.1, CUDA 11.0, and cuDNN 11.0.

## Procedures

### Step 1 – Download CUDA

Go to this website (<https://developer.nvidia.com/cuda-toolkit-archive>), choose “CUDA Toolkit 11.7.0” → “Windows” → “10” or “11” (based on your Windows version) → “exe (local)” → “Download (2.5GB)”, then download to your local disk. You will obtain an “.exe” executable file as shown in Figure 1.



**Figure 1. The Downloaded Executable File (note that the version number should be 11.7, not 11.0 as shown in the figure)**

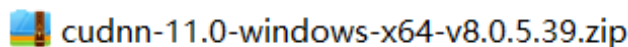
### Step 2 – Install CUDA

Double click the downloaded file (Figure 1). Follow the instruction and complete the installation.

### Step 3 – Download cuDNN

Go to this website (<https://developer.nvidia.com/rdp/cudnn-archive>), choose “Download cuDNN v8.4.1 (May 27th, 2022), for CUDA 11.x” → “Local Installer for Windows (Zip)”.

Then you will be asked to log in. Simply register a new account and log in, then download. After downloading, you will get a “.zip” file as shown in Figure 2 below.



**Figure 2. Downloaded cuDNN zip File**

### Step 4 – Install cuDNN

Decompress the zip file, you will get a folder. Double click and enter the folder, the folder contents should be as shown in Figure 3 below.



**Figure 3. Decompressed Folder**

Go to this file path “C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\” by pasting this path (also known as location) into the address bar on the top of your file manager. Then double click the version of your installed CUDA, enter the corresponding folder.

Copy all the files and folders shown in Figure 3, then paste them to the folder as mentioned in previous paragraph.

### **Step 5 – Check**

Open Command Line Tool (Press “**Windows**” + “**R**”, then type “**cmd**” then click “Enter”). Type “**nvcc -V**”. The output should contain your installed CUDA version. You can refer to Figure 4 below.

```
C:\Users\>nvcc -V
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2020 NVIDIA Corporation
Built on Thu_Jun_11_22:26:48_Pacific_Daylight_Time_2020
Cuda compilation tools, release 11.0, V11.0.194
Build cuda_11.0_bu.relgpu_drvr445TC445_37.28040450_0
```

**Figure 4. Command Line Output for “nvcc -V”**

### **Step 6 – Install PyTorch**

Still in the Command Line Tool, type “**pip install torch torchvision torchaudio --index-url https://download.pytorch.org/whl/cu118**”, according to the PyTorch official website (<https://pytorch.org/>). If error were raised, try to replace “**pip**” by “**pip3**”.

If you are using macOS system, simply refer to the PyTorch official website (<https://pytorch.org/>), scroll down to the installation part, select “Your OS” to be “Mac”, and “Compute Platform” to be “Default”. Copy the code to the terminal command line tool and run the code.