목차

RHEL9 PyTorch 환경 구성

이 문서는 RHEL9 에서 PyTorch를 실행하기 위한 환경을 구성하는 문서이다.

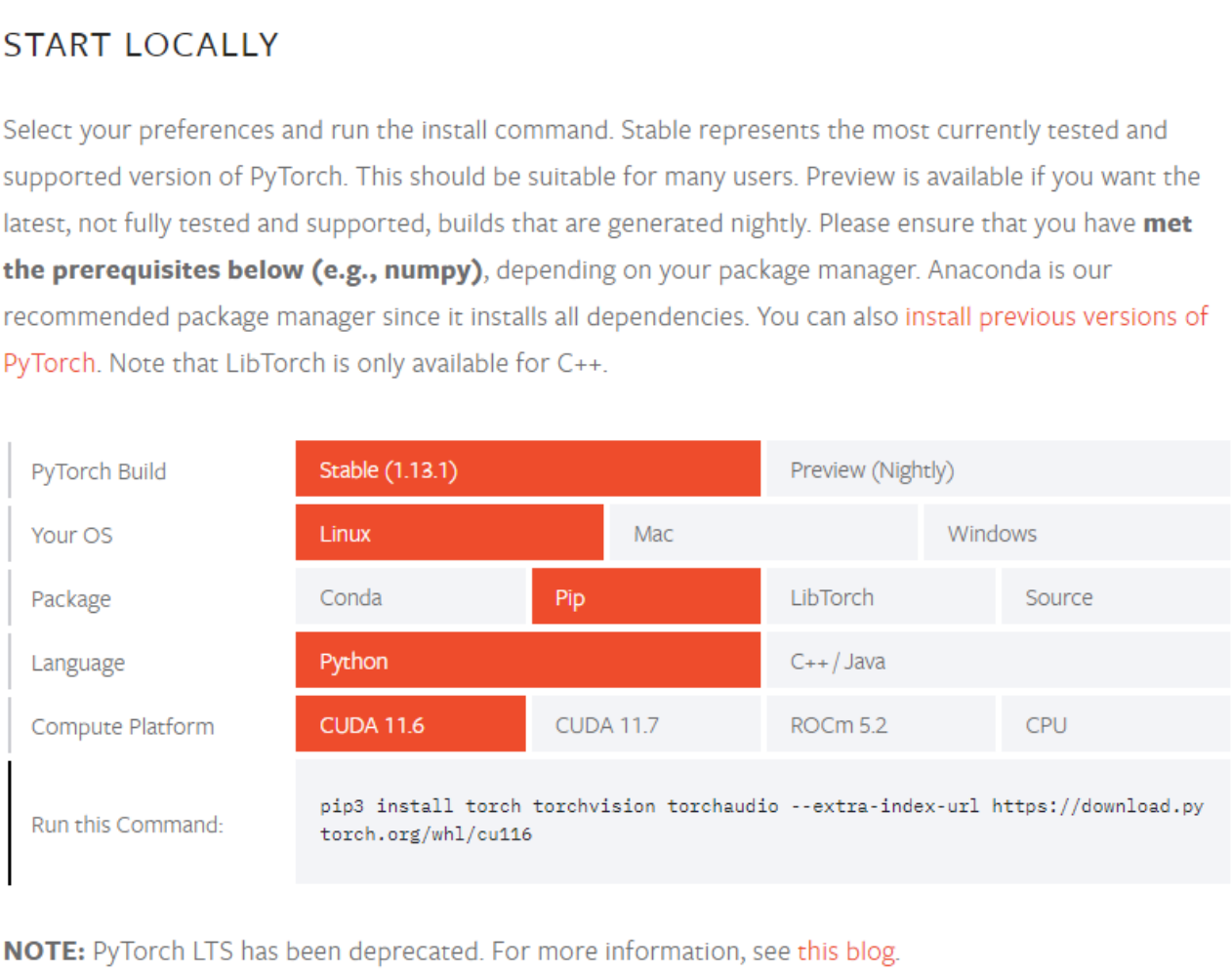
준비작업

당연하게도 PyTorch 를 사용하기위한 NVIDIA Driver, CUDA Driver등은 설치되어있다고 가정한다. 드라이버 설치과정에 대한 내용은 NVIDIA Driver install 문서를 참조하기 바란다.

PyTorch 설치

- https://pytorch.org/get-started/locally/

위사이트 링크를 클릭하면 아래와 같은 페이지가 나온다



자신에게 맞는 OS, 패키지, 사용할 프로그래밍 언어, CUDA버전 등을 선택하면 Run this Command라고 되어있는 부분을 복사하여 실행시키면 바로 설치가 된다.

```
[root@kvm33 ~]# pip3 install torch torchvision torchaudio --extra-index-url
```

```
https://download.pytorch.org/whl/cu116
Looking in indexes: https://pypi.org/simple,
https://download.pytorch.org/whl/cu116
Collecting torch
  Downloading
https://download.pytorch.org/whl/cu116/torch-1.13.1%2Bcu116-cp39-cp39-linux_
x86_64.whl (1977.9 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 2.0/2.0 GB 1.5 MB/s eta
0:00:00
Collecting torchvision
  Downloading
https://download.pytorch.org/whl/cu116/torchvision-0.14.1%2Bcu116-cp39-cp39-
linux_x86_64.whl (24.2 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 24.2/24.2 MB 10.6 MB/s eta
0:00:00
Collecting torchaudio
  Downloading
https://download.pytorch.org/whl/cu116/torchaudio-0.13.1%2Bcu116-cp39-cp39-l
inux_x86_64.whl (4.2 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 4.2/4.2 MB 10.2 MB/s eta
0:00:00
Collecting typing-extensions
  Downloading typing_extensions-4.4.0-py3-none-any.whl (26 kB)
Collecting pillow!=8.3.*,>=5.3.0
  Downloading Pillow-9.4.0-cp39-cp39-manylinux_2_28_x86_64.whl (3.4 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 3.4/3.4 MB 9.9 MB/s eta
0:00:00
Collecting numpy
  Downloading numpy-1.24.1-cp39-cp39-
manylinux_2_17_x86_64.manylinux2014_x86_64.whl (17.3 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 17.3/17.3 MB 10.8 MB/s eta
0:00:00
Requirement already satisfied: requests in /usr/lib/python3.9/site-packages
(from torchvision) (2.25.1)
Requirement already satisfied: chardet<5,>=3.0.2 in /usr/lib/python3.9/site-
packages (from requests->torchvision) (4.0.0)
Requirement already satisfied: idna<3,>=2.5 in /usr/lib/python3.9/site-
packages (from requests->torchvision) (2.10)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in
/usr/lib/python3.9/site-packages (from requests->torchvision) (1.26.5)
Installing collected packages: typing-extensions, pillow, numpy, torch,
torchvision, torchaudio
Successfully installed numpy-1.24.1 pillow-9.4.0 torch-1.13.1+cu116
torchaudio-0.13.1+cu116 torchvision-0.14.1+cu116 typing-extensions-4.4.0
WARNING: Running pip as the 'root' user can result in broken permissions and
conflicting behaviour with the system package manager. It is recommended to
use a virtual environment instead: https://pip.pypa.io/warnings/venv
[root@kvm33 ~]# python
Python 3.9.14 (main, Nov  7 2022, 00:00:00)
```

```
[GCC 11.3.1 20220421 (Red Hat 11.3.1-2)] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import torch
>>> [Ctrl+D]
```

제대로 설치되어있는지 확인을 위해 아래 샘플 코드를 실행해보자

```
import torch
import math

print(torch.__version__) # torch version 출력

dtype = torch.float
# device = torch.device("cpu")
device = torch.device("cuda") # Uncomment this to run on GPU, GPU 를 사용하므로 해당 라인 실행

# Create random input and output data
x = torch.linspace(-math.pi, math.pi, 2000, device=device, dtype=dtype)
y = torch.sin(x)

# Randomly initialize weights
a = torch.randn((), device=device, dtype=dtype)
b = torch.randn((), device=device, dtype=dtype)
c = torch.randn((), device=device, dtype=dtype)
d = torch.randn((), device=device, dtype=dtype)

learning_rate = 1e-6
for t in range(2000):
    # Forward pass: compute predicted y
    y_pred = a + b * x + c * x ** 2 + d * x ** 3

    # Compute and print loss
    loss = (y_pred - y).pow(2).sum().item()
    if t % 100 == 99:
        print(t, loss)

    # Backprop to compute gradients of a, b, c, d with respect to loss
    grad_y_pred = 2.0 * (y_pred - y)
    grad_a = grad_y_pred.sum()
    grad_b = (grad_y_pred * x).sum()
    grad_c = (grad_y_pred * x ** 2).sum()
    grad_d = (grad_y_pred * x ** 3).sum()

    # Update weights using gradient descent
    a -= learning_rate * grad_a
    b -= learning_rate * grad_b
    c -= learning_rate * grad_c
    d -= learning_rate * grad_d
```

```
print(f'Result: y = {a.item()} + {b.item()} x + {c.item()} x^2 + {d.item()}
x^3')
```

위 내용으로 test-torch.py 파일을 생성후 실행해본다.

주의사항

샘플용 파일test-torch.py 를 만들때 절대 파일명을 torch.py 로 만들지 않도록 한다.

왜냐하면 이미 torch.py라는 모듈이 존재하기 때문에 같은 이름으로 만들게 되면 import torch 시에 엉뚱하게도 샘플파일이 로딩되어 아래와 같은 오류가 발생할 수 있다.

```
[root@kvm33 ~]# python
Python 3.9.14 (main, Nov  7 2022, 00:00:00)
[GCC 11.3.1 20220421 (Red Hat 11.3.1-2)] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import torch
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/root/torch.py", line 4, in <module>    ##### <<<<< 이부분을 보면 엉뚱
하게도 /root/torch.py 파일을 로딩하는것을 알수 있다.
    print(torch.__version__) # torch version 출력
AttributeError: partially initialized module 'torch' has no attribute
'__version__' (most likely due to a circular import)
>>>
```

참조링크

- https://pytorch.org/get-started/locally/
- https://acton21.tistory.com/13