

[320] Hardware Tradeoffs, Installing PyTorch

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PyTorch is like numpy, but...

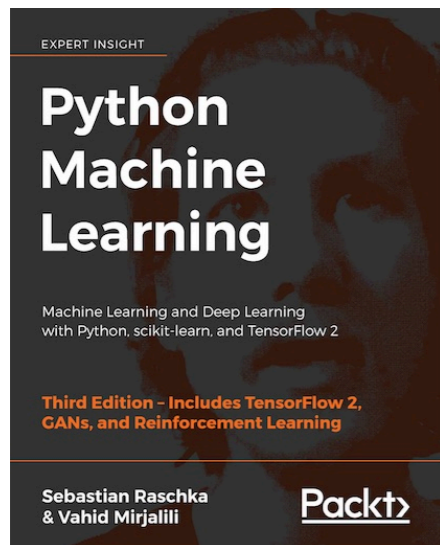
- 1 easy to move matrices to GPU and do operations there
- 2 easy to compute gradients (derivatives evaluated at specific points), for optimizations
- 3 easy to construct deep-learning neural networks

<https://pytorch.org/tutorials/>

challenge: installing PyTorch requires a lot of memory

GPU vs. CPU

advice: compare hardware based on cost, and benchmarks measuring how fast some specific type of work can be done



Specifications	Intel® Core™ i7-6900K Processor Extreme Ed.	NVIDIA GeForce® GTX™ 1080 Ti
Base Clock Frequency	3.2 GHz	< 1.5 GHz
Cores	8	3584
Memory Bandwidth	64 GB/s	484 GB/s
Floating-Point Calculations	409 GFLOPS	11300 GFLOPS
Cost	~ \$1000.00	~ \$700.00

<https://sebastianraschka.com/books.html>

The GPU is 30% cheaper but 28x faster at floating-point operations!

Memory vs. Storage

	Memory (RAM)	Storage (SSD/HDD)
Speed	fast	slow
Size	small	large
Persistent	no	yes

Swap Space

	Memory (RAM)	Storage (SSD/HDD)
Speed	fast	slow
Size	small	large
Persistent	no	yes

When there's not enough memory, you can use storage instead. Storage space used as a substitute for memory is called **swap** space.

Enabling swap can make certain things possible (like installing PyTorch!), but can also slow things down

Using Swap to install PyTorch

separate terminal:

0

```
sudo apt install htop  
htop
```

1

```
sudo fallocate -l 4G /swapfile  
sudo chown root /swapfile  
sudo chmod 600 /swapfile  
sudo mkswap /swapfile  
sudo swapon /swapfile
```

2

```
pip3 install torch torchvision
```

3

```
sudo swapoff /swapfile  
sudo rm /swapfile
```