An introduction to PyTorch

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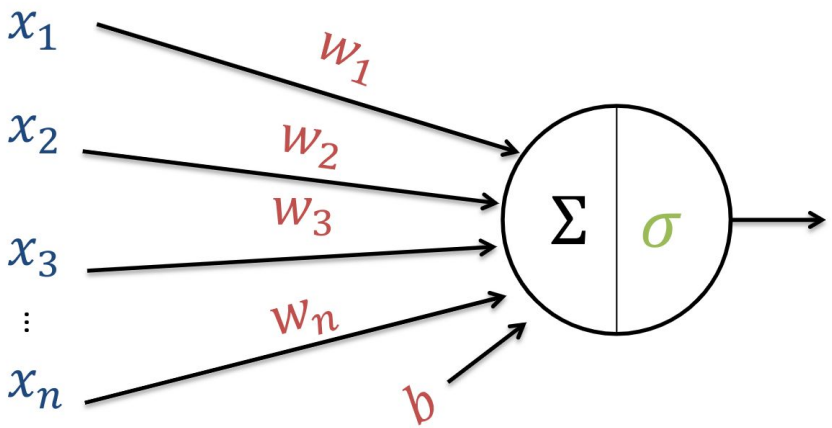
Neural Networks and Deep Learning

Do we need really a tool?

- NumPy may be enough
- Arithmetic operations on matrices
- Derivatives Computation

The artificial neuron (perceptron)



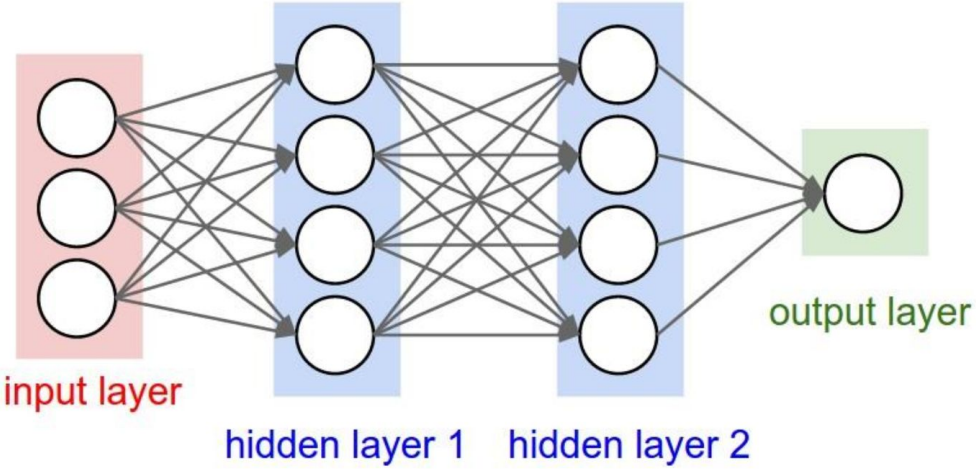
Output:

$$y = \sigma(\sum w_i x_i + b)$$
$$= \sigma(\boldsymbol{w}^T \boldsymbol{x} + b)$$

- x_i are the inputs
- w_i are the weights and b the bias
- Σ denotes the summation
- σ is a (possibly nonlinear) activation function

w_i, b are TUNABLE!!

Neural networks



- A neuron detects some patterns in its inputs – combinations that cause it to fire
- When assembled into a network, neurons deep in the network react to patterns composed of more primitive parts

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We tried on previous iterations - it was **complicated**

What we need?

1. GPU utilization
    a. Computation in parallel
        i. A lot of slower cores (thousands) instead of 16 fast
2. Backpropagation (derivatives computation)
    a. Done automatically
    b. Applicable for different network architectures

Some words on GPU support

- Sometimes real pain in the ass
- Before using “framework” you have to meet dependencies
  1. **nvidia-GPU** (with cuda support -> newer one])
  2. Installed **nvidia-drivers** for your graphic card
     a. `watch nvidia-smi` - to test if visible in the system
  3. Installed **CUDA** library
  4. Then you can use framework which uses CUDA
  5. But sometimes some of this part can be installed automatically

That’s why we encourage you to use Colab. You don’t have to care about dependencies and focus on important stuff.

Most popular solutions

From facebook

From Google