Introduction

Darshan's DL Lectures ① Theory + Pracs 70% 30%
② Pracs → Easy & Repetitive

- Deep learning is an extended field of machine learning that has proven to be highly useful in the domains of text, image, and speech, primarily.

Python ⇒ Tetris Puzzle

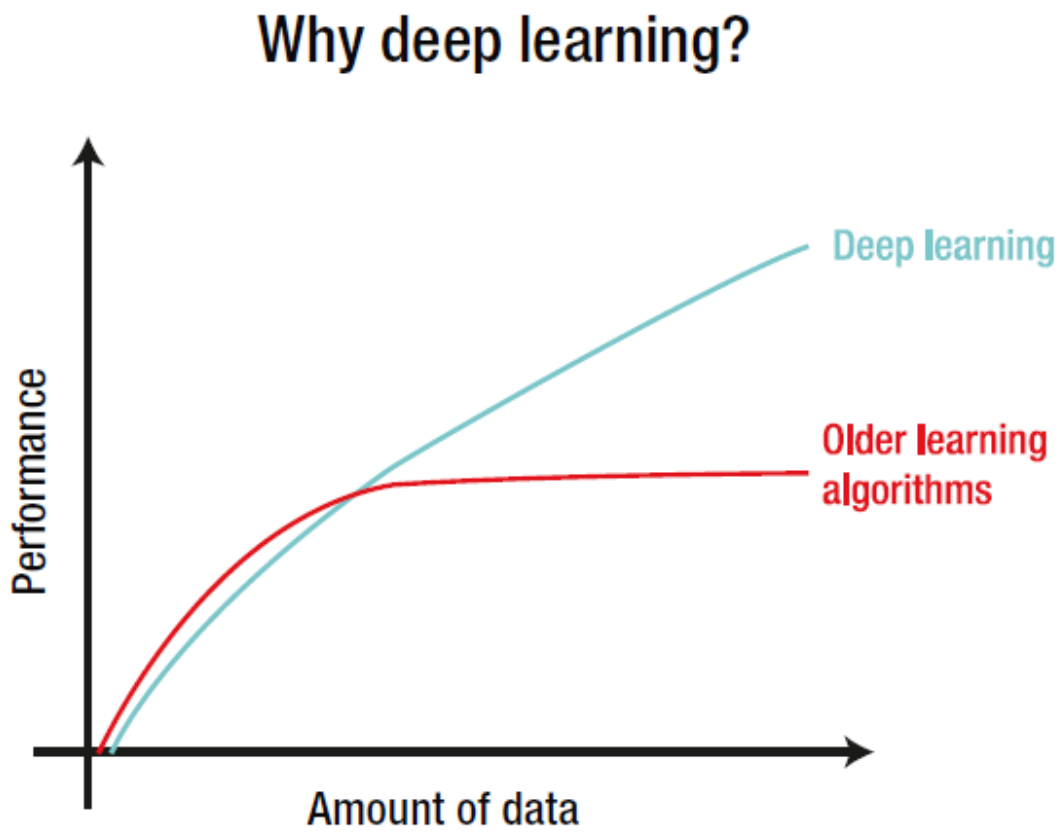
- The collection of algorithms implemented under deep learning have similarities with the relationship between stimuli and neurons in the human brain.

DL → imitates human brain to some extent

- Deep learning has extensive applications in computer vision, language translation, speech recognition, image generation, and so forth. These sets of algorithms are simple enough to learn in both a supervised and unsupervised fashion.

Scaling data science techniques to amount of data

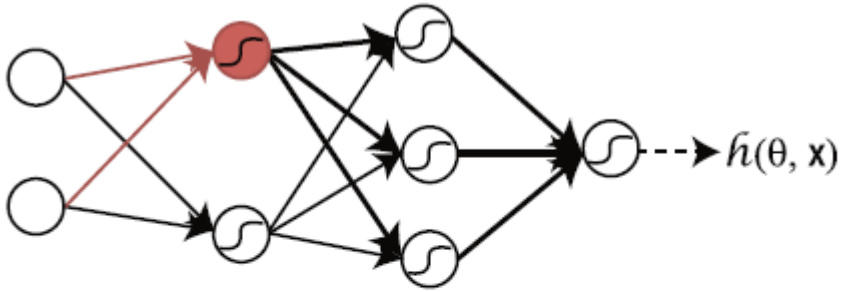
Introduction



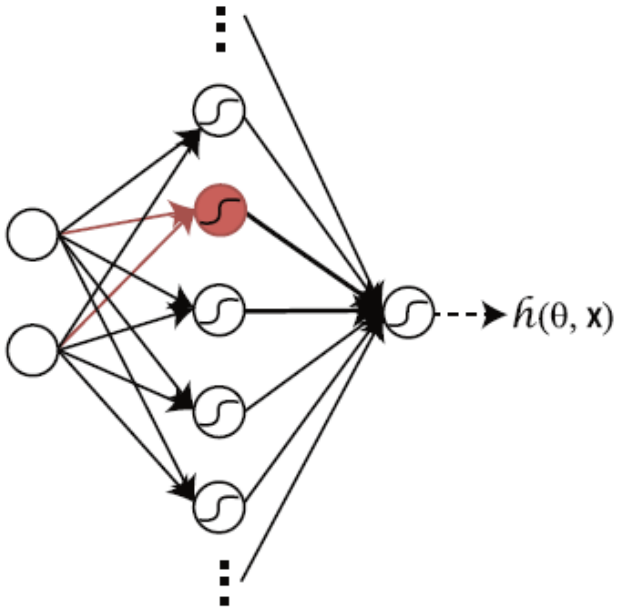
Scaling data science techniques to amount of data

Introduction

- The term *deep* in deep learning refers to the depth of the artificial neural network architecture, and *learning* stands for learning through the artificial neural network itself.



Deep Network



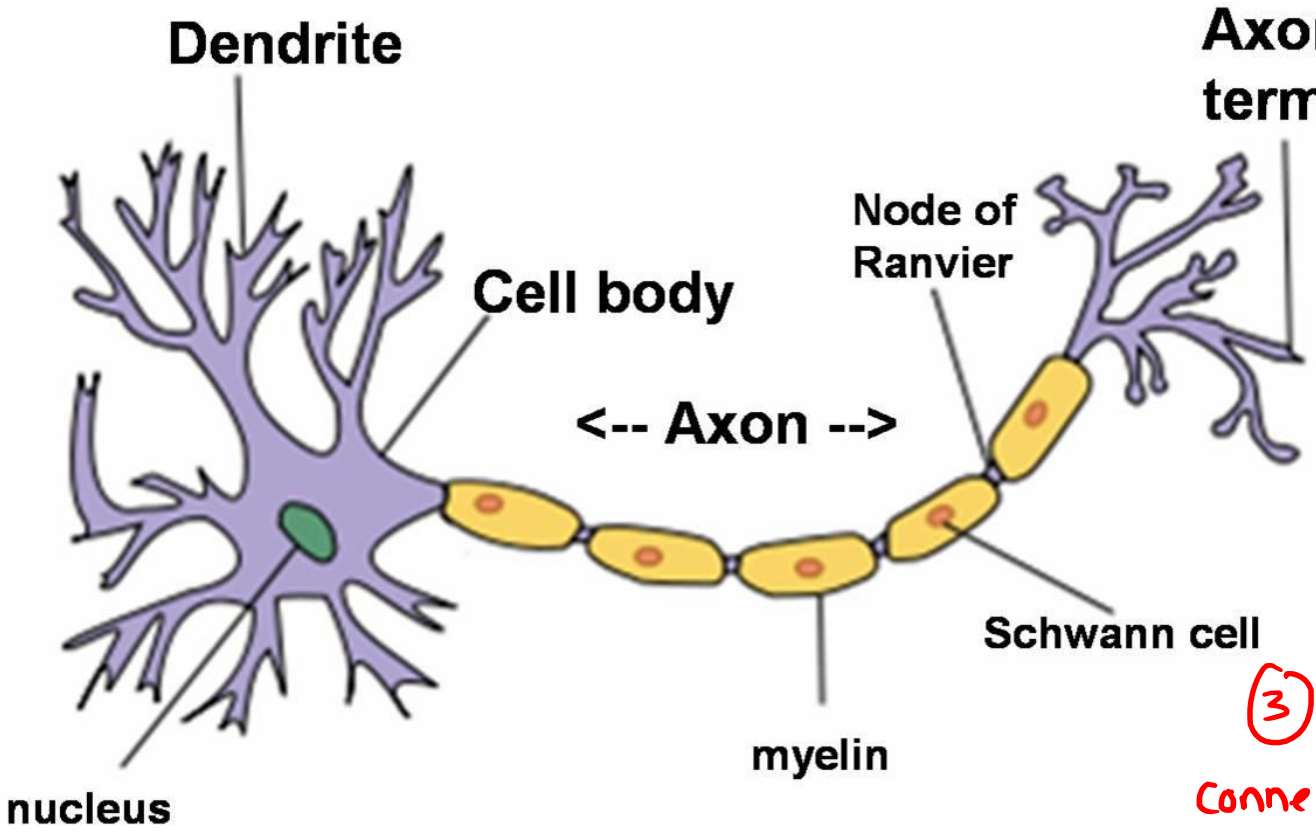
Shallow Network

Introduction

Discover latent structures (feature learning) from unlabeled & unstructured data, such as Images (Pixel data), Documents (Text) or files (audio, video data).

- Deep neural networks are capable of what?
- How Deep Is “Deep”? If the # Hidden layers > 1, then we call it as Deep.
- A deep neural network is simply a feed forward neural network with multiple hidden layers.

Basic Structure of NN - History



(1) Each unit (neuron) is simple

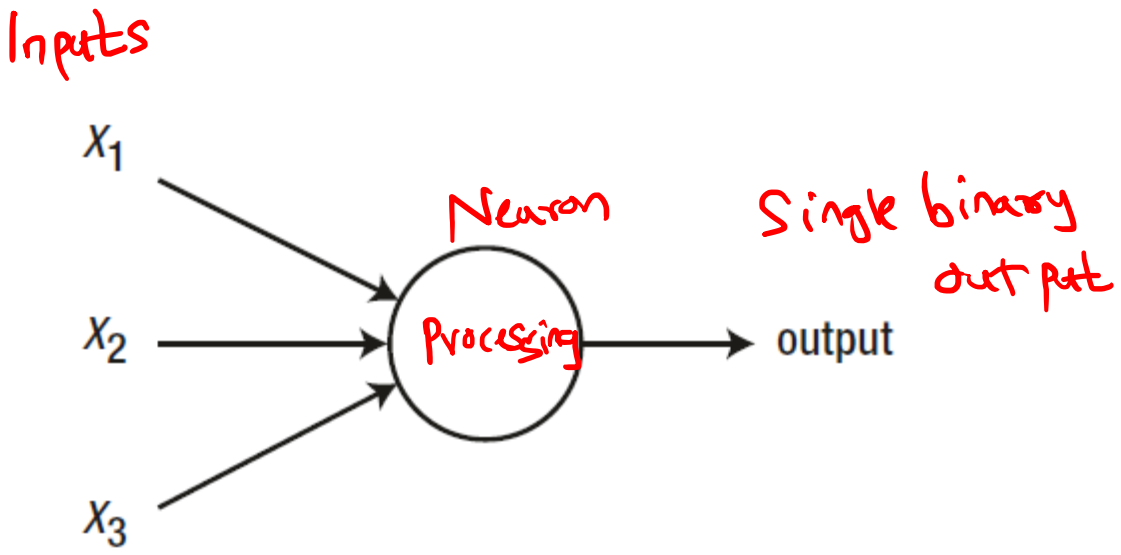
(2) Human brain has 100 billion Neurons with 100 trillion connections

(3) Strength & nature of connection stores memories & program that makes us 'Human'.

(4) A Neural Network is a web of Artificial Neurons.

Basic Structure of NN - History

- Artificial neuron or perceptron, first developed in the 1950s by Frank Rosenblatt.

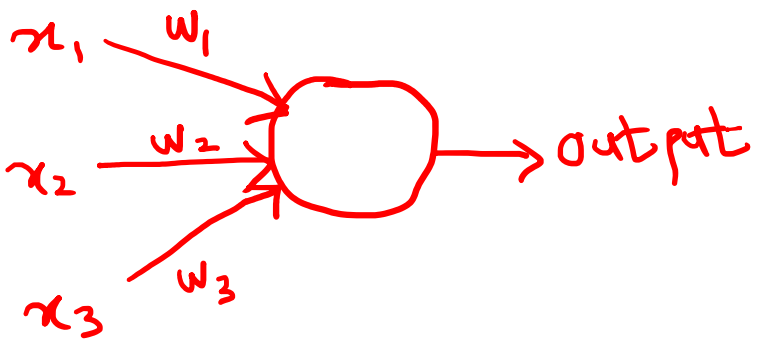


Sample neuron

Basic Structure of NN - History

What is Neural Network?

First Understand, a type of Artificial Neuron i.e. PERCEPTRON.



$$\text{Output} = \begin{cases} 0 & \text{if } \sum_{i=1}^{3} w_i x_i \leq \text{threshold} \\ 1 & \text{if } \sum_{i=1}^{3} w_i \cdot x_i > \text{threshold} \end{cases}$$

What is $\sum_{i=1}^{3} w_i \cdot x_i$? $w_1 \cdot x_1 + w_2 \cdot x_2 + w_3 \cdot x_3$