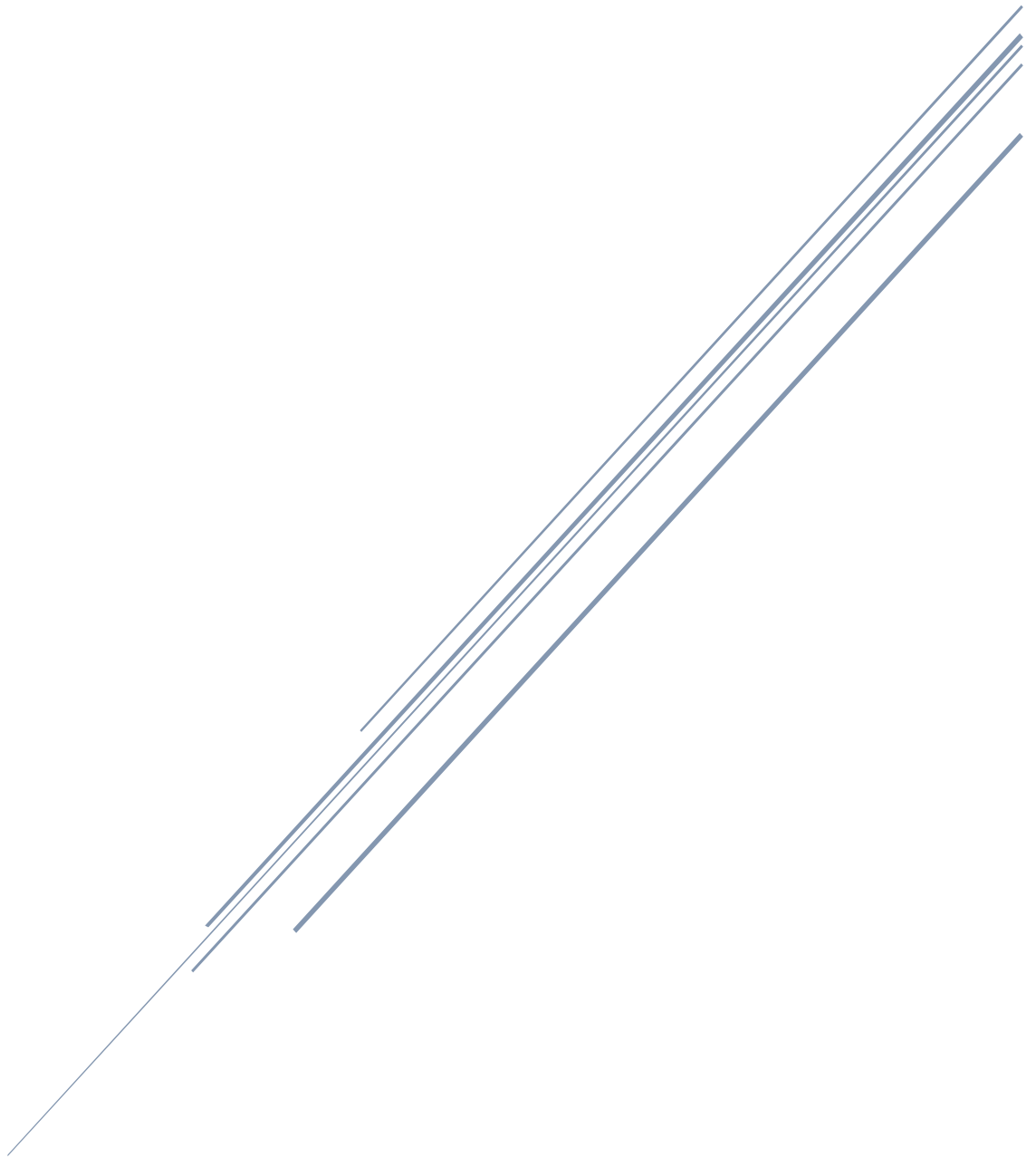


DEEP LEARNING

Module 1: Introduction



v-cardona
Deep Learning Fundamentals with Keras

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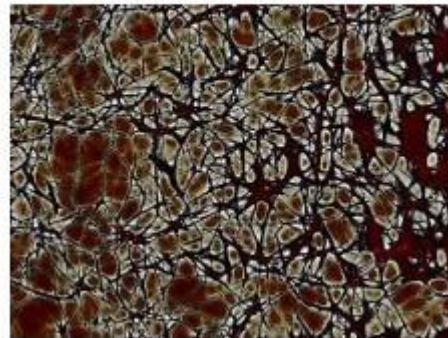
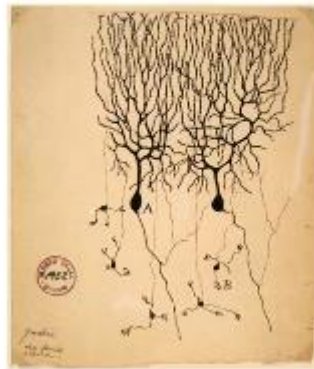
Introduction to deep learning

Applications: colour restoration, audio synchronisation, automatic handwriting regeneration, adding sounds to silent movies automatically, self-driving cars.

Neurons and neural networks

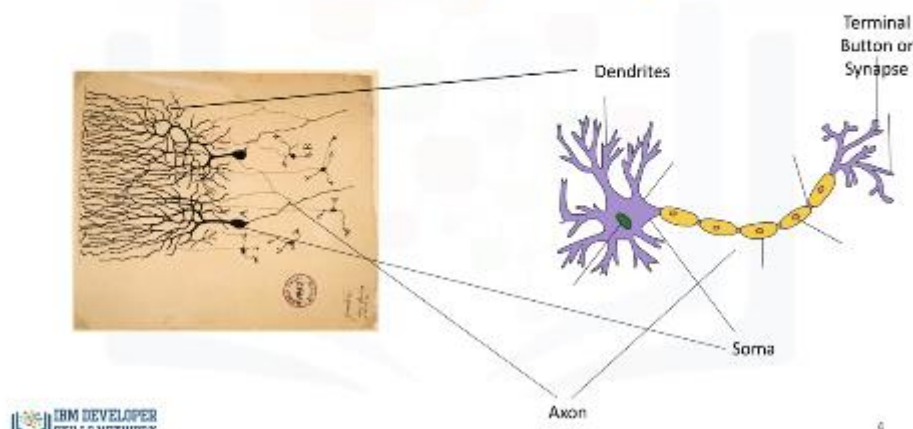
Algorithms inspired by the way neurons and neural networks function and process data in the brain.

A Neural Network



The main body of the neuron is called the soma, which contains the nucleus of the neuron. The big network of arms sticking out of the body is called the dendrites, and then the long arm that sticks out of the soma in the other direction is called the axon. The whiskers at the end of the axon are called the terminal buttons or synapses. So the dendrites receive electrical impulses which carry information, or data, from sensors or terminal buttons of other adjoining neurons. The dendrites then carry the impulses or data to the soma. In the nucleus, electrical impulses, or the data, are processed by combining them together, and then they are passed on to the axon. The axon then carries the processed information to the terminal button or synapse, and the output of this neuron becomes the input to thousands of other neurons.

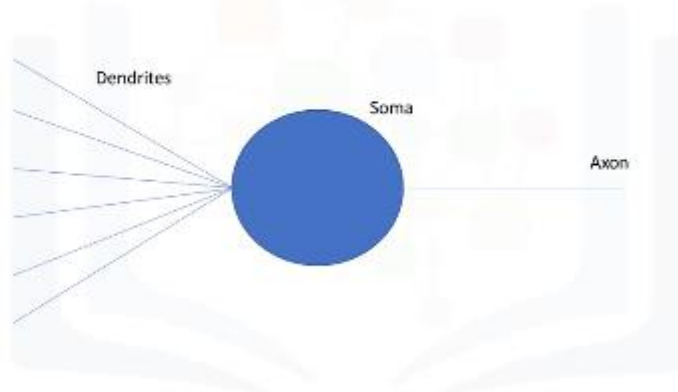
A Neural Network (Cont'd)



Learning in the brain occurs by repeatedly activating certain neural connections over others, and this reinforces those connections. This makes them more likely to produce a desired outcome given a specified input. Once the desired outcome occurs, the neural connections causing that outcome become strengthened.

An artificial neuron behaves in the same way as a biological neuron. So it consists of a soma, dendrites, and an axon to pass on the output of this neuron to other neurons. The end of the axon can branch off to connect to many other neurons.

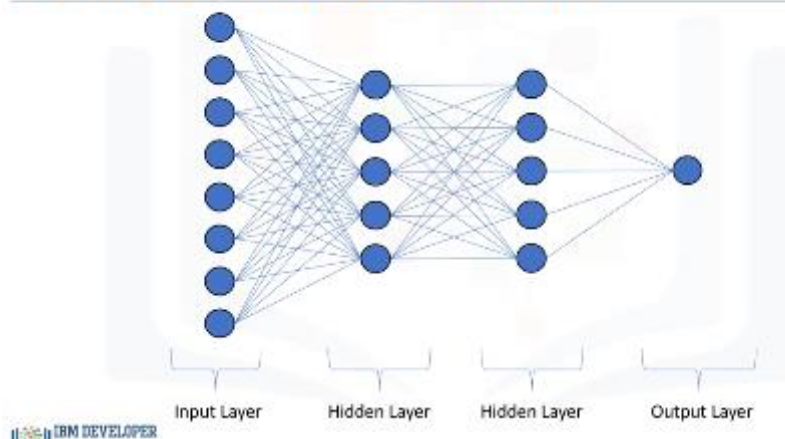
Artificial Neuron



Artificial neural networks

For a network of neurons, we normally divide it into different layers: the first layer that feeds the input into the network is obviously called the input layer. The set of nodes that provide the output of the network is called the output layer. And any sets of nodes in between the input and the output layers are called the hidden layers. When working with neural networks, the three main topics that we deal with are: forward propagation, backpropagation, and activation functions.

Artificial Neural Network



Forward propagation is the process through which data passes through layers of neurons in a neural network from the input layer all the way to the output layer.