Multilayer Perceptron

Multilayer Dense Feedforward Neural Networks

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Introduction

TODO.

Neurons

Basic elements

The neuron's basic task is to take an input, perform some computation and output a value.

Main elements

- An input vector $\mathbf{x} = \langle x_1, x_2, \ldots, x_n \rangle \in \mathbb{R}^n$.
- A vector of weights $\mathbf{w} = \langle w_1, w_2, \ldots, w_n \rangle \in \mathbb{R}^n$.
- A constant $b \in \mathbb{R}$, called *bias*.
- A computation between inputs and weights, like

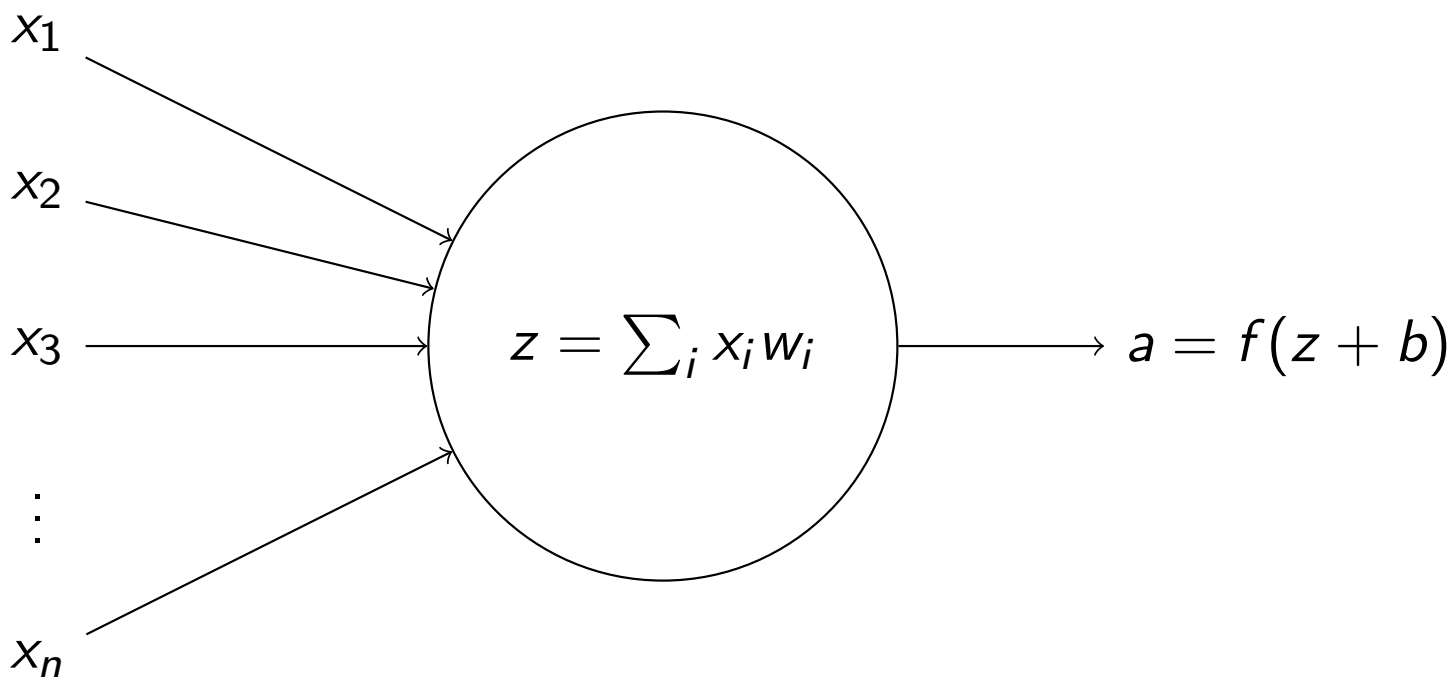
$$z = \mathbf{x} \cdot \mathbf{w} = \sum_i x_i w_i.$$

- An activation function f to produce an output $f(z + b)$.

Neurons

Graphical representation

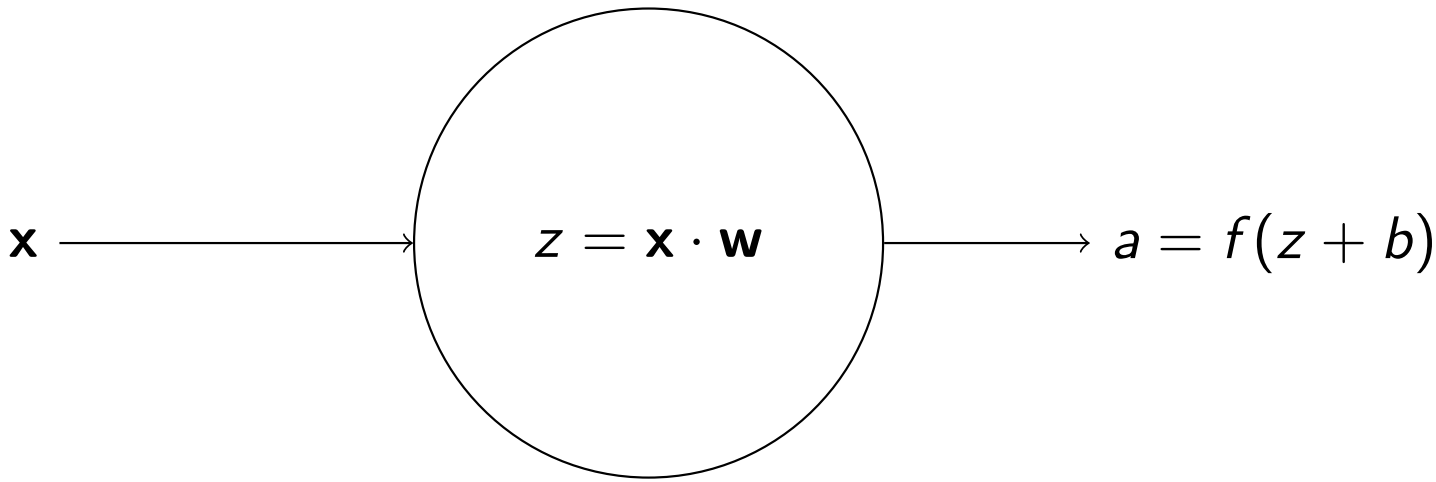
A common graphical representation highlights those elements:



Neurons

Graphical representation

The same representation, but using only vectors:



Multilayer Architecture

Dense feedfoward architecture

An architecture with k layers, $L_0, L_1, \ldots, L_{k-1}$, is graphically represented as: