

Readings in Neuroinformatics

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THE PERCEPTRON: A PROBABILISTIC MODEL FOR INFORMATION STORAGE AND ORGANIZATION IN THE BRAIN, F. Rosenblatt, Psychological Review Vol. 65, No. 6, 1958.

Abstract

The brain stores information partly in the strength of synapses of neurons and in networks. It accesses these for future reference in order to control behaviour and modulate recognition. How can the information storage be described and what is the underlying theory that influences behaviour and recognition? In this paper, we propose a model of a theoretical nervous system called a perceptron aiming to answer these questions. The perceptron resembles the structure of an actual brain. It has four layers simulating neurons that are connected with one another in a feedforward and backward fashion, which works in a probabilistic manner based on statistical separability. Stimuli in the first layer project to the second layer, called the projection area. The projection area is randomly connected to the association area. Lastly, the association area connects in a feedforward fashion to the fourth layer. Given a visual stimulus, the perceptron is capable of learning, meaning the strength of synapses adapt accordingly. Furthermore, it performs satisfyingly well under error-and-trial experimental settings. Therefore, the perceptron is a promising model based on established biological and physical laws to investigate cognitive behaviours with generality and verifiability.