

Readings in Neuroinformatics

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Frank Rosenblatt. The perceptron: a probabilistic model for information storage and organization in the brain. *Psychological review*, 65(6):386, 1958.

Abstract

Any model for the physical realization of cognitive abilities needs to account for information storage and access as well as behavioral output. Compared to the notion of hard coded stimuli images in the brain, a model based on ever-changing connections between activity centers explains both at the same time. Existing probabilistic theories assuming this model have all extrapolated behavioral outcomes based on behavioral experiments, thus making non-reducible statements which cannot exclude circularity. Here we introduce our concept of the *perceptron*, a hypothetical cognitive system assuming solely a small set of variables to predict virtually any phenomenon of perception and behavior in an intelligent system. The theory is built with mathematical analysis and integrates basic laws already established in physics and biology. Predictions under various idealized environments are shown. The results hold for simple cognitive sets, selective recall and basic categorization tasks. The perceptron proves to be parsimonious and verifiable without reduction of its explanatory power and generality. It may serve as a foundation of further studies about the structure and function of information handling systems.

172 words.