A MODEL OF CORTICAL NEURAL NETWORK STRUCTURE

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Abstract

A model of cortical neural network structure was proposed in which the single-cell-representation hypothesis was introduced. In the model, it was assumed that each information being aware at each moment corresponds to the firing of one specific neuron. It was also assumed that the outputs of such a neuron is coded randomly and connected to other neurons recurrently. It was shown that this structure can be extended to the scale of the human cerebral cortex, and that this model is consistent to the relationship between the number of neurons in the entire cortex and the number of synapses on each neuron. To explain memory, the recruitment of unused element, called virgin cell, was introduced.

Keywords: cortical neural network, single-cell representation, random coding, virgin cell, winner-takes-all algorithm