Abstract

Simple cells found in primary visual cortex are orientation selective. It has been experimentally found that they acquire this property with time i.e. learning of orientation selectivity takes place. Many computational models have been proposed for the development of orientation selectivity. Most of the models proposed so far are either abstract in nature or are very simplified version of
actual learning mechanism. In this work we propose a model for development of orientation selectivity based on spike timing dependent plasticity (STDP), which till now is considered to be the actual learning mechanism adopted by neural circuits. We could obtain elongated segregated receptive field structure thus giving simple cells the property of orientation selectivity. We also observe that input activity plays a major role in the development of orientation selectivity, too much or too less a correlation between the inputs activities do not result in the formation of segregated ON and OFF regions in the RF structure [1]. There is also a need of normalization for the development of orientation selectivity.

Reference

- Bliss TV, Collingridge GL (January 1993). "A synaptic model of memory: long-term


Index Terms

Computer Science
Information
Technology

Key words

Simple cells
visual cortex

Hebbian model
STDP
BCM learning