

HIGH AND LOW FREQUENCY IMAGE PROCESSING WITH RBF-SOM

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Abstract

Recent neurophysiological studies suggest, that primate brain utilises two pathways for object recognition: ventral visual stream for precise object recognition and magnocellular pathways for top-down facilitation of object recognition. In our study, we propose hierarchical architecture for 3D object recognition, consisting of the number of modules, resembling the ventral visual stream of the primate brain (V1, V2, V4, inferior temporal cortex) and orbitofrontal cortex.

Earlier work

In the previous studies, we have presented a general framework for development of the cortex-like visual object recognition systems for processing high quality input data by processing it with the hierarchy of modules, resembling the VVS: V1-V4 and IT[1].

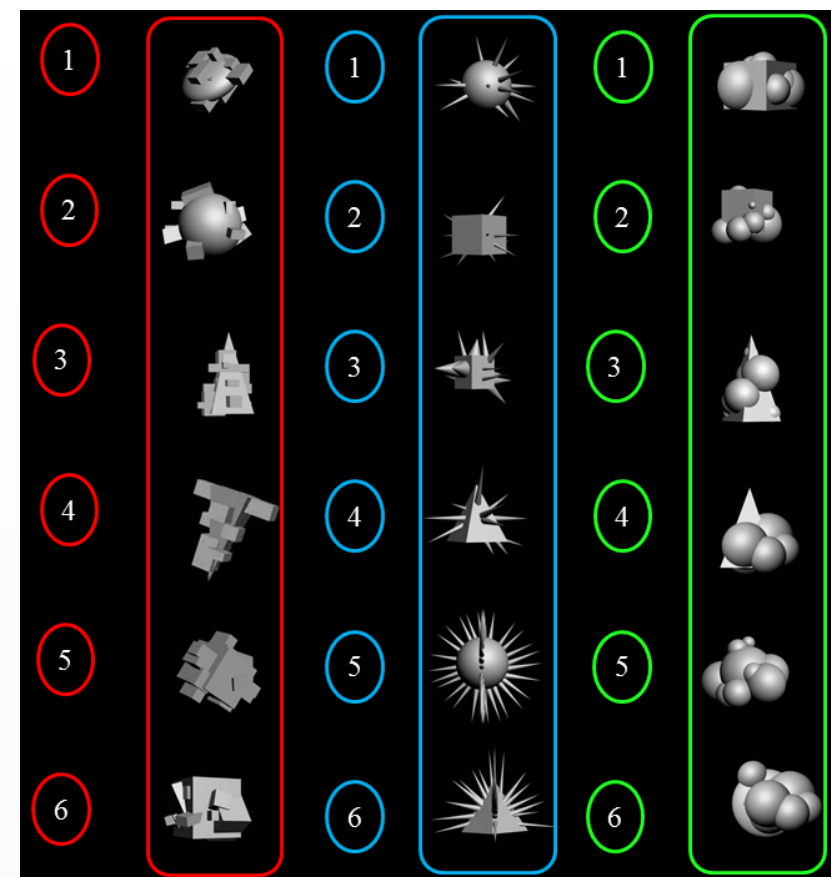
Objective

Here, we propose the enhanced architecture for visual processing with the emphasis on the connection of the early visual areas with OFC. Our objective was to extend the existing framework to provide faster low-frequency data processing and top-down prediction mechanisms. Partially processed LSF image of the visual input is rapidly projected to OFC from early visual regions. In parallel, more detailed and slower analysis of the visual input is being performed along the ventral visual stream and activates predictions about candidate objects similar to the LSF image [2].

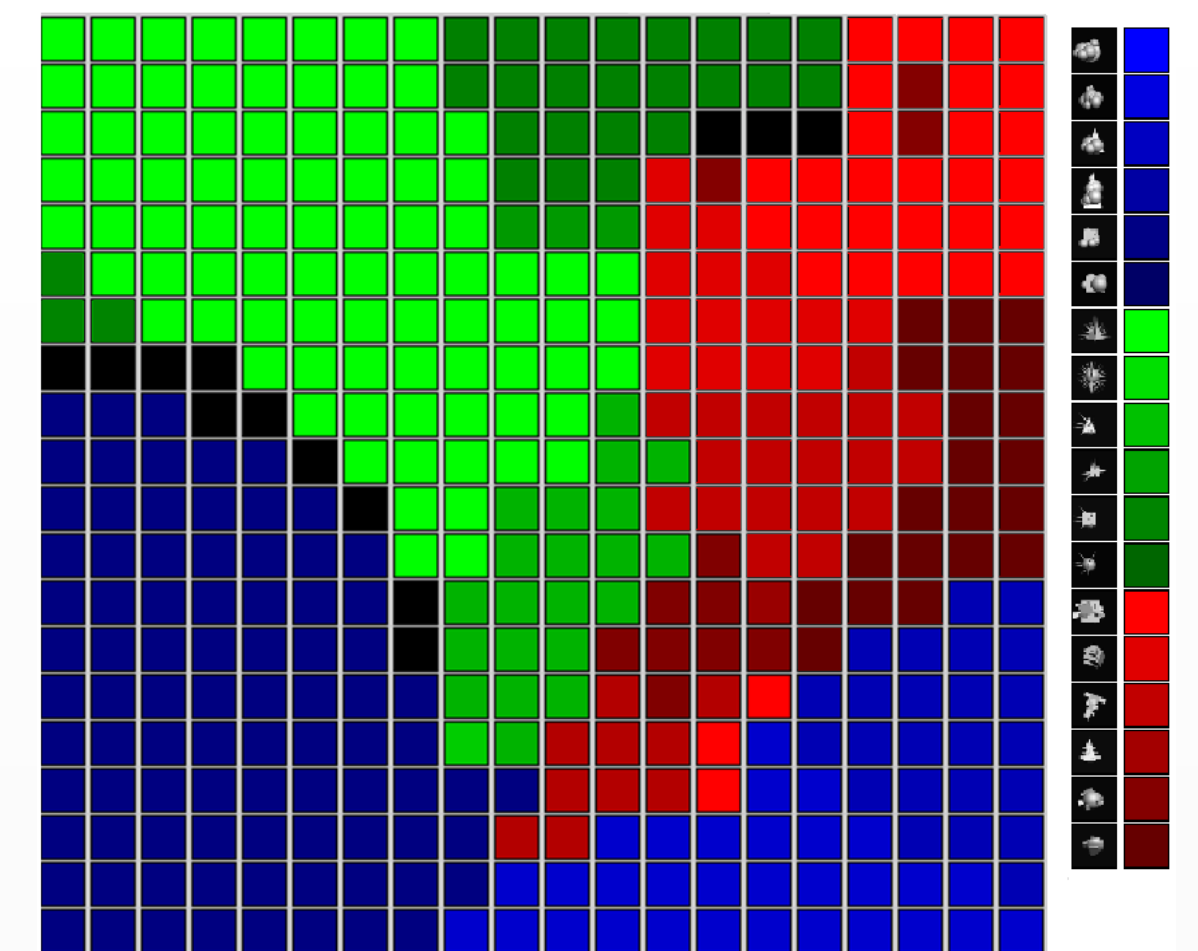
References

- [1] N., Efremova, N., Asakura, I. Inui Neural Network model of IT for 3D Object Recognition and Classification, in *The proceedings of IEEE/CME 2011*.
- [2] K., Kveraga, J. Boshyan and M. Bar, Magnocellular Projections as the Trigger of Top-Down Facilitation in Recognition, in *J. of Neuroscience*, 2007.

Stimuli

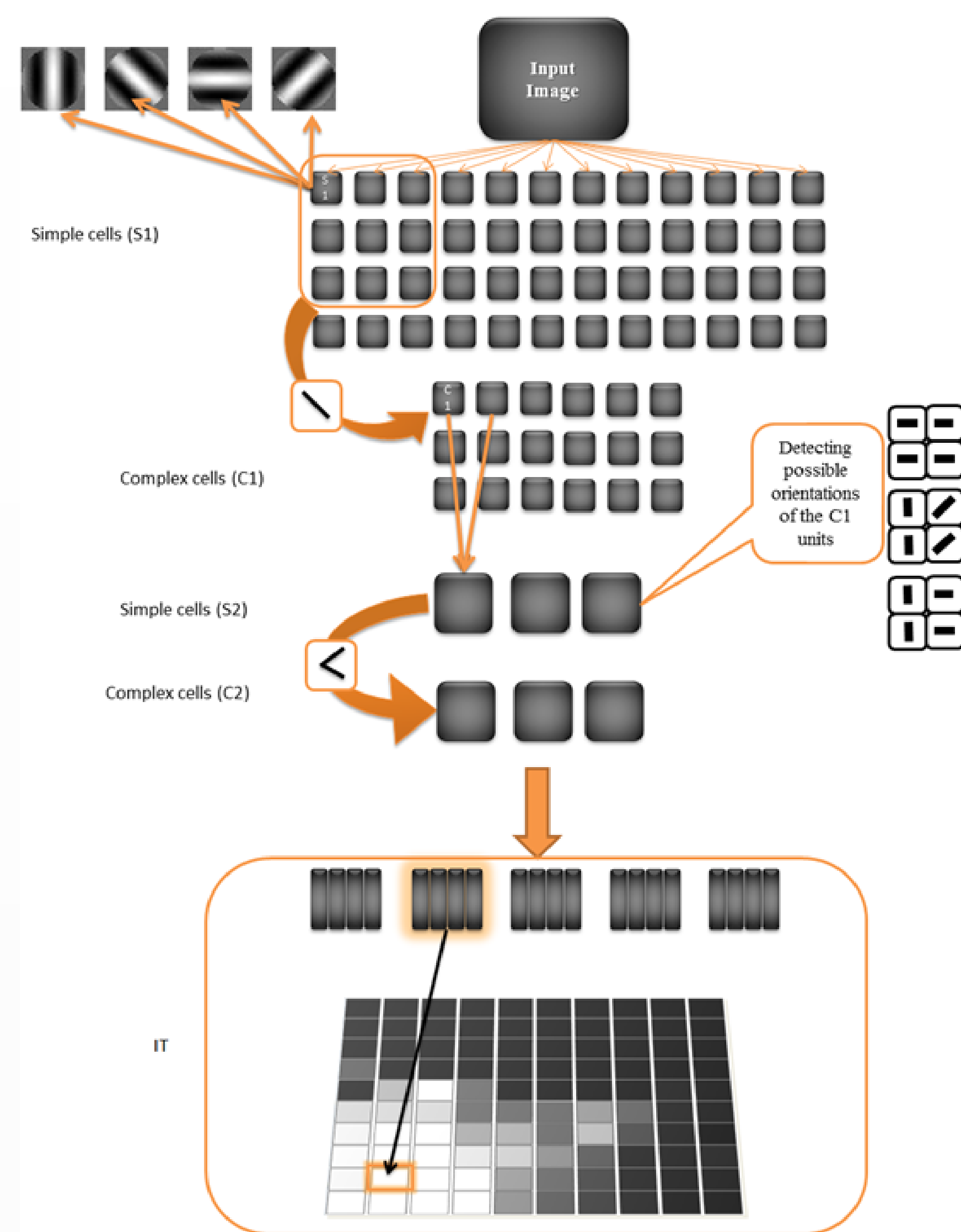


Results

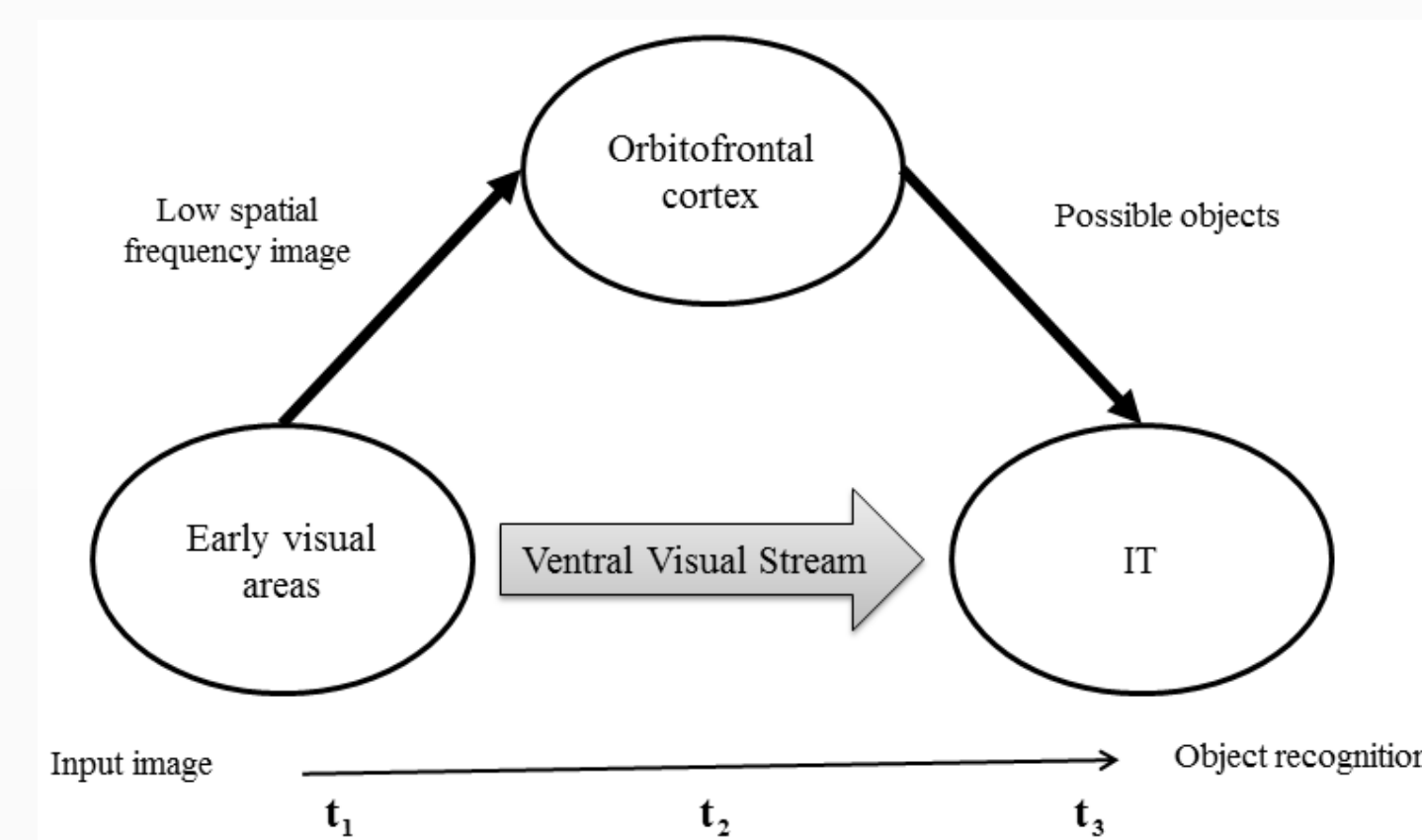


Model Architecture

Architecture for modules V1-IT.



OFC-module: M-pathway for recognition of the LF images works in parallel with the P-pathway for HF images.



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