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A BIO-INSPIRED COMPUTATIONAL NEURAL MODEL FOR ILLUSTRATION FACE AND CAR EXPERTISE EFFECT ON THE GATEWAY TO THE RIGHT FFA

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Abstract. *The human visual system consists of a hierarchy of multiple cortical areas and it has been reported that a cortical region in the fusiform gyrus called the Fusiform Face Area, FFA, responds much more strongly to faces than to any other class of stimulus. Recent studies have also revealed that objects of visual expertise activate the FFA more strongly than non-expertise stimuli, and it was argued that the right FFA is involved in expertise-specific rather than face-specific visual processing. According to these evidences, we propose a new biologically plausible computational model to illustrate face and car expertise effect on the gateway to the right FFA. In addition, there has been reported a difference in the onset latency of macaque inferotemporal neural responses. This latter case is also considered in the proposed model, where faces are recognized in the first layer and in the second layer, a discrimination task between cars and other objects is carried out.*

Keywords: Biologically plausible computational model, Visual expertise, Gateway to the right FFA, Face perception

1. **Introduction.** The human visual system consists of a hierarchy of multiple cortical areas performing feedforward neural computation on the incoming visual signals. At the early steps, the visual cortical areas V1 and V2 perform edge and line detection. In a higher stage of processing, area V4 represents partially complex shapes with information about the structural description of the represented features [1]. In the final stage of visual processing lies the inferotemporal cortex, IT, which is thought to execute visual object recognition. Near 25% of cells in IT have been shown to respond selectively to face images, making IT the ultimate cortical machinery for performing face/nonface recognition tasks [2-4].

Consistent with prior patient research on prosopagnosia [6], in functional Magnetic Resonance Imaging, fMRI, studies, a cortical region in the fusiform gyrus called the fusiform