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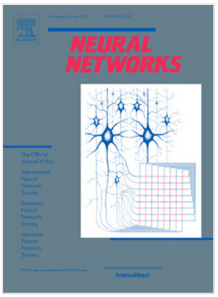

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Cognitive Memory and Mapping in a Brain-like System for Robotic Navigation

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Abstract

Electrophysiological studies in animals may provide a great insight into developing brain-like models of spatial cognition for robots. These studies suggest that the spatial ability of animals requires proper functioning of the hippocampus and the entorhinal cortex (EC). The involvement of the hippocampus in spatial cognition has been extensively studied, both in animal as well as in theoretical studies, such as in the brain-based models by Edelman and colleagues. In this work, we extend these earlier models, with a particular focus on the spatial coding properties of the EC and how it functions as an interface between the hippocampus and the neocortex, as proposed by previous work. By realizing the cognitive memory and mapping functions of the hippocampus and the EC, respectively, we develop a neurobiologically-inspired system to enable a mobile robot to perform task-based navigation in a maze environment.

Keywords:
Hippocampus, Entorhinal cortex, Brain-like system, Place-dependent response, Spatial cognition, Navigation, HMAX, Neurorobotics.

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