

Dynamic Field Theory as a conceptual framework for understanding embodied cognition

Gregor Schöner, Institut für Neuroinformatik,
Ruhr-Universität Bochum, Germany

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Abstract

Understanding embodied and situated cognition means understanding how cognitive processes are closely linked to sensory and motor processes and depend on the behavioral and environmental context in which they unfold. Such understanding must be based on principles of neural function. Although neurons are discrete units, that discreteness is unrelated to discreteness in behavior, such as when people respond categorically to stimulus or task continua. Similarly, the discrete time structure of neural spiking events is unrelated to discrete behavioral events, such as the initiation of a motor act. The neuronal level of description appropriate for understanding behavior is thus spatio-temporally continuous. Dynamical field theory is a neurally inspired theoretical framework which accounts for how decision events emerge from continuous time processes, how cognitive functions emerge from neuronal interaction, and how experience structures behavior [1]. The talk will illustrate these ideas through examples from movement planning [2], working memory and discrimination [3] and simple forms of robotic perception and cognition [4].

Keywords: neuronal dynamics; autonomous robotics

References

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