

Workshop on Morphologies, Motion and Cognition

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Invited Keynote Lecture

Title:

Morphological computation – connecting brain, body, and environment

Abstract

Traditionally, in robotics, artificial intelligence, and neuroscience, there has been a focus on the study of the control or the neural system itself. Recently there has been an increasing interest into the notion of embodiment not only in robotics and artificial intelligence, but also in the neurosciences, psychology, and philosophy. In this talk, the notion of morphological computation is introduced and it is demonstrated how it can be exploited on the one hand for designing intelligent, adaptive robotic systems, and on the other for understanding natural systems. While embodiment has often been used in its trivial meaning, i.e. „intelligence requires a body“, the concept has deeper and more important implications, concerned with connecting brain, body, and environment, or more generally with the relation between physical and information (neural, control) processes. Embodiment also has important and sometimes surprising implications for the phenomenon of emergence. A number of case studies are presented to illustrate the concepts of embodiment and morphological computation.