Neuropsychological implications for attention in perception and action

Marlene Behrmann
Rotman Research Institute of Baycrest Centre
and Dept of Psychology
University of Toronto
Toronto, Canada M5S 1A1

Abstract

Organized behaviour requires the coordination of perception and action, both of which rely on information that is spatially coded. The question is whether perception and action draw upon a common set of spatial representations or whether they rely on separate representations which must be linked to achieve integrated behaviour. These two alternative views are difficult to distinguish in normal behaviour but neuropsychological evidence obtained from patients with spatial impairments may prove useful in addressing this issue. Patients with unilateral neglect, a deficit in visuospatial attention following right hemisphere damage, fail to report information appearing on their contralesional left-hand side. Many of these same patients are also be impaired at directing actions to their contralesional left-hand side. Experiments designed to examine the relationship between perceptual neglect and action (motor) neglect reveal a close correspondence between these deficits in at least some patients. These findings suggest a tight coupling of perception and action, indicating the use of a common spatial map.

Representation in Situated Agents

Leslie Pack Kaelbling
Computer Science Department
Brown University

Abstract

For my purposes, a *situated agent* is a system that has an ongoing interaction with a dynamic environment. It could be a mobile robot, a factory controller, or a software-based meeting scheduler. Traditional models of program specification and correctness are not directly suited for use in situated agents. What is important about such agents is their *situatedness* how they are connected to and affected by their environment.

Situated automata theory, developed by Stanley Rosenschein and myself, provides a formal method for characterizing the interactions between an agent and its situating environment. The designer of an agent can provide declarative, symbolic specifications of the agent's knowledge and behavior, but these specifications can be compiled into a compact, efficient computation to be performed by the agent.

In addition, situated automata theory allows the analysis of different choices of representation of the internal state of an agent. This analysis provides a technical basis for arguing that, in many cases, traditional "symbolic" representations are inefficient and difficult to maintain correctly. It also points out cases in which symbolic representations are to be preferred.