Caregivers and the Education of the Mirror System

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Abstract

Recent research on action sequence detection and early word learning suggests that the fields of robotics and infant development have much to learn from one another (Cohen, Oates, & Beals 2001; Quick & Dautenhahn, 1999; Steels, 2001; Zukow-Goldring, Arbib, & Oztop 2002).

Our approach to analyzing how members of a speech community gain a common ground for communicating is informed by Rizzolatti & Arbib's (1998) suggestion that the origins of language reside in behaviors not originally related to communication.

Zukow-Goldring & Rader (2001) have shown how caregivers bracket ongoing actions with gestures that direct the child's attention to perceptual information embodied in action sequences as well as the perceivable correspondence between word and referent. Such supervised learning narrows the search space and enhances the speed of achieving a common understanding.

Oztop and Arbib (2002) modeled the learning processes in the "mirror system" linking the execution and observation of actions, while Oztop, Arbib & Bradley (in press) model formation of the repertoire of actions that grounds development of the mirror system.

The paper integrates research on infant cognitive development with modeling of development of the mirror system as a basis for recommendations about future work on developing "Social Brains" in robots.