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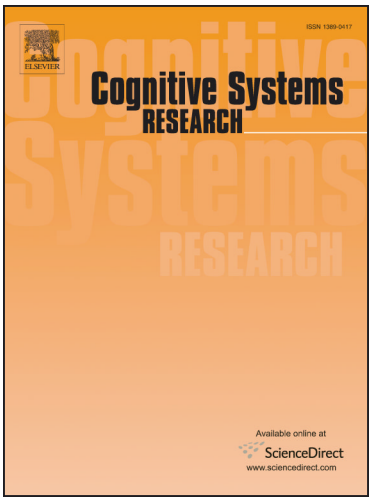

A Cognitively Enhanced Collaborative Control Architecture for an Intelligent Wheelchair: Formalization, Implementation and Evaluation

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A Cognitively Enhanced Collaborative Control Architecture for an Intelligent Wheelchair: Formalization, Implementation and Evaluation

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Abstract

For people with mobility impairment, powered wheelchairs are able to extend independent transportation. However, most users find it difficult to operate the powered wheelchairs effectively. This can be due to variety of physical or cognitive impairments. Herein lies the motivation of developing intelligent wheelchairs that provide the user, assistance in control and navigation as and when required, supporting retention of residual skills. For better Human-Robot Interaction, such intelligent wheelchairs need to be cognitively enhanced. This paper propose a Cognitive Collaborative Architecture (CCA) for an intelligent wheelchair which is designed to assist the user as a team member. Whenever user finds it difficult to drive or control the wheelchair, CCA transfers control to the robotic agent which continues the human navigation strategy providing 'assistance-as-required'.

Keywords: Cognitive Architecture, Rehabilitation Robotics, Intelligent Wheelchair

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