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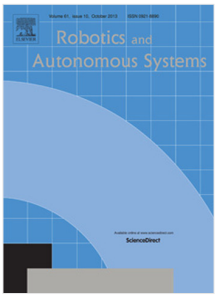

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The State-of-the-Art in Autonomous Wheelchairs Controlled through Natural Language: A Survey

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Abstract

Natural language is a flexible and powerful control modality which can transform a wheelchair from a vehicle into a genuine helper. While autonomous wheelchairs are increasingly designed to use natural language for control, most of them only handle a small number of rigid commands. To establish the state-of-the-art in language-enabled wheelchairs and determine how to improve natural language capabilities, we introduce a framework for analyzing and classifying properties of language-enabled wheelchairs. We then apply the framework to the twenty-four most recent natural language-enabled wheelchair projects, in order to compare their achievements and identify areas for improvement.

Keywords: Intelligent wheelchairs, Natural language, Assistive technologies, Human-robot interaction

1. Introduction

Many societies are faced with a growing elderly population. Over the next fifteen years, the number of elderly citizens in the United States alone is expected to increase by over 50% [1]. Hence, *assistive technologies* that can support the elderly in their daily lives and help them retain some level of autonomy are becoming increasingly important. In fact, independent mobility technologies such as wheelchairs, for example, have

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