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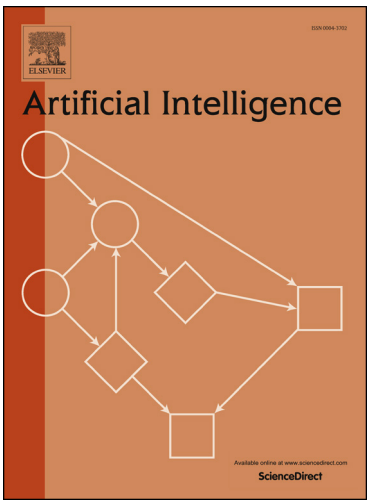

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Intelligent Agent Supporting Human-Multi-Robot Team Collaboration

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Abstract

The number of multi-robot systems deployed in field applications has risen dramatically over the years. Nevertheless, supervising and operating multiple robots simultaneously is a difficult task for a single operator to execute. In this article we propose a novel approach for utilizing automated advising agents in assisting an operator to better manage a team of multiple robots in complex environments. We introduce an advice provision methodology and exemplify its implementation using automated advising agents in two real-world human-multi-robot team collaboration tasks: the Search And Rescue (SAR) and the warehouse operation tasks. Our intelligent advising agents were evaluated through extensive field trials, with over 150 human operators using both simulated and physical mobile robots, and showed a significant improvement in the team's performance.

Keywords: Human-Multi-Robot-Interaction, Human-Robot-Interaction, Automated Agents, Advising Agents

1. Introduction

In recent years multi-robot systems have been applied to complex tasks that used to be performed by humans alone. These tasks include fire-fighting [1], landmine detection [2], decontamination of radiation [3], agricultural work [4], construction [5], underwater missions [6], warehouse operation [7] and Search And Rescue (SAR) [8]. The use of multiple robots for executing these tasks increases robustness and improves efficiency compared to the use of a single robot [9].

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