Insights into Expertise and Tactics in Human-Robot Teaming

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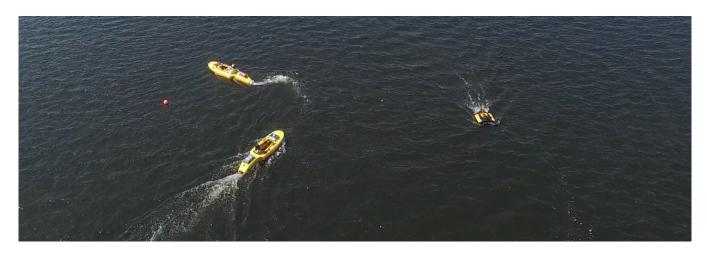


Figure 1: The red human-robot team defending their flag against a blue team human attacker.

ABSTRACT

As robot capabilities rapidly evolve, the dynamics of human-robot teams will change. Autonomous, intelligent technologies will come to serve in roles that more closely resemble those of teammates, as opposed to tools. This will require humans to adapt and remain agile in developing novel strategies and tactics for employing these systems in complex, real-world scenarios. Building on previous work that presented a novel data set collected from teams of humans and robots playing capture the flag, the current research aims to identify measures capable of predicting successful teaming that lead to a positive, winning outcomes in the game. Video and text log analysis were used to describe gameplay and identify specific successful tactics. In conjunction with the experience levels of the participants, a number of measures of communication with autonomous robot teammates and robot efficiency were used to predict game performance. Only one metric was found to successfully predict

game outcomes across all four games: level of robot involvement with offensive maneuvers. Several possible mechanisms for this observation are discussed, as well as multiple directions for future research directions leveraging this human-robot teaming platform.

CCS CONCEPTS

• Computer systems organization \rightarrow Embedded systems; *Redundancy*; Robotics; • Networks \rightarrow Network reliability.

KEYWORDS

datasets, human-robot team, measures, tactics

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1 INTRODUCTION

Robots already play a significant role in the world, sometimes in teaming situations directly with humans, so human-robot tactics have become an important area of study. Additionally, it has been predicted that rapid advancements in robotic technologies

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