Trusting a Robot as a User Versus as a Teammate

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Abstract

The human's role in human-robot interaction likely affects their trust in the robot. For example, prior work has shown that humans who are expected to use features of an autonomous robot tend to be more trusting than humans who operate a robot. In this paper, we discuss this prior work and its extensions into human-robot teaming. Our test environment is an on-water game of capture the flag where humans in motorized kayaks work with autonomous surface vehicles against a similar opposing team.

User Trust in Emergencies

Prior work found that users tend to overtrust robots in emergencies

The robot first guided a participant to a meeting room in a non-emergency scenario

The robot either:
- Drove straight to the meeting room, or
- Detoured through another room and spun in circles before reaching the meeting room
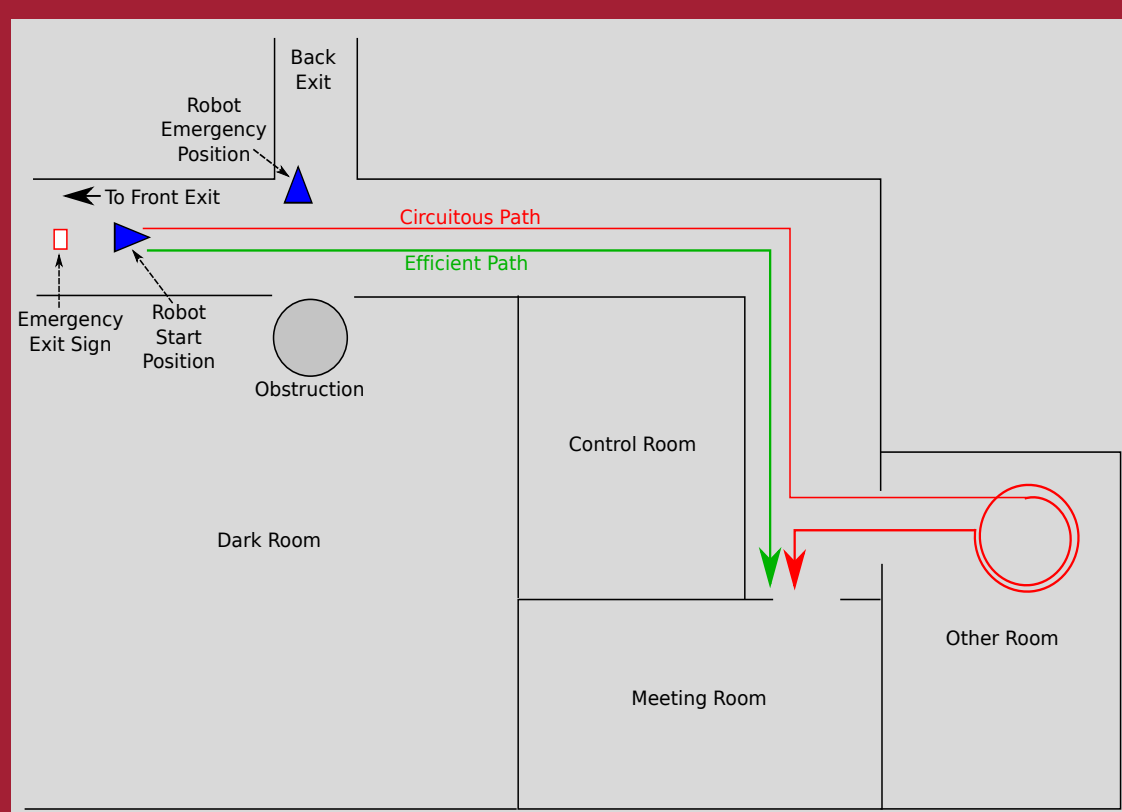
After the participant sat in the meeting room and closed the door, artificial smoke filled the hallway and triggered a fire alarm
Participants exited the room and found the robot guiding them to an unmarked, previously unknown exit.

Regardless of the robot's prior behavior, EVERY participant followed the robot's guidance

Does this overtrust extend into other domains?
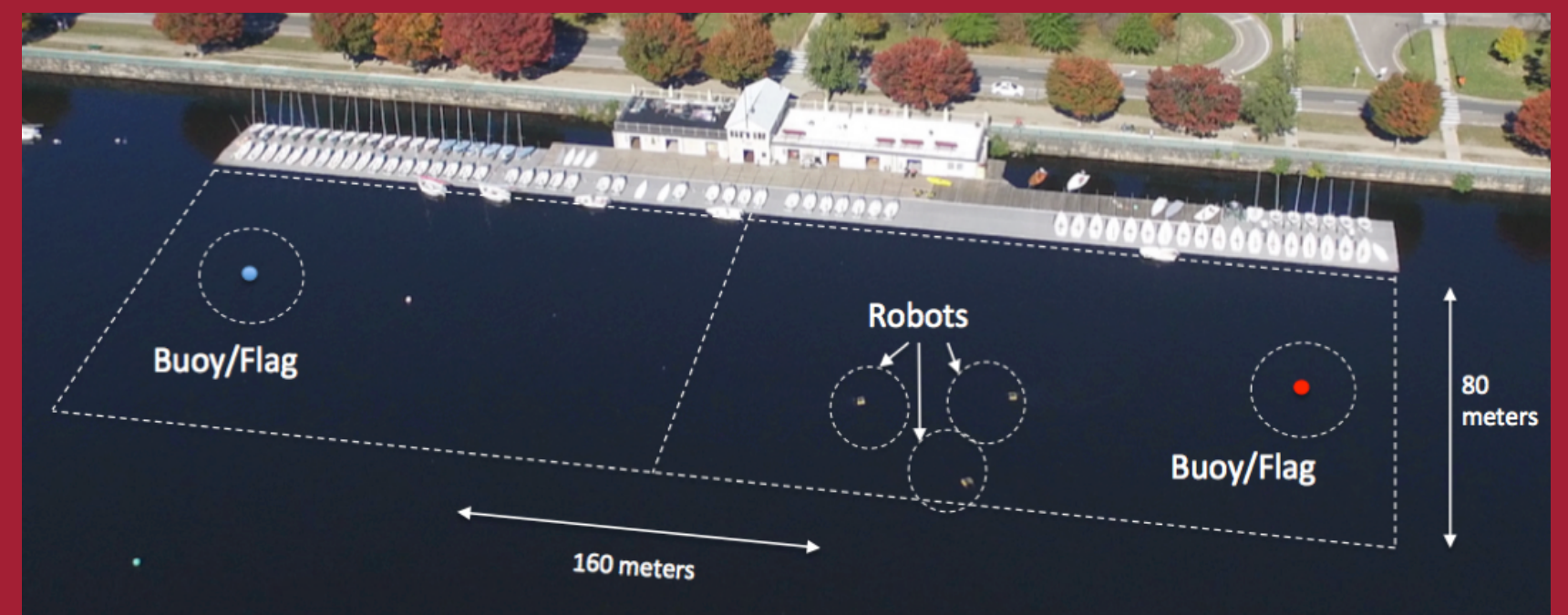
Teammate Trust

In ongoing work for the Aquaticus project, we investigate the trust between humans and their robot teammates

Humans pilot Mokais (motorized kayaks) and communicate over voice

Robots use speech to text and text to speech to communicate with humans

In our testbed, two humans and two robots play capture the flag against another four entity team on the Charles River in front the of the MIT Sailing Pavilion.

Will the human overtrust a teammate?

We measure trust using:
- Post-experiment surveys (Shaefer)
- Frequency of communication with robot
- Level of robot autonomy preferred by human teammate
- Number of times human looks at robot

We also investigate human cognitive workload during the experiment

Ongoing Work

Experimenting with trust versus different levels of autonomy
Exploring different roles humans and robots can play on a team:
- Human leader, human and robot subordinates
- Robot leader, human and robot subordinates
- Robots as wingmen
- Human-human wingmen with robot-robot wingmen

Manipulating communication reliability during the competition

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