Misdirection in Robot Teams: Exploiting Organizational Principles for Operational Advantage

EAGER: CNS: Misdirection in Robot Teams: Exploiting Organizational Principles for Operational Advantage
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Challenge

This project focuses on higher-level strategies for multi-robots: to misdirect and to counter-misdirect. As multi-robot systems become more autonomous, distributed, networked, numerous, and with more capability to make critical decisions, the prospect for intentional and unintentional misdirection must be anticipated and exploited.

Fear-based push approach
https://commons.wikimedia.org/wiki/File:Karjus.jpg

Pull Approach
https://en.wikipedia.org/wiki/File:Pied_Piper2.jpg

Solution - Developed Multiple Strategies

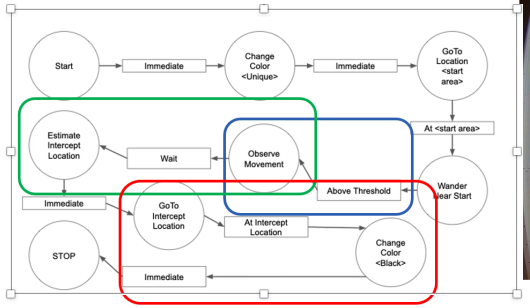
- Push misdirection – Fear-based herding
- Pull misdirection – Judas goat/ Pied piper
- Counter Misdirection
- Exploit biological parallels

Key Innovations

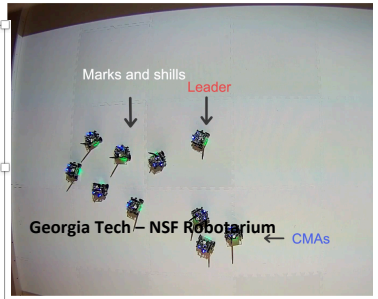
- Use of shills for misdirection
- Counter-misdirection for multi-robots

Added Shills and Counter-Misdirection Agents

Counter Misdirection FSA



Validation on Physical Robots



Scientific Impact

- Multiagent deception is a phenomenon that will continue to become more commonplace. It is important to develop these methods to better understand the phenomenon as well as to create methods to counter its effects if and when they are deployed.

Broader Impact

- Deception, unfortunately, is becoming commonplace in the cyberworld. It is important to study both the basis for such deception as well as methods to counter it.
- There are deep ethical questions associated with the use of deception and this project considers and discusses those effects