Nonholonomic Strategies for Stable Multi-Robot Self-Organization

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Description

Multi-robot systems are increasingly becoming the preferred approach to many real world applications such as search and rescue, surveillance, exploration, agricultural foraging and so on. The massive attention these systems receive from researchers stems from the idea of using simple robots to enable the realization of complex tasks (e.g. exploration, search and rescue) trough self-organization in a more effective (e.g. robustness, fault-tolerance) and efficient (e.g. scalability, flexibility) manner than traditional single advanced robot approaches. While successful instances of physical embodied robots for multi-robot research have been developed, time, materials and experimentation workspace pose hard constraints (e.g. robot handling and configuration, environment setup) on development of such systems, especially in the context of designing robust, scalable and flexible self-organization strategies.

The goal of this research project is two fold, namely: i) first, build a test-bed for multi-robot realistic simulations with which to validate various scenarios of robot swarming behaviors such as aggregation, dispersion, formation navigation, and ii) second, develop new self-organization strategies that enable the decentralized coordination for large teams of robots.

References:

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