Multi-Robot Formation Control for Area Coverage

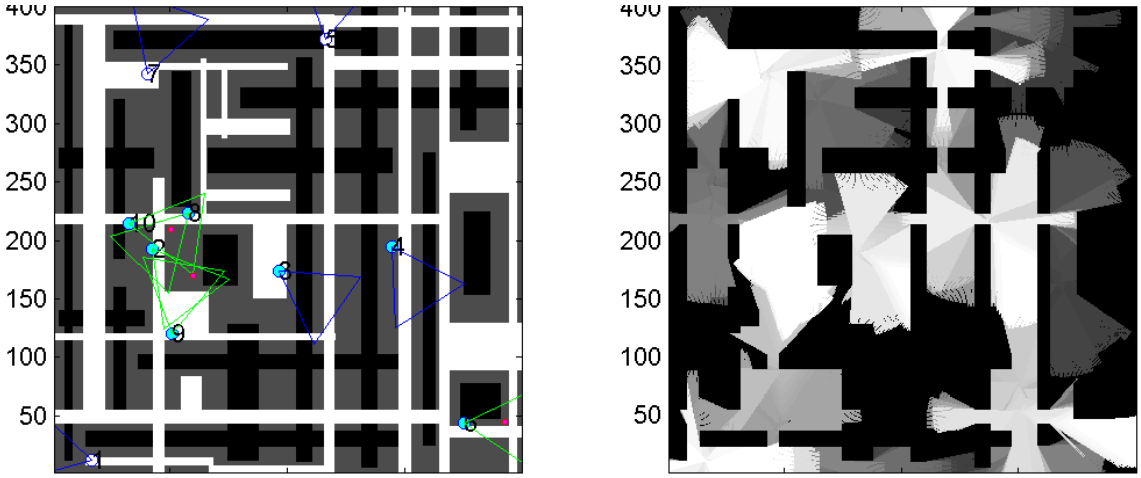
Thesis outline

Groups of robots offer the potential for increased performance and robustness for several applications. With an increasing amount of robots, the control techniques used for these systems also increase in complexity.

In this project, the task of area coverage is chosen as a representative case in multi-robot interaction. The robots try to cover an area to provide, for example, mapping data, a mobile communication infrastructure, and surveillance information. The coverage problem is usually defined as to "cover a search space consistently and uniformly". In mobile robotics, we seek with this thesis to maneuver a team of robots into positions to keep the area constantly under good coverage with their sensors.

This thesis aims to compare several (behavior-based) robot control strategies, to see which of them allows a better coverage, which of them optimizes temporal constraints, which of them reacts best to changes in the environment (e.g. robot breakdowns, …)

All this will be done in a simulation environment in Matlab.



Student Tasks

The student will receive the following:

- Documentation on multi – robot collaboration
- Example programs of behavior – based multi – robot control

With this information, the student is required to output the following:

- Implement a few multi-robot control strategies in the simulator
- Compare the performance of these multi-robot control strategies in the simulator

Student Profile

- Basic programming skills (Matlab)
- Sound interest in robotics