PhD Proposal MAP-I

Swarm Cleaning

Supervisors

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Abstract

Swarming Robotics is a new approach to the coordination of multi-robot systems which consists in using large numbers of very simple robots believing that a desired collective behavior emerges from the interactions between the simple robots and from the interactions of the simple robots with the environment. Swarming Robotics is inspired in the emergent behavior observed in social insects like ants or bees sometimes called swarm intelligence. In these insect societies very simple individual rules may result in a very elaborated and complex swarm behavior.

This research project will be aimed at developing new algorithms for swarming robotics with applications in cooperative cleaning applications. It is intended to develop a scalable swarm of cleaning robots with limited intelligence and communication capabilities that will be able to effectively clean large areas without prior knowledge of the task to perform.

The approach will be twofold: (i) Algorithm development and experiments using a previously developed simulator that will be adapted for the project; (ii) Experiments with real robots to further validate the approach.

Objectives

The main objective of the project will be the development of new swarming robotics algorithms and its experimentation in multi-robot cleaning tasks. Specific objective include the development of a multi-robot cleaning simulator and the development of simple robots and its use in the project. It is intend that the simulator enables the simulation of heterogeneous robots in distinct cleaning tasks.

Additional Information

Complete Description available upon request.