

Field Robotics Center Seminar Series

Tuesday, Oct 19, 2010 GHC 2109 11am - noon

Pizza will be served



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Map-Merging-Free Connectivity Positioning for Distributed Robot Teams

Abstract

We consider a set of static towers with communication capabilities, but not within range of each other due to distance and obstacles. The goal is to achieve connectivity among the towers through a set of robots positioned in a way to act as gateways among the towers. The autonomous mobile robots are initially randomly deployed without necessarily being within range of each other, nor of the static towers, and without any common global coordinates. As the robots move, they may come within range of other robots or towers and can share information. In this talk, we present a representation for the connectivity information that allows for the robots to share connectivity information without the need to merge the individual maps that they acquire while they navigate the environment. We also present several heuristics to guide the robot motion to explore the environment in search of towers and other robots. The robots analyze their own accumulated map and communicated information from other robots, and can determine if a complete positioning exists to achieve the joint connectivity goal. We show that our representation is sufficient for the robot team to achieve a connected configuration with the static towers, without the need for merging their individual maps.

Speaker Bio

Somchaya Liemhetcharat is a Ph.D. student at the Robotics Institute, under Prof. Manuela Veloso. He is interested in multi-robot coordination, in particular the areas of information sharing, role assignment and modeling of capabilities.



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