



ABSTRACT

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Title: Coordination Support for Heterogeneous Sensor Networks

Abstract

Emerging applications of sensor networks including mobile sensor nodes are requiring distributed cooperative intelligence in order to provide more meaningful information for the final users. This necessitates support for analysis and decision making mechanisms that provide intelligent behavior to the sensor nodes that make the network able to autonomously handle changes in the environment and in the network itself, in order to continue performing their sensing tasks and contribute to the overall system mission. Additionally, emerging applications require different types of information, and thus, different types of data have to be collected, which requires the employment of a variety of sensors. The data collected by them are then processed to provide high-level information. This information processing requires an adequate interoperability support in order to promote a smooth cooperation among the sensor nodes. On the other hand, the final user should be provided with an easy to use interface in order to setup a task or a set of tasks, seen as a mission for the whole system required to retrieve the information, without having to bother about network or measuring details.

Observing the need for solutions to the issues mentioned above, this thesis aims to support flexible sensor network operation, by means of a so called 'mission-driven' approach, which consists of a paradigm in which the user just provide high-level sensing mission statements that are then translated in sensor network setup parameters. These parameters are then transmitted to the network, which autonomously decide which specific sensor node that will accomplish different parts of the mission. This support is provided by means of a middleware that as key composing part uses software agents to provide intelligent reasoning mechanisms and specialized services. These agents are organized by a framework, where specific agents support the dissemination of the sensing mission among the network nodes.

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