

Description of master thesis

Multi-Agent Planning for Robots

Bo Kanstrup Hansen & Anders Rasmussen

The goal of the present project is to develop a robust planning system for multiple mobile robots. The possible application domains of such a system are e.g. systems of mobile transportation robots in hospitals, robots for delivering mail and other goods on a university campus, or a system of domestic robots in a household. Such domains are characterised by being highly dynamic, and new tasks can arise continuously. The planning system needs to make plans for how the robots can efficiently carry out the set of pending tasks at any given moment.

The planning system will be a piece of software that can be integrated in a physical system consisting of a number of mobile robots and a main coordinating agent (a computer). The coordinating agent will have the responsibility of distributing tasks to the individual robots. Among the challenges in designing such a planning system are:

- How to divide the work-load between the coordinating agent and the individual robots?
- How to design a communication protocol between the coordinating agent and the individual robots?
- How to share and distribute the knowledge among the robots?
- How to deal with communication breakdown, incomplete knowledge about the environment, deadlocks, resource usage problems, temporary and permanent changes in the environment?

The project should result in a software system which is as generic as possible, allowing it to be applied to a wide range of multi-agent robotic domains. Thus, the system should be able to take a formal description of the intended robotic domain as input and from there be able to automatically generate plans for the incoming tasks. The developed planning system will be tested on a simulated platform.