

## **Abstract**

If robots are deployed in large numbers in our environment in future, collaboration between them may be essential for a successful operation. One potential approach for the organisation of a large number of robots is their specialisation in certain functionalities and the provision and use of these functionalities as services. One crucial task in this approach is the localization of robots in the environment that can provide the looked-for services.

In this thesis the Cell-based Service Discovery (CSD) protocol is developed. The basic idea is to form a cell-based grid using the position information of the robots. Master nodes in each cell are responsible for the management of ordinary nodes and their services. The solution is analyzed analytically and in simulation, and compared to other solutions. CSD has its strength in scenarios where a scalable solution for networks with average to high node mobility is required. A simplified version of the protocol is implemented on a real multi-robot system and using an example scenario the advantages of service-based multi-robot systems are demonstrated.