

SFB/TR 8 Spatial Cognition / IQN Video Conference

Autonomous Navigation of Mobile Agents Using RFID-Enabled Space Partitions

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Existing techniques for autonomous indoor navigation are often environment-specific and thus limited in terms of their applicability.

In my talk (joint work with Muhammad Atif Mehmood and Egemen Tanin), I will outline a fundamentally different approach to indoor navigation and propose an active environment based navigation system. We argue that for a versatile navigation system the environment itself should provide spatial information. In our proposed approach, navigation is based on the concept of "space partitions" where the location of an agent is approximated by the closest partition. We show that Radio Frequency Identification (RFID) technology is a viable option for generating space partitions. Passive RFID tags provide cost effective deployment strategy to construct a complete partitioning of the environment. A sparse deployment of tags leads to coarse partitioning, which in turn allows an agent to only approximate its position. We introduce a path planning algorithm that reaches the agent's destination with a small overhead compared to the shortest path assuming precise information. Our experiments show that the deployment allows efficient path planning even under a large degree of imprecision.

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