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Approaches to Probabilistic Model Learning for Mobile Manipulation Robots

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- Presents recent research in Probabilistic Model Learning for Mobile Manipulation Robots
- Presents novel learning techniques that enable mobile manipulation robots, i. e., mobile platforms with one or more robotic manipulators, to autonomously adapt to new or changing situations
- Describes experiments, which have been conducted to analyze and validate the properties of the developed algorithms

Mobile manipulation robots are envisioned to provide many useful services both in domestic environments as well as in the industrial context. Examples include domestic service robots that implement large parts of the housework, and versatile industrial assistants that provide automation, transportation, inspection, and monitoring services. The challenge in these applications is that the robots have to function under changing, real-world conditions, be able to deal with considerable amounts of noise and uncertainty, and operate without the supervision of an expert. This book presents novel learning techniques that enable mobile manipulation robots, i.e., mobile platforms with one or more robotic manipulators, to autonomously adapt to new or changing situations. The approaches presented in this book cover the following topics: (1) learning the robot's kinematic structure and properties using actuation and visual feedback, (2) learning about articulated objects in the environment in which the robot is operating, (3) using tactile feedback to augment the visual perception, and (4) learning novel manipulation tasks from human demonstrations.

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