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# Towards Service Robots for Everyday Environments

## Recent Advances in Designing Service Robots for Complex Tasks in Everyday Environments

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# Foreword

Robotics is undergoing a major transformation in scope and dimension. From a largely dominant industrial focus, robotics is rapidly expanding into human environments and vigorously engaged in its new challenges. Interacting with, assisting, serving, and exploring with humans, the emerging robots will increasingly touch people and their lives.

Beyond its impact on physical robots, the body of knowledge robotics has produced is revealing a much wider range of applications reaching across diverse research areas and scientific disciplines, such as: biomechanics, haptics, neurosciences, virtual simulation, animation, surgery, and sensor networks among others. In return, the challenges of the new emerging areas are proving an abundant source of stimulation and insights for the field of robotics. It is indeed at the intersection of disciplines that the most striking advances happen.

The *Springer Tracts in Advanced Robotics (STAR)* is devoted to bringing to the research community the latest advances in the robotics field on the basis of their significance and quality. Through a wide and timely dissemination of critical research developments in robotics, our objective with this series is to promote more exchanges and collaborations among the researchers in the community and contribute to further advancements in this rapidly growing field.

The volume edited by Erwin Prassler et al provides a unique collection of a sizable segment of the robotics research in Germany. It reports on contributions from leading groups within the last five years within the collaborative research project DESIRE on Service Robotics, funded by the German Ministry of Education and Research.

The “desire” underlying the design of a common project platform was to build a robot that could serve as a challenging workbench and a vehicle for the integration of high-tech components such as lightweight arms and dexterous hands into new systems and applications.

This eight–chapter book provides a useful sample of the results achieved and the lessons learned in the project, addressing key issues in: system architecture; task planning and execution; self-modeling, monitoring and adaptation; perception; mobility, manipulation and grasping; interaction and learning; robot development process and tools.

The thorough discussion, accurate treatment, and wide span of the work unfolding in this area reveal the significant advances in service robotics. DESIRE culminates with this important reference to the world robotics community on the current developments and new directions undertaken by this team of German researchers. A fine addition to the STAR series!

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