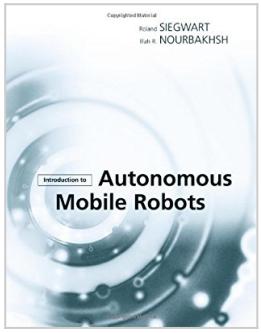

Introduction to Autonomous Mobile Robots (Intelligent Robotics and Autonomous Agents series)

By Roland Siegwart, Illah R. Nourbakhsh

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Mobile robots range from the teleoperated Sojourner on the Mars Pathfinder mission to cleaning robots in the Paris Metro. Introduction to Autonomous Mobile Robots offers students and other interested readers an overview of the technology of mobility -- the mechanisms that allow a mobile robot to move through a real world environment to perform its tasks -- including locomotion, sensing, localization, and motion planning. It discusses all facets of mobile robotics, including hardware design, wheel design, kinematics analysis, sensors and perception, localization, mapping, and robot control architectures.The design of any successful robot involves the integration of many different disciplines, among them kinematics, signal analysis, information theory, artificial intelligence, and probability theory. Reflecting this, the book presents the techniques and technology that enable mobility in a series of interacting modules. Each chapter covers a different aspect of mobility, as the book moves from low-level to high-level details. The first two chapters explore low-level locomotory ability, examining robots' wheels and legs and the principles of kinematics. This is followed by an in-depth view of perception, including descriptions of many "off-the-shelf" sensors and an analysis of the interpretation of sensed data. The final two chapters consider the higher-level challenges of localization and cognition, discussing successful localization strategies, autonomous mapping, and navigation competence. Bringing together all aspects of mobile robotics into one volume, Introduction to Autonomous Mobile Robots can serve as a textbook for coursework or a working tool for beginners in the field.

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Review

"This book is easy to read and well organized. The idea of providing a robot functional architecture as an outline of the book, and then explaining each component in a chapter, is excellent. I think the authors have achieved their goals, and that both the beginner and the advanced student will have a clear idea of how a robot can be endowed with mobility."--Raja Chatila, LAAS - CNRS, France

"A robot is an uncertainty machine: its perception and decision-making capabilities must embed at their core the processes dealing with uncertainty. This book is an essential reference for the student, the teacher, and the researcher to understand the basics and the advanced methods of estimation theory, and the probabilistic models and processes underlying robot localization, SLAM, and decision making. A 'must have' textbook!"--Raja Chatila, LAAS - CNRS, FrancePlease note: Arrived too late to appear on book jacket.

From the Inside Flap
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