Introduction To Autonomous Mobile Robots Intelligent Robotics And Autonomous Agents Series

Mobile Robotics
Field and Service Robotics
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Analysis and Design of Intelligent Systems Using Soft Computing Techniques
Autonomous Robots
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Introduction to Autonomous Mobile Robots, second edition
Robot Vision
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Introduction to Autonomous Mobile Robots
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Scientific Methods in Mobile Robotics
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Introduction To Autonomous Mobile Robots
AI and Humanity
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Autonomous Mobile Robots and Multi-Robot Systems

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Mobile Robotics Vieweg+Teubner Verlag
A roboticist imagines life with robots that sell us products, drive our cars, even allow us to assume new physical form, and more. With robots, we are inventing a new species that is part material and part digital. The ambition of modern robotics goes beyond copying humans, beyond the effort to make walking, talking androids that are indistinguishable from people. Future robots will have superhuman abilities in both the physical and digital realms. They will be embedded in our physical spaces, with the ability to go where we cannot, and will have minds of their own, thanks to artificial intelligence. In Robot Futures, the roboticist Illah Reza Nourbakhsh considers how we will share our world with these creatures, and how our society could change as it incorporates a race of stronger, smarter beings. Nourbakhsh imagines a future that includes adbots offering interactive custom messaging; robotic flying toys that operate by means of “gaze tracking”; robot-enabled multimodal, multicontinental telepresence; and even a way that nanorobots could allow us to assume different physical forms. Nourbakhsh examines the underlying technology and the social consequences of each scenario. He also offers a counter-vision: a robotics designed to create civic and community empowerment. His book helps us understand why that is the robot future we should try to bring about.
Field and Service Robotics John Wiley & Sons
As mobile robots become more common in general knowledge and practices, as opposed to simply in research labs, there is an increased need for the introduction and methods to Simultaneous Localization and Mapping (SLAM) and its techniques and concepts related to robotics. Simultaneous Localization and Mapping for Mobile Robots: Introduction and Methods investigates the complexities of the theory of probabilistic localization and mapping of mobile robots as well as providing the most current and concrete developments. This reference source aims to be useful for practitioners, graduate and postgraduate students, and active researchers alike.
Autonomous Mobile Robots Springer
This book comprises a selection of papers on new methods for analysis and design of hybrid intelligent systems using soft computing techniques from the IFSA 2007 World Congress, held in Cancun, Mexico, June 2007.
Analysis and Design of Intelligent Systems Using Soft Computing Techniques Springer Nature
“Autonomous manipulation” is a challenge in robotic technologies. It refers to the capability of a mobile robot system with one or more manipulators that performs intervention tasks requiring physical contacts in unstructured environments and without continuous human supervision. Achieving autonomous manipulation capability is a quantum leap in robotic technologies as it is currently beyond the state of the art in robotics. This book addresses issues with the complexity of the problems encountered in autonomous manipulation including representation and modeling of robotic structures, kinematic and dynamic robotic control, kinematic and algorithmic singularity avoidance, dynamic task priority, workspace optimization and environment perception. Further development in autonomous manipulation should be able to provide robust improvements of the solutions for all of the above issues. The book provides an extensive tract on sensory-based autonomous manipulation for intervention tasks in unstructured environments. After presenting the theoretical foundations for kinematic and dynamic modelling as well as task-priority based kinematic control of multi-body systems, the work is focused on one of the most advanced underwater vehicle-manipulator system, SAUVIM (Semi-Autonomous Underwater Vehicle for Intervention Missions). Solutions to the problem of target identification and localization are proposed, a number of significant case studies are discussed and practical examples an d experimental/simulation results are presented. The book may inspire the robot research community to further investigate critical issues in autonomous manipulation and to develop robot systems that can profoundly impact our society for the better.
Autonomous Robots Springer Science & Business Media
Take your ROS skills to the next level by implementing complex robot structures in a ROS simulation Key FeaturesLearn fundamental ROS concepts and apply them to solve navigation tasksWork with single board computers to program smart behavior in mobile robotsUnderstand how specific characteristics of the physical environment influence your robot’s performanceBook Description Connecting a physical robot to a robot simulation using the Robot Operating System (ROS) infrastructure is one of the most common challenges faced by ROS engineers. With this book, you'll learn how to simulate a robot in a virtual environment and achieve desired behavior in equivalent real-world scenarios. This book starts with an introduction to GoPiGo3 and the sensors and actuators with which it is equipped. You'll then work with GoPiGo3's digital twin by creating a 3D model from scratch and running a simulation in ROS using Gazebo. Next, the book will show you how to use GoPiGo3 to build and run an autonomous mobile robot that is aware of its surroundings. Finally, you'll find out how a robot can learn tasks that have not been programmed in the code but are acquired by observing its environment. You'll even cover topics such as deep learning and reinforcement learning. By the end of this robot programming book, you'll be well-versed with the basics of building specific-purpose applications in robotics and developing highly intelligent autonomous robots from scratch. What you will learnGet to grips with developing environment-aware robotsGain insights into how your robots will react in physical environmentsBreak down a desired behavior into a chain of robot actionsRelate data from sensors with context to produce adaptive responsesApply reinforcement learning to allow your robot to learn by trial and errorImplement deep learning to enable your robot to recognize its surroundingsWho this book is for If you are an engineer looking to build AI-powered robots using the ROS framework, this book is for you. Robotics enthusiasts and hobbyists who want to develop their own ROS robotics projects will also find this book useful. Knowledge of Python and/or C++ programming and familiarity with single board computers such as Raspberry Pi is necessary to get the most out of this book.
Hands-On ROS for Robotics Programming Automation
As with other transportation methods, safety issues in aircraft can result in a total loss of life. Recently, the air transport industry has come under immense scrutiny after several deaths occurred due to aircraft design and airlines that allowed improperly inspected aircraft to fly. Spacecraft too have found errors in system software that could lead to catastrophic failure. It is imperative that the aviation and aerospace industries continue to revise and refine safety protocols from the construction and design of aircraft, to secure and improve aviation systems, and to test and inspect aircraft. The Research Anthology on Reliability and Safety in Aviation Systems, Spacecraft, and Air Transport is a vital reference source that examines the latest scholarly material on the use of adaptive and assistive technologies in aviation to establish clear guidelines for the design and implementation of such technologies to better serve the needs of both military and civilian pilots. It also covers new information technology use in aviation systems to streamline the cybersecurity, decision making, planning, and design processes within the aviation industry. Highlighting a range of topics such as air navigation systems, computer simulation, and airline operations, this multi-volume book is ideally designed for pilots, scientists, engineers, aviation operators, air traffic controllers, air crash investigators, teachers, academicians, researchers, and students.
Introduction to Autonomous Robots Springer Science & Business

Media
A thorough introduction to all aspects of robotics emphasizing its potential in industry. Provides coverage of industrial robots, remotely controlled arms, and mobile robots. Begins with a preliminary discussion of basic concepts and terms, and goes on to cover various applications. Summarizes the uses and engineering of telechiric manipulators and mobile robots.
Autonomous Mobile Robots MIT Press
Autonomous Mobile Robots: Planning, Navigation, and Simulation presents detailed coverage of the domain of robotics in motion planning and associated topics in navigation. This book covers numerous base planning methods from diverse schools of learning, including deliberative planning methods, reactive planning methods, task planning methods, fusion of different methods, and cognitive architectures. It is a good resource for doing initial project work in robotics, providing an overview, methods and simulation software in one resource. For more advanced readers, it presents a variety of planning algorithms to choose from, presenting the tradeoffs between the algorithms to ascertain a good choice. Finally, the book presents fusion mechanisms to design hybrid algorithms. Presents intuitive and practical coverage of all sub-problems of mobile robotics to enable easy comprehension of sophisticated modern-day robots Covers a wide variety of motion planning algorithms, giving a near-exhaustive treatment of the domain with thought provoking comparisons between algorithms Dives into detailed discussions on robot operating systems and other simulators to get hands-on knowledge without the need of in-house robots
Autonomous Land Vehicles John Wiley & Sons
This book explores a new rapidly developing area of robotics. It describes the state of the art in intelligence control, applied machine intelligence, and research and initial stages of manufacturing autonomous mobile robots. A complete account of the theoretical and experimental results obtained during the last two decades together with some generalizations on Autonomous Mobile Systems are included in this book.
Fundamentals of Robot Technology Packt Publishing Ltd
Interleaving Planning and Execution for Autonomous Robots develops a formal representation for interleaving planning and execution in the context of incomplete information. This work bridges the gap between theory and practice in robotics by presenting control architectures that are provably sound, complete and optimal, and then describing real-world implementations of these robot architectures. Dervish, winner of the 1994 AAAI National Robot Contest, is one of the robots featured. Interleaving Planning and Execution for Autonomous Robots is based on the author's PhD research, covering the same material taught in CS 224, the very popular Introduction to Robot Programming Laboratory taught at Stanford for four years by Professor Michael Genesereth and the author.
Mobile Robotics for Multidisciplinary Study Springer-Verlag
Using information and scale as central themes, this comprehensive survey explains how to handle real problems in astronomical data analysis through a modern arsenal of powerful techniques. The coverage includes chapters or appendices on: detection and filtering; image compression; multichannel, multiscale, and catalog data analytical methods; wavelets transforms, Picard iteration, and software tools.
Introduction to Autonomous Mobile Robots, second edition Springer Science & Business Media
An introduction to the science and practice of autonomous robots that reviews over 300 current systems and examines the underlying technology.
Robot Vision IGI Global
A concise, accessible introduction to robots, what they can do, what they can't, and what their increasing encroachment into our lives might mean for us. Since the turn of the millennium a quiet revolution has been underway. Millions of autonomous robots with some level of intelligence are now in domestic use, mainly as vacuum cleaners. Driverless cars - which are nothing less than autonomous robots - are starting to appear on our streets. There is a huge effort underway in industry and universities to develop the next generation of more intelligent, autonomous, mobile robots. Accompanying these arrivals has been a steady stream of inflammatory articles in the media raising concerns over the impending spectre of super-intelligent robots, along with stories about how most jobs will soon be lost to robots. Here, using the Question-and-Answer format, Phil Husbands gives a balanced and broad introduction to robotics and the current state of the field, analysing where it has come from, and where it might go in the future. He begins with the history of robotics and its complex relationship with popular culture, and then moves on to discuss the technology underlying robots in an engaging, non-technical way, exploring the limits of what robots can actually do now and what they might be able to do in the future. Naturally these machines, which often seem to display life-like properties, are attracting great attention. Do they pose a threat or an unprecedented opportunity? And although the 'singularity' may not be something to worry about, there are certainly ethical issues needing consideration as robots with some intelligence are used increasingly across many sectors. Husbands considers both these ethical problems and also the wider socio-political challenges that robots are already creating, and the larger ones they might bring in the future.
Autonomous Mobile Robots in Unknown Outdoor Environments Introduction to Autonomous Mobile Robots, second edition
Introduction to Autonomous Mobile Robots, second editionMIT Press
Discovery Science Springer
The economic potential of autonomous mobile robots will increase tremendously during the next years. Service robots such as cleaning machines and inspection or assistance robots will bring us great support in our daily lives. This textbook provides an introduction to the methods of controlling these robotic systems. Starting from mobile robot kinematics, the reader receives a systematic overview of the basic problems as well as methods and algorithms used for solving them. Localisation, object recognition, map building, navigation and control architectures for autonomous vehicles will be discussed in detail. In conclusion, a survey of specific service robot applications is included as well. This book is a very useful introduction to mobile robotics for beginners as well as advanced students and engineers.
Robots MIT Press
A comprehensive survey of artificial intelligence algorithms and programming organization for robot systems, combining theoretical rigor and practical applications. This textbook offers a comprehensive survey of artificial intelligence (AI) algorithms and programming organization for robot systems. Readers who master the topics covered will be able to design and evaluate an artificially intelligent robot for applications involving sensing, acting, planning, and learning. A background in AI is not required; the book introduces key AI topics from all AI subdisciplines throughout the book and explains how they contribute to autonomous capabilities. This second edition is a major expansion and reorganization of the first edition, reflecting the dramatic advances made in AI over the past fifteen years. An introductory overview provides a framework for thinking about AI for robotics, distinguishing between the fundamentally different design paradigms of automation and autonomy. The book then discusses the reactive functionality of sensing and acting in AI robotics; introduces the deliberative functions most often associated with intelligence and the capability of autonomous initiative; surveys multi-robot systems and (in a new chapter) human-robot interaction; and offers a “metaview” of how to design and evaluate autonomous systems and the ethical considerations in doing so. New material covers locomotion, simultaneous localization and mapping, human-robot interaction, machine learning, and ethics. Each chapter includes exercises, and many chapters provide case studies. Endnotes point to additional reading, highlight advanced topics, and offer robot trivia.
Modelling and Control of the Coordinated Motion of a Group of Autonomous Mobile Robots CRC Press
An examination of the implications for society of rapidly advancing artificial intelligence systems, combining a humanities perspective with technical analysis; includes exercises and discussion questions. AI and Humanity provides an analytical framing and a common language for understanding the effects of technological advances in artificial intelligence on society. Coauthored by a computer scientist and a scholar of literature and cultural studies, it is unique in combining a humanities perspective with technical analysis, using the tools of literary explication to examine the societal impact of AI systems. It explores the historical development of these technologies, moving from the apparently benign Roomba to the considerably more sinister semi-autonomous weapon system Harpy. The book is driven by an exploration of the cultural and etymological roots of a series of keywords relevant to both AI and society. Works examined range from Narrative of the Life of Frederick Douglass, given a close reading for its themes of literacy and agency, to Simon Head's critique of the effects of surveillance and automation on the Amazon labor force in Mindless. Originally developed as a textbook for an interdisciplinary humanities-science course at Carnegie Mellon, AI & Humanity offers discussion questions, exercises (including journal writing and concept mapping), and reading lists. A companion website provides updated resources and a portal to a video archive of interviews with AI scientists, sociologists, literary theorists, and others.
New Developments and Advances in Robot Control Springer Science & Business Media
Mobile Robotics: A Practical Introduction (2nd edition) is an excellent introduction to the foundations and methods used for designing completely autonomous mobile robots. A fascinating, cutting-edge, research topic, autonomous mobile robotics is now taught in more and more universities. In this book you are introduced to the fundamental concepts of this complex field via twelve detailed case studies that show how to build and program real working robots. Topics covered in clued learning, autonomous navigation in unmodified, noisy and unpredictable environments, and high fidelity robot simulation. This new edition has been updated to include a new chapter on novelty detection, and provides a very practical introduction to mobile robotics for a general scientific audience. It is essential reading for 2nd and 3rd year undergraduate students and postgraduate students studying robotics, artificial intelligence, cognitive science and robot engineering. The update and overview of core concepts in mobile robotics will assist and encourage practitioners of the field and set challenges to explore new avenues of research in this exiting field. The author is Senior Lecturer at the Department of Computer Science at the University of Essex. "A very fine overview over the relevant problems to be solved in the attempt to bring intelligence to a moving vehicle." Professor Dr. Ewald von Puttkamer, University of Kaiserslautern "Case studies show ways of achieving an impressive repertoire of kinds of learned behaviour, navigation and map-building. The book is an admirable introduction to this modern approach to mobile robotics and certainly gives a great deal of food for thought. This is an important and though-provoking book." Alex M. Andrew in Kybernetes Vol 29 No 4 and Robotica Vol 18
Künstliche Intelligenz MIT Press
A comprehensive survey of artificial intelligence algorithms and programming organization for robot systems, combining theoretical rigor and practical applications. This textbook offers a comprehensive survey of artificial intelligence (AI) algorithms and programming organization for robot systems. Readers who master the topics covered will be able to design and evaluate an artificially intelligent robot for applications involving sensing, acting, planning, and learning. A background in AI is not required; the book introduces key AI topics from all AI subdisciplines throughout the book and explains how they contribute to autonomous capabilities. This second edition is a major expansion and reorganization of the first edition, reflecting the dramatic advances made in AI over the past fifteen years. An introductory overview provides a framework for thinking about AI for robotics, distinguishing between the fundamentally different design paradigms of automation and autonomy. The book then discusses the reactive functionality of sensing and acting in AI robotics; introduces the deliberative functions most often associated with intelligence and the capability of autonomous initiative; surveys multi-robot systems and (in a new chapter) human-robot interaction; and offers a “metaview” of how to design and evaluate autonomous systems and the ethical considerations in doing so. New material covers locomotion, simultaneous localization and mapping, human-robot interaction, machine learning, and ethics. Each chapter includes exercises, and many chapters provide case studies. Endnotes point to additional reading, highlight advanced topics, and offer robot trivia.
Introduction to Autonomous Mobile Robots Elsevier
Abstract: The coordinated motion of a group of autonomous mobile robots for the achievement of a coordinated task has received signifcant research interest in the last decade. Avoiding the collisions of the robots with the obstacles and other members of the group is one of the main problems in the area as previous studies have revealed. Substantial amount of research effort has been concentrated on defning virtual forces that will yield reference trajectories for a group of autonomous mobile robots engaged in coordinated behavior. If the mobile robots are nonholonomic, this approach fails to guarantee coordinated motion since the nonholonomic constraint blocks sideway motions. Two novel approaches to the problem of modeling coordinated motion of a group of autonomous nonholonomic mobile robots inclusive of a new collision avoidance scheme are developed in this thesis. In the first approach, a novel coordination method for a group of autonomous nonholonomic mobile robots is developed by the introduction of a virtual reference system, which in turn implies online collision-free trajectories and consists of virtual mass-spring-damper units. In the latter, online generation of reference trajectories for the robots is enabled in terms of their linear and angular velocities. Moreover, a novel collision avoidance algorithm, that updates the velocities of the robots when a collision is predicted, is developed in both of the proposed models. Along with the presentation of several coordinated task examples, the proposed models are verifed via simulations. Experiments were conducted to verify the performance of the collision avoidance algorithm.