Autonomous Mobile Robots

Autonomous Land Vehicles
Introduction to Autonomous Mobile Robots
Autonomous Mobile Robots
Autonomous mobile robots. 1. Perception, mapping, and navigation
Distributed Autonomous Robotic Systems 4
Wheeled Mobile Robotics
Autonomous Mobile Robots: Perception, mapping, and navigation
Mobile Robots
Autonomous Mobile Robots
Feature-Based Localization in Sonar-Equipped Autonomous Mobile Robots Through Hough Transform and Unsupervised Learning Network
Autonomous Mobile Robotics
Autonomous mobile robots. 2. Control, planning, and architecture
Information Processing in Autonomous Mobile Robots
Robot Vision
Introduction to Autonomous Robots
Dynamics for vision guided autonomous mobile robots
Introduction To Autonomous Mobile Robots
Mobile Robotics
Build Autonomous Mobile Robot from Scratch using ROS
Introduction to Autonomous Mobile Robots, second edition
Recent Trends In Mobile Robots
Autonomous Mobile Robots in Unknown Outdoor Environments
Distributed Autonomous Robotic Systems 3
Human-following Architecture for Autonomous Mobile Robots in Hospital Environments
Advances in Intelligent Autonomous Systems

Autonomous Mobile Robots: Control, Planning, and Architecture. 528 p
Autonomous Mobile Robots and Multi-Robot Systems
Designing Autonomous Mobile Robots
Adaptive Navigation and Motion Planning for Autonomous Mobile Robots
Distributed Computing by Oblivious Mobile Robots
Introduction to Autonomous Mobile Robots
Sensors for Mobile Robots
Autonomous Robots
Autonomous Mobile Robots: Control, planning, and architecture
Autonomous Mobile Robots the Ultimate Step-By-Step Guide
Mobile Robotics
Autonomous Mobile Robots
Advances in Plan-Based Control of Robotic Agents
Modelling and Controlling of Behaviour for Autonomous Mobile Robots
Autonomous Mobile Robots

WALSH ALYSON

Autonomous Land Vehicles Butterworth-Heinemann
Robots or biological intelligent machines are characterized by open, adaptive systems which have autonomy and hierarchical structure. In recent years, more and more mobile robots have been applied in indoor transportation applications. In this book, the study of mobile robotics in life sciences is presented and a number of relatively technical difficulties are considered. A design methodology of behavior-based distributed control architecture for autonomous mobile robots is presented. The third chapter presents the virtual environment implementation for project simulation and conception of supervision and control systems for mobile robots. Finally, the last chapter deals with the controllers and compensators that are widely used in the design and development of mobile robotic devises for various applications such as exploration, search and rescue, surveillance, or object manipulations and transport.

Introduction to Autonomous Mobile Robots World Scientific
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.

Autonomous Mobile Robots Springer Science & Business Media

It has long been the goal of engineers to develop tools that enhance our ability to do work, increase our quality of life, or perform tasks that are either beyond our ability, too hazardous, or too tedious to be left to human efforts. Autonomous mobile robots are the culmination of decades of research and development, and their potential is seemingly unlimited. Roadmap to the Future Serving as the first comprehensive reference on this interdisciplinary technology, Autonomous Mobile Robots: Sensing, Control, Decision Making, and Applications authoritatively addresses the theoretical, technical, and practical aspects of the field. The book examines in detail the key components that form an autonomous mobile robot, from sensors and sensor fusion to modeling and control, map building and path planning, and decision making and autonomy, and to the final integration of these components for diversified applications. Trusted Guidance A duo of accomplished experts leads a team of renowned international researchers and professionals who provide detailed technical reviews and the latest solutions to a variety of important problems. They share hard-won insight into the practical implementation and integration issues involved in developing autonomous and open robotic systems, along with in-depth examples, current and future applications, and extensive illustrations. For anyone involved in researching, designing, or deploying autonomous robotic systems, Autonomous Mobile Robots is the perfect resource.

Autonomous mobile robots. 1. Perception, mapping, and navigation Apress

Start from scratch and build a variety of features for autonomous mobile robots both in simulation and hardware. This book will show you how to simulate an autonomous mobile robot using ROS and then develop its hardware implementation. You'll start by gaining an understanding of the basic theoretical concepts underlying the development of autonomous robots, including history, mathematics, electronics, mechanical aspects, 3D modelling, 3D printing, Linux, and programming. In subsequent chapters, you will learn how to describe kinematics, simulate and visualize the robot, how to interface Arduino with ROS, tele-operate the robot, perform mapping, autonomous navigation, add additional sensors, sensor fusion, laser scan matching, web interface, and more. Not only will you learn theoretical aspects, you’ll also review the hardware realization of mobile robots. Projects start with a very basic two-wheeled mobile robot and progress to complex features such as mapping, navigation, sensor fusion, autodocking, and web interface. Upon completing this book, you’ll have incorporated important robot algorithms including SLAM, Path Finding, Localization, and Kalman Filters – and you will be ready to start designing and building your own autonomous robots. What You Will Learn Design and build your

customized physical robot with autonomous navigation capability Create a map of your house using the robot’s lidar scanner Command the robot to go to any accessible location on the map Interact with the robot using a mobile app, joystick, keyboard, push-button, or remote computer Monitor robot updates via LCD, a mobile app, sound, and status LEDs Automate delivery of small payloads and return to home base Utilize autodocking to home base for battery charging Leverage sensor fusion to improve accuracy Interface with the robot via the Web to monitor and control it remotely Who This Book Is For Complete beginners who want to build customized robots from scratch. No experience is expected, although basic programming knowledge could be handy.

Distributed Autonomous Robotic Systems 4 CRC Press

Distributed autonomous robotic systems (DARS) are systems composed of multiple autonomous units such as modules, cells, processors, agents, and robots. Combination or cooperative operation of multiple autonomous units is expected to lead to desirable features such as flexibility, fault tolerance, and efficiency. The DARS is the leading established conference on distributed autonomous systems. All papers have the common goal to contribute solutions to the very demanding task of designing distributed systems to realize robust and intelligent robotic systems.

Wheeled Mobile Robotics Chapman & Hall

This collection of twenty-three timely contributions covers a well-selected repertory of topics within the autonomous systems field. The book discusses a range of design, construction, control, and operation problems along with a multiplicity of well-established and novel solutions.

Autonomous Mobile Robots: Perception, mapping, and navigation LAP Lambert Academic Publishing

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

Mobile Robots Springer

This book consists of 18 chapters divided in four sections: Robots for Educational Purposes, Health-Care and Medical Robots, Hardware - State of the Art, and Localization and Navigation. In the first section, there are four chapters covering autonomous mobile robot Emmy III, KCLBOT - mobile nonholonomic robot, and

general overview of educational mobile robots. In the second section, the following themes are covered: walking support robots, control system for wheelchairs, leg-wheel mechanism as a mobile platform, micro mobile robot for abdominal use, and the influence of the robot size in the psychological treatment. In the third section, there are chapters about I2C bus system, vertical displacement service robots, quadruped robots - kinematics and dynamics model and Epi.q (hybrid) robots. Finally, in the last section, the following topics are covered: skid-steered vehicles, robotic exploration (new place recognition), omnidirectional mobile robots, ball-wheel mobile robots, and planetary wheeled mobile robots.

Autonomous Mobile Robots Springer Science & Business Media

As research progresses, it enables multi-robot systems to be used in more and more complex and dynamic scenarios. Hence, the question arises how different modelling and reasoning paradigms can be utilised to describe the intended behaviour of a team and execute it in a robust and adaptive manner. Hendrik Skubch presents a solution, ALICA (A Language for Interactive Cooperative Agents) which combines modelling techniques drawn from different paradigms in an integrative fashion. Hierarchies of finite state machines are used to structure the behaviour of the team such that temporal and causal relationships can be expressed. Utility functions weigh different options against each other and assign agents to different tasks. Finally, non-linear constraint satisfaction and optimisation problems are integrated, allowing for complex cooperative behaviour to be specified in a concise, theoretically well-founded manner.

Feature-Based Localization in Sonar-Equipped Autonomous Mobile Robots Through Hough Transform and Unsupervised Learning Network 5starcooks

This volume is a collection of 22 papers presented at the International Workshop on Information Processing in Autonomous Mobile Robots, held in Munich (Germany) in March 1991. Autonomous mobile robot technologies are generating significant interest because of their potential capabilities for future applications on the plant floor as weil as in the service industry. Autonomous robots may navigate around factories and laboratories, hospitals, office-buildings, airports or sirnilar public and sernipublic places. They may deliver equipment, coilect garbage and perform other such tasks. One of the major challenges for the field of autonomous mobile robot research is to develop robust and real-time systerns for perception and understanding of complicated real environments as weil as for intelligent decision-making with respect to proper actions. This Workshop was set up to stimulate discussion and the exchangement of new ideas on various aspects of autonomous mobile robot methodologies and applications. The main focal points of the Workshop program were sensing and perception, navigation and control, knowledge bases and computer architechtures as weil as various applications. The papers are prepared by leading experts in theses areas from Europe, Japan, the United States and by researchers involved in the interdisciplinary research project on "Information Processing in Autonomous Mobile Robots (Sonderforschungsbereich 331)" at the Technische Universität München.

Autonomous Mobile Robotics Springer Nature

Offers a theoretical and practical guide to the communication and navigation of autonomous mobile robots and multi-robot systems This book covers the methods and algorithms for the navigation, motion planning, and control of mobile robots acting individually and in groups. It addresses methods of positioning in global and local coordinates systems, off-line and on-line path-planning, sensing and sensors fusion, algorithms of obstacle avoidance, swarming techniques and cooperative behavior. The book includes ready-to-use algorithms, numerical examples and simulations, which can be directly implemented in both simple and advanced mobile robots, and is accompanied by a website hosting codes, videos, and PowerPoint slides Autonomous Mobile Robots and Multi-Robot Systems: Motion-Planning, Communication and Swarming consists of four main parts. The first looks at the models and algorithms of navigation and motion planning in global coordinates systems with complete information about the robot’s location and velocity. The second part considers the motion of the robots in the potential field, which is defined by the environmental states of the robot's expectations and knowledge. The robot's motion in the unknown environments and the corresponding tasks of environment mapping using sensed information is covered in the third part. The fourth part deals with the multi-robot systems and swarm dynamics in two and three dimensions. Provides a self-contained, theoretical guide to understanding mobile robot control and navigation Features implementable algorithms, numerical examples, and simulations Includes coverage of models of motion in global and local coordinates systems with and without direct communication between the robots Supplemented by a companion website offering codes, videos, and PowerPoint slides Autonomous Mobile Robots and Multi-Robot Systems: Motion-Planning, Communication and Swarming is an excellent tool for researchers, lecturers, senior undergraduate and graduate students, and engineers dealing with mobile robots and related issues.

Autonomous mobile robots. 2. Control, planning, and architecture

Elsevier

In recent years, autonomous robots, including Xavier, Martha [1], Rhino [2,3], Minerva,and Remote Agent, have shown impressive performance in long-term demonstrations. In NASA’s Deep Space program, for example, an - tonomous spacecraft controller, called the Remote Agent [5], has autonomously performed a scienti?c experiment in space. At Carnegie Mellon University, Xavier [6], another autonomous mobile robot, navigated through an o?ce - vironment for more than a year, allowing people to issue navigation commands and monitor their execution via the Internet. In 1998, Minerva [7] acted for 13 days as a museum tourguide in the Smithsonian Museum, and led several thousand people through an exhibition. These autonomous robots have in common that they rely on plan-based c- trol in order to achieve better problem-solving competence. In the plan-based approach, robots generate control actions by maintaining and executing a plan that is e?ective and has a high expected utility with respect to the robots’ c- rent goals and beliefs. Plans are robot control programs that a robot can not only execute but also reason about and manipulate [4]. Thus, a plan-based c- troller is able to manage and adapt the robot’s intended course of action — the plan — while executing it and can thereby better achieve

complex and changing tasks.

Information Processing in Autonomous Mobile Robots John Wiley & Sons

The study of what can be computed by a team of autonomous mobile robots, originally started in robotics and AI, has become increasingly popular in theoretical computer science (especially in distributed computing), where it is now an integral part of the investigations on computability by mobile entities. The robots are identical computational entities located and able to move in a spatial universe; they operate without explicit communication and are usually unable to remember the past; they are extremely simple, with limited resources, and individually quite weak. However, collectively the robots are capable of performing complex tasks, and form a system with desirable fault-tolerant and self-stabilizing properties. The research has been concerned with the computational aspects of such systems. In particular, the focus has been on the minimal capabilities that the robots should have in order to solve a problem. This book focuses on the recent algorithmic results in the field of distributed computing by oblivious mobile robots (unable to remember the past). After introducing the computational model with its nuances, we focus on basic coordination problems: pattern formation, gathering, scattering, leader election, as well as on dynamic tasks such as flocking. For each of these problems, we provide a snapshot of the state of the art, reviewing the existing algorithmic results. In doing so, we outline solution techniques, and we analyze the impact of the different assumptions on the robots' computability power. Table of Contents: Introduction / Computational Models / Gathering and Convergence / Pattern Formation / Scatterings and Coverings / Flocking / Other Directions

Robot Vision MIT Press

This book presents recent trends in the field as perceived by a global selection of researchers and experts. Subjects covered include motion planning of mobile robots in unknown environments, coordination between mobility and manipulability, computation environments for mobile robots, nonlinear control of mobile robots and environmental modeling using advanced sensing technologies. Issues ranging from progress in applications to fundamental problems are discussed.

Introduction to Autonomous Robots Springer Science & Business Media

The Fifth International Symposium on Distributed Autonomous Robotic Systems (DARS 2000) dealt with new strategies to realize complex, modular, robust, and fault-tolerant robotic systems. Technologies, algorithms, and system architectures for distributed autonomous robotic systems were presented and discussed during the meeting. DARS 2000 was truly an international event, with participants represent ing eleven countries from Europe, Asia, and the Americas. All of the papers in this volume were presented at DARS 2000, and were selected on the basis of peer re views to ensure quality and relevance. These papers have the common goal of con tributing solutions to realize robust and intelligent multirobot systems. The topics of the symposium address a wide range of issues that are important in the development of decentralized robotic systems. These topics include architec tures, communication, biological inspirations, reconfigurable robots, localization, exploration and mapping, distributed sensing, multi robot motion coordination,

tar get assignment and tracking, multirobot learning, and cooperative object transport. DARS clearly requires a broad area of interdisciplinary technologies related not only to robotics and computer engineering, but also to biology and psychology. The DARS symposium is the leading established conference on distributed au tonomous systems. The First, Second, and Third International Symposia on Distrib uted Autonomous Robotic Systems (DARS '92, DARS '94, and DARS '96) were held at the Institute of Physical and Chemical Research (RIKEN), Saitama, Japan.

Dynamics for vision guided autonomous mobile robots BoD – Books on Demand

The author compiles everything a student or experienced developmental engineer needs to know about the supporting technologies associated with the rapidly evolving field of robotics.From the table of contents: Design Considerations * Dead Reckoning * Odometry Sensors * Doppler and Inertial Navigation * Typical Mobility Configurations * Tactile and

Introduction To Autonomous Mobile Robots 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.

Mobile Robotics IEEE Computer Society

This book introduces concepts in mobile, autonomous robotics to 3rd-4th year students in Computer Science or a related discipline. The book covers principles of robot motion, forward and inverse kinematics of robotic arms and simple wheeled platforms, perception, error propagation, localization and simultaneous localization and mapping. The cover picture shows a wind-up toy that is smart enough to not fall off a table just using intelligent mechanism design and illustrate the importance of the mechanism in designing intelligent, autonomous systems. This book is open source, open to contributions, and released under a creative common license.

Build Autonomous Mobile Robot from Scratch using ROS World Scientific Publishing Company

Wheeled Mobile Robotics: From Fundamentals Towards Autonomous Systemscovers the main topics from the wide area of mobile robotics, explaining all applied theory and application. The book gives the reader a good foundation, enabling them to continue to more advanced topics. Several examples are included for better understanding, many of them accompanied by short MATLAB® script code making it easy to reuse in practical work. The book includes several examples of discussed methods and projects for wheeled mobile robots and some advanced methods for their control and localization. It is an ideal resource for those seeking an understanding of robotics, mechanics, and control, and for engineers and researchers in industrial and other specialized research institutions in the field of wheeled mobile robotics. Beginners with basic math knowledge will benefit from the examples, and engineers with an understanding of basic system theory and control will find it easy to follow the more demanding fundamental parts and advanced methods explained.

- Offers comprehensive coverage of the essentials of the field that are suitable for both academics and practitioners - Includes several examples of the application of algorithms in simulations and real laboratory projects - Presents foundation in mobile robotics theory before continuing with more advanced topics - Self-sufficient to beginner readers, covering all important topics in the mobile robotics field - Contains specific topics on modeling, control, sensing, path planning, localization, design architectures, and multi-agent systems

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. Autonomous robots are intelligent machines capable of performing tasks in the world by themselves, without explicit human control. Examples range from autonomous helicopters to Roomba, the robot vacuum cleaner. In this book, George Bekey offers an introduction to the science and practice of autonomous robots that can be used both in the classroom and as a reference for industry professionals. He surveys the hardware implementations of more than 300 current systems, reviews some of their application areas, and examines the underlying technology, including control, architectures, learning, manipulation, grasping, navigation, and mapping. Living systems can be considered the prototypes of autonomous systems, and Bekey explores the biological inspiration that forms the basis of many recent developments in robotics. He also discusses robot control issues and the design of control architectures. After an overview of the field that introduces some of its fundamental concepts, the book presents background material on hardware, control (from both biological and engineering perspectives), software architecture, and robot intelligence. It then examines a broad range of implementations and applications, including locomotion (wheeled, legged, flying, swimming, and crawling robots), manipulation (both arms and hands), localization, navigation, and mapping. The many case studies and specific applications include robots built for research, industry, and the military, among them underwater robotic vehicles, walking machines with four, six, and eight legs, and the famous humanoid robots Cog, Kismet, ASIMO, and QRIO. The book concludes with reflections on the future of robotics—the potential benefits as well as the possible dangers that may arise from large numbers of increasingly intelligent and autonomous robots.