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 Robotic Fabrication in Architecture, Art and Design 2014
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Global Perspectives on Robotics and Autonomous Systems: Development and Applications Springer

Robotic automation has become ubiquitous in the modern manufacturing landscape, spanning an overwhelming range of processes and applications-- from small scale force-controlled grinding operations for orthopedic joints to large scale composite manufacturing of aircraft fuselages. Smart factories, seamlessly linked via industrial networks and sensing, have revolutionized mass production, allowing for intelligent, adaptive manufacturing processes across a broad spectrum of industries. Against this background, an emerging group of researchers, designers, and fabricators have begun to apply robotic technology in the pursuit of architecture, art, and design, implementing them in a range of processes and scales. Coupled with computational design tools the technology is no longer relegated to the repetitive production of the assembly line, and is instead being employed for the mass-customization of non-standard components. This radical shift in

protocol has been enabled by the development of new design to production workflows and the recognition of robotic manipulators as "multi-functional" fabrication platforms, capable of being reconfigured to suit the specific needs of a process. The emerging discourse surrounding robotic fabrication seeks to question the existing norms of manufacturing and has far reaching implications for the future of how architects, artists, and designers engage with materialization processes. This book presents the proceedings of Rob|Arch2014, the second international conference on robotic fabrication in architecture, art, and design. It includes a Foreword by Sigrid Brell-Cokcan and Johannes Braumann, Association for Robots in Architecture. The work contained traverses a wide range of contemporary topics, from methodologies for incorporating dynamic material feedback into existing fabrication processes, to novel interfaces for robotic programming, to new processes for large-scale automated construction. The latent argument behind this research is that the term 'file-to-factory' must not be a reductive celebration of expediency but instead a perpetual challenge to increase the quality of feedback between design, matter, and making.
Mechanisms, Transmissions and Applications Springer

Business innovation and industrial intelligence are paving the way for a future in which smart factories, intelligent machines, networked processes and Big Data are combined to foster industrial growth. The maturity and growth of instrumentation, monitoring and automation as key technology drivers support Industry 4.0 as a viable, competent and actionable business model. This book offers a primer, helping readers understand this paradigm shift from industry 1.0 to industry 4.0. The focus is on grasping the necessary pre-conditions, development & technological aspects that conceptually describe this transformation, along with the practices, models and real-time experience needed to achieve sustainable smart manufacturing technologies. The primary goal is to address significant questions of what, how and why in this context, such as: What is Industry 4.0? What is the current status of its implementation? What are the pillars of Industry 4.0? How can Industry 4.0 be effectively implemented? How are firms exploiting the Internet of Things (IoT), Big Data and other emerging technologies to improve their production and services? How can the implementation of Industry 4.0 be accelerated? How is Industry 4.0 changing the workplace landscape? Why is this melding of the virtual and physical world needed for smart production engineering environments? Why is smart production a game-changing new form of product design and manufacturing?

Systems and Information Sciences Springer Science & Business Media

Mobile robotics is a challenging field with great potential. It covers disciplines including electrical engineering, mechanical engineering, computer science, cognitive science, and social science. It is essential to the design of automated robots, in combination with artificial intelligence, vision, and sensor technologies. Mobile robots are widely used for surveillance, guidance, transportation and entertainment tasks, as well as medical applications. This Special Issue intends to concentrate on recent developments concerning mobile robots and the research surrounding them to enhance studies on the fundamental problems observed in the robots. Various multidisciplinary approaches and integrative contributions including navigation, learning and adaptation, networked system, biologically inspired robots and cognitive methods are welcome contributions to this Special Issue, both from a research and an application perspective.

ROBOTICS Springer

Human-Robot Interaction: Safety, Standardization, and Benchmarking provides a comprehensive introduction to the new scenarios emerging where humans and robots interact in various environments and applications on a daily basis. The focus is on the current status and foreseeable implications of robot safety, approaching these issues from the standardization and benchmarking perspectives. Featuring contributions from leading experts, the book presents state-of-the-art research, and includes real-world applications and use cases. It explores the key leading sectors—robotics, service robotics, and medical robotics—and elaborates on the safety approaches that are being developed for effective human-robot interaction, including physical robot-human contacts, collaboration in task execution, workspace sharing, human-aware motion planning, and exploring the landscape of relevant standards and guidelines. Features Presenting a comprehensive introduction to human-robot interaction in a number of domains, including industrial robotics, medical robotics, and service robotics Focusing on robot safety standards and benchmarking Providing insight into current developments in international standards Featuring contributions from leading experts, actively pursuing new robot development Modern Robotics Human-Robot Interaction

This book examines the role of computer-assisted techniques for discovering, designing, optimizing and manufacturing new, effective, and safe pharmaceutical formulations and drug delivery systems. The book discusses computational approaches, statistical modeling and molecular modeling for the development and safe delivery of drugs in humans. The application of concepts of QbD (Quality by Design), DoE (Design of Experiments), artificial intelligence and in silico pharmacokinetic assessment/simulation have been made a lot easier with the help of commercial software and expert systems. This title provides in-depth knowledge of such useful software with illustrations from the latest researches. The book also fills in the gap between pharmaceuticals and molecular modeling at micro, meso and macro scale by covering topics such as advancements in computer-aided Drug Design (CADD), drug-polymer interactions in drug delivery systems, molecular modeling of nanoparticles and pharmaceuticals/bioinformatics. This book provides abundant applications of computers in formulation designing and characterization are provided as examples, case studies and illustrations. Short reviews of software, databases and expert systems have also been added to culminate the interest of readers for novel applications in formulation development and drug delivery. Computer-aided pharmaceuticals and drug delivery is an authoritative reference source for all the latest scholarly update on emerging developments in computer-assisted techniques for drug designing and development. The book is ideally designed for pharmacists, medical practitioners, students and researchers.

A Roadmap to Industry 4.0: Smart Production, Sharp Business and Sustainable Development Springer

Nowadays, our expectations of robots have been significantly increases. The robot, which was initially only doing simple jobs, is now expected to be smarter and more dynamic. People want a robot that resembles a human (humanoid) has and has emotional intelligence that can perform action-reaction interactions. This book consists of two sections. The first section focuses on emotional intelligence, while the second section discusses the control of robotics. The contents of the book reveal the outcomes of research conducted by scholars in robotics fields to accommodate needs of society and industry.

ROS Robotics Projects CRC Press

Build exciting robotics projects such as mobile manipulators, self-driving cars, and industrial robots powered by ROS, machine learning, and virtual reality Key Features Create and program cool robotic projects using powerful ROS libraries Build industrial robots like mobile manipulators to handle complex tasks Learn how reinforcement learning and deep learning are used with ROS Book Description Nowadays, heavy industrial robots placed in workcells are being replaced by new age robots called cobots, which don't need workcells. They are used in manufacturing, retail, banks, energy, and healthcare, among other domains. One of the major reasons for this rapid growth in the robotics market is the introduction of an open source robotics framework called the Robot Operating System (ROS). This book covers projects in the latest ROS distribution, ROS Melodic Morenia with Ubuntu Bionic (18.04). Starting with the fundamentals, this updated edition of ROS Robotics Projects introduces you to ROS-2 and helps you understand how it is different from ROS-1. You'll be able to model and build an industrial mobile manipulator in ROS and simulate it in Gazebo 9. You'll then gain insights into handling complex robot applications using state machines and working with multiple robots at a time. This ROS book also introduces you to new and popular hardware such as Nvidia's Jetson Nano, Asus Tinker Board, and Beaglebone Black, and allows you to explore interfacing with ROS. You'll learn as you

build interesting ROS projects such as self-driving cars, making use of deep learning, reinforcement learning, and other key AI concepts. By the end of the book, you'll have gained the confidence to build interesting and intricate projects with ROS. What you will learn Grasp the basics of ROS and understand ROS applications Uncover how ROS-2 is different from ROS-1 Handle complex robot tasks using state machines Communicate with multiple robots and collaborate to build apps with them Explore ROS capabilities with the latest embedded boards such as Tinker Board S and Jetson Nano Discover how machine learning and deep learning techniques are used with ROS Build a self-driving car powered by ROS Teleoperate your robot using Leap Motion and a VR headset Who this book is for If you're a student, hobbyist, professional, or anyone with a passion for learning robotics and interested in learning about algorithms, motion control, and perception capabilities from scratch, this book is for you. This book is also ideal for anyone who wants to build a new product and for researchers to make the most of what's already available to create something new and innovative in the field of robotics.

Intelligent Systems and Applications Springer Nature

Wheeled Mobile Robotics: From Fundamentals Towards Autonomous Systems covers 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

Intelligent Autonomous Systems 13 Springer Nature

This book discusses the papers presented at Conference ISPEM 2023 which was organized by Wrocław University of Science and Technology, Liverpool John Moores University, and University of Minho. The conference gave an opportunity to exchange experiences in intelligent systems and tools in production, and maintenance, especially its practical application.

RoboCup 2012: Robot Soccer World Cup XVI Springer Science & Business Media

The book Intelligent Systems and Applications - Proceedings of the 2020 Intelligent Systems Conference is a remarkable collection of chapters covering a wider range of topics in areas of intelligent systems and artificial intelligence and their applications to the real world. The Conference attracted a total of 545 submissions from many academic pioneering researchers, scientists, industrial engineers, students from all around the world. These submissions underwent a double-blind peer review process. Of those 545 submissions, 177 submissions have been selected to be included in these proceedings. As intelligent

systems continue to replace and sometimes outperform human intelligence in decision-making processes, they have enabled a larger number of problems to be tackled more effectively. This branching out of computational intelligence in several directions and use of intelligent systems in everyday applications have created the need for such an international conference which serves as a venue to report on up-to-the-minute innovations and developments. This book collects both theory and application based chapters on all aspects of artificial intelligence, from classical to intelligent scope. We hope that readers find the volume interesting and valuable; it provides the state of the art intelligent methods and techniques for solving real world problems along with a vision of the future research.

Computer Aided Pharmaceutics and Drug Delivery Springer Nature

This book constitutes the proceedings of the 1st International Conference on Systems and Information Sciences (ICCIS), held in Manta, Ecuador, from July 27 to 29, 2020, and was jointly organized by Universidad Laica Eloy Alfaro de Manabí "ULEAM", in collaboration with GDEON. ICCIS aims to bring together systems and information sciences researchers and developers from academia and industry around the world to discuss cutting-edge research. The book covers the following topics: AI, Expert Systems and Big Data Analytics Cloud, IoT and Distributed Computing Communications Database System and Application Financial Technologies (FinTech), Economics and Business Engineering m-Learning and e-Learning Security Software Engineering Web Information Systems and Applications General Track

Proceedings of the Future Technologies Conference (FTC) 2018 Springer Nature

This book provides a decentralized approach for the identification and control of robotics systems. It also presents recent research in decentralized neural control and includes applications to robotics. Decentralized control is free from difficulties due to complexity in design, debugging, data gathering and storage requirements, making it preferable for interconnected systems. Furthermore, as opposed to the centralized approach, it can be implemented with parallel processors. This approach deals with four decentralized control schemes, which are able to identify the robot dynamics. The training of each neural network is performed on-line using an extended Kalman filter (EKF). The first indirect decentralized control scheme applies the discrete-time block control approach, to formulate a nonlinear sliding manifold. The second direct decentralized neural control scheme is based on the backstepping technique, approximated by a high order neural network. The third control scheme applies a decentralized neural inverse optimal control for stabilization. The fourth decentralized neural inverse optimal control is designed for trajectory tracking. This comprehensive work on decentralized control of robot manipulators and mobile robots is intended for professors, students and professionals wanting to understand and apply advanced knowledge in their field of work.

Decentralized Neural Control: Application to Robotics PHI Learning Pvt. Ltd.

The concept of Robotics and Artificial Intelligence (AI) has been in practice over the years with the advent of technological progress overtime and is transforming our world in profound and unprecedented ways, with the potential to revolutionise virtually every aspect of our lives. From self-driving cars and personal assistants to medical diagnosis and financial forecasting, AI is rapidly becoming an indispensable tool for solving complex problems and unlocking new opportunities for innovation and progress. As the world becomes increasingly complex and interconnected, robotics has emerged as a critical field that is

revolutionizing how we live, work and interact with our environment. From manufacturing and transportation to healthcare and education, robots are transforming industries and creating new opportunities for innovation and progress. Keeping this in mind, I.C.S.E. Robotics and Artificial Intelligence for Class 9 has been designed. This book is strictly based on the latest syllabus prescribed by the Council for the Indian School Certificate Examination (CISCE) and is intended to provide a comprehensive overview of the field, exploring the fundamental principles and applications of robotics and AI technology. Based on the latest research and developments in the fields, this book offers a detailed overview of the key concepts and techniques that underpin AI, from machine learning and natural language processing to computer vision and Robotics. This book will provide you with a comprehensive and up-to-date understanding of these exciting and rapidly evolving fields keeping in line with ICSE syllabus. Salient Features of this Book • As per the latest syllabus and examination pattern prescribed by the ICSE. • The book is divided into two parts: Part I deals with the Robotics portion. This part consists of three units: Introduction to Robotics, Robot as a System and Concepts in Robotics. Part II deals with the Artificial Intelligence portion. This part consists of two units: Introduction to Artificial Intelligence (AI), Role of Data and Information. Evolution of Computing, Introduction to Data and Programming with Python, AI Concepts and AI Project Framework, and Assignments and Laboratory Experiments. • All the concepts explained in a simple language using a step-by-step approach supported by a lot of illustrations. Chapter-wise Features • Learning Objectives introduces you to the learning outcomes and knowledge criteria covered in the chapter. • Chapter content caters to know about the topic of the chapter which may enrich your knowledge. • Did You Know? provides an interesting piece of knowledge to get the students interested. • Activity encourages students to integrate theory with practice. • Recap sums up the key concepts given in the chapter. • Key Terms are the main terminologies that are present in the chapter. • Each chapter contains an accompanying exercise that will assess students' understanding after they have completed the entire unit by answering the questions given in the exercise. Online Support • E-books (for teachers only). Teadtv Resource Book • Overview of the chapters • Lesson plan • Answers of the exercise We hope that this book will inspire you to explore the limitless possibilities of Robotics and AI to make meaningful contributions to this dynamic and transformative field. Thus, it is a request to our esteemed readers to share the feedback, suggestions* etc. for the improvement of the book. All your suggestions for the improvement of the book are welcome. -Author

Intelligent Systems and Applications BoD – Books on Demand

This book includes the thoroughly refereed proceedings of the 18th Annual RoboCup International Symposium, held in Joao Pessoa, Brazil, in July 2014. The 36 revised papers were carefully reviewed and selected from 66 submissions and include 11 champion-team papers, three special-track papers on open-source hardware and software, nine papers on the advancement of the RoboCup leagues track, and three best papers. The contributions present current research and educational activities in the field of robotics and artificial intelligence with a special focus on the interaction between robots and humans.

Simultaneous Localization and Mapping for Mobile Robots: Introduction and Methods Elsevier

The second edition of a comprehensive introduction to all aspects of mobile robotics, from algorithms to mechanisms. Mobile robots range from the Mars Pathfinder mission's teleoperated Sojourner to the cleaning robots in the Paris Metro. This text offers students

and other interested readers an introduction to the fundamentals of mobile robotics, spanning the mechanical, motor, sensory, perceptual, and cognitive layers the field comprises. The text focuses on mobility itself, offering an overview of 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 synthesizes material from such fields as kinematics, control theory, signal analysis, computer vision, information theory, artificial intelligence, and probability theory. The book presents the techniques and technology that enable mobility in a series of interacting modules. Each chapter treats a different aspect of mobility, as the book moves from low-level to high-level details. It covers all aspects of mobile robotics, including software and hardware design considerations, related technologies, and algorithmic techniques. This second edition has been revised and updated throughout, with 130 pages of new material on such topics as locomotion, perception, localization, and planning and navigation. Problem sets have been added at the end of each chapter. Bringing together all aspects of mobile robotics into one volume, *Introduction to Autonomous Mobile Robots* can serve as a textbook or a working tool for beginning practitioners. Curriculum developed by Dr. Robert King, Colorado School of Mines, and Dr. James Conrad, University of North Carolina-Charlotte, to accompany the National Instruments LabVIEW Robotics Starter Kit, are available. Included are 13 (6 by Dr. King and 7 by Dr. Conrad) laboratory exercises for using the LabVIEW Robotics Starter Kit to teach mobile robotics concepts.

Introduction to Autonomous Mobile Robots, second edition Springer Nature

This book includes the thoroughly refereed post-conference proceedings of the 16th Annual RoboCup International Symposium, held in Mexico City, Mexico, in June 2012. The 24 revised papers presented together with nine champion team papers and one best paper award were carefully reviewed and selected from 64 submissions. The papers present current research and educational activities within the fields of Robotics and Artificial Intelligence with a special focus to robot hardware and software, perception and action, robotic cognition and learning, multi-robot systems, human-robot interaction, education and edutainment, and applications.

Advances in Design, Simulation and Manufacturing IV Packt Publishing Ltd

This book focusses on one of the important classes of Robots known as manipulators or robotic arms, and provides a thorough treatment of its kinematics, dynamics, and control. The book also covers the problem of trajectory generation and robot programming. The text, apart from providing a detailed account of topics such as on taxonomy of robots, spatial description of rigid bodies, kinematics of manipulator, concept of dexterous workspace, concept of singularity, manipulator dynamics using both the Newton–Euler and Lagrangian approaches with a deeper insight into the manipulator dynamics, manipulator control, and programming, additionally encompasses topics on motion planning, intelligent control, and distributed control of manipulators. The book is an excellent learning resource for understanding the complexities of manipulator design, analysis, and operation. It clearly presents ideas without compromising on the mathematical rigour. KEY FEATURES • Full coverage of syllabi of all the Indian universities • Based on classroom-tested lecture notes • Numerous illustrative examples • Chapter-end problems for brainstorming Primarily designed for students studying Robotics in undergraduate and postgraduate engineering courses in mechanical and mechatronics disciplines, the book is also of immense value to the students pursuing research in robotics.

Instructor Resources PPTs and Solution Manual are also available for the faculty members who adopt the book.

Human-in-the-loop Learning and Control for Robot Teleoperation Springer Nature

The book, presenting the proceedings of the 2018 Future Technologies Conference (FTC 2018), is a remarkable collection of chapters covering a wide range of topics, including, but not limited to computing, electronics, artificial intelligence, robotics, security and communications and their real-world applications. The conference attracted a total of 503 submissions from pioneering researchers, scientists, industrial engineers, and students from all over the world. After a double-blind peer review process, 173 submissions (including 6 poster papers) have been selected to be included in these proceedings. FTC 2018 successfully brought together technology geniuses in one venue to not only present breakthrough research in future technologies but to also promote practicality and applications and an intra- and inter-field exchange of ideas. In the future, computing technologies will play a very important role in the convergence of computing, communication, and all other computational sciences and applications. And as a result it will also influence the future of science, engineering, industry, business, law, politics, culture, and medicine. Providing state-of-the-art intelligent methods and techniques for solving real-world problems, as well as a vision of the future research, this book is a valuable resource for all those interested in this area.

Towards Service Robots for Everyday Environments Springer

This book constitutes the refereed proceedings of the 18th EPIA Conference on Artificial Intelligence, EPIA 2017, held in Porto,

Portugal, in September 2017. The 69 revised full papers and 2 short papers presented were carefully reviewed and selected from a total of 177 submissions. The papers are organized in 16 tracks devoted to the following topics: agent-based modelling for criminological research (ABM4Crime), artificial intelligence in cyber-physical and distributed embedded systems (AICPDES), artificial intelligence in games (AIG), artificial intelligence in medicine (AIM), artificial intelligence in power and energy systems (AIPES), artificial intelligence in transportation systems (AITS), artificial life and evolutionary algorithms (ALEA), ambient intelligence and affective environments (AmIA), business applications of artificial intelligence (BAAI), intelligent robotics (IROBOT), knowledge discovery and business intelligence (KDBI), knowledge representation and reasoning (KRR), multi-agent systems: theory and applications (MASTA), software engineering for autonomous and intelligent systems (SE4AIS), social simulation and modelling (SSM), and text mining and applications (TeMA).

Wheeled Mobile Robotics Springer Nature

This proceedings book features selected papers on 12 themes, including telecommunication, power systems, digital signal processing, robotics, control systems, renewable energy, power electronics, soft computing and more. Covering topics such as optoelectronic oscillator at S-band and C-band for 5G telecommunications, neural networks identification of eleven types of faults in high voltage transmission lines, cyber-attack mitigation on smart low voltage distribution grids, optimum load of a piezoelectric-based energy harvester, the papers present interesting ideas and state-of-the-art overviews.

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