Vrep Teaching Robotics

This proceedings volume showcases the latest achievements in research and development in Educational Robotics presented at the 7th International Conference on Robotics in Education (RiE) held in Vienna, Austria, during April 14-15, 2016. The book offers a range of methodologies for teaching robotics and presents various educational robotics curricula. It includes dedicated chapters for the design and analysis of learning environments as well as evaluation means for measuring the impact of robotics on the students' learning success. Moreover, the book presents interesting programming approaches as well as new applications, the latest tools, systems and components for using robotics. The presented applications cover the whole educative range, from elementary school to high school, college, university and beyond, for continuing education and possibly outreach and workforce development. The book provides a framework involving two complementary kinds of contributions: on the one hand on technical aspects and on the other hand on matters of didactic.

This book contains a selection of papers accepted for presentation and discussion at ROBOT 2015: Second Iberian Robotics Conference, held in Lisbon, Portugal, November 19th-21th, 2015. ROBOT 2015 is part of a series of conferences that are a joint organization of SPR – "Sociedade Portuguesa de Robótica/ Portuguese Society for Robotics", SEIDROB – Sociedad Española para la Investigación y Desarrollo de la Robótica/ Spanish Society for Research and Development in Robotics and CEA-GTRob – Grupo Temático de Robótica/ Robotics Thematic Group. The conference organization had also the collaboration of several universities and research institutes, including: University of Minho, University of Porto, University of Lisbon, Polytechnic Institute of Porto, University of Aveiro, University of Zaragoza, University of Malaga, LIACC, INESC-TEC and LARSyS. Robot 2015 was focussed on the Robotics scientific and technological activities in the Iberian Peninsula, although open to research and delegates from other countries. The conference featured 19 special sessions, plus a main/general robotics track. The special sessions were about: Agricultural Robotics and Field Automation; Autonomous Driving and Driver Assistance Systems; Communication Aware Robotics; Environmental Robotics; Social Robotics: Intelligent and Adaptable AAL Systems; Future Industrial Robotics Systems; Legged Locomotion Robots; Rehabilitation and Assistive Robotics; Robotic Applications in Art and Architecture; Surgical Robotics; Urban Robotics; Visual Perception for Autonomous Robots; Machine Learning in Robotics; Simulation and Competitions in Robotics; Educational Robotics; Visual Maps in Robotics; Control and Planning in Aerial Robotics, the XVI edition of the Workshop on Physical Agents and a Special Session on Technological Transfer and Innovation.

This book offers a timely and comprehensive snapshot of research and developments in the field of control engineering. Covering a wide range of theoretical and practical issues, the contributions describes a number of different control approaches, such adaptive control, fuzzy and neuro-fuzzy control, remote and robust control systems, real time an fault tolerant control, among others. Sensors and actuators, measurement systems, renewable energy systems, aerospace systems as well as industrial control and automation, are also comprehensively covered. Based on the proceedings of the 14th APCA International Conference on Automatic Control and Soft Computing, held on July 1-3, 2020, in Bragança, Portugal, the book offers a timely and thoroughly survey of the latest research in the field of control, and a source of inspiration for researchers and professionals worldwide.

This book constitutes the proceedings of the Third International Conference on Technologies and Innovation, CITI 2017, held in Guayaquil, Ecuador, in October 2017. The 24 papers presented in this volume were carefully reviewed and selected from 68 submissions. They were organized in topical sections named: cloud and mobile computing; knowledge based and expert systems; applications in healthcare and wellness; e-learning; and ICT in agronomy.

The 11th International Symposium on Distributed Computing and Artificial Intelligence 2014 (DCAI 2014) is a forum to present applications of innovative techniques for studying and solving complex problems. The exchange of ideas between scientists and technicians from both the academic and industrial sector is essential to facilitate the development of systems that can meet the ever-increasing demands of today's society. The present edition brings together past experience, current work and promising future trends associated with distributed computing, artificial intelligence and their application in order to provide efficient solutions to real problems. This year's technical program presents both high quality and diversity, with contributions in well-established and evolving areas of research (Algeria, Brazil, China, Croatia, Czech Republic, Denmark, France, Germany, Ireland, Italy, Japan, Malaysia, Mexico, Poland, Portugal, Republic of Korea, Spain, Taiwan, Tunisia, Ukraine, United Kingdom), representing a truly "wide area network" of research activity. DCAI'14 Special Sessions have been a very useful tool in order to complement the regular program with new or emerging topics of particular interest to the participating community. Special Sessions that emphasize on multi-disciplinary and transversal aspects, such as AI-driven methods for Multimodal Networks and Processes Modeling and Multi-Agents Macroeconomics have been especially encouraged and welcome. This symposium is organized by the Bioinformatics, Intelligent System and Educational Technology Research Group (http://bisite.usal.es/) of the University of Salamanca. The present edition was held in Salamanca, Spain, from 4th to 6th June 2014.

This book constitutes the refereed post-conference proceedings of the 5th International Conference on Cognitive Systems and Signal Processing, ICCSIP 2020, held in Zhuhai, China, in December 2020. The 59 revised papers presented were carefully reviewed and selected from 120 submissions. The papers are organized in topical sections on algorithm; application; manipulation; bioinformatics; vision; and autonomous vehicles.

Advanced Manufacturing and Automation VIIISpringer

This book gathers the proceedings of the Multidisciplinary International Conference of Research Applied to Defense and Security (MICRADS), held at the Military Engineering Institute, Rio de Janeiro, Brazil, from 8 to 10th May 2019. It covers a variety of topics in systems, communication and defense; strategy and political-administrative vision in defense; and engineering and technologies applied to defense. Given its scope, it offers a valuable resource for practitioners, researchers, and students alike.

The second edition of this handbook provides a state-of-the-art overview on the various aspects in the rapidly developing field of robotics. Reaching for the human frontier, robotics is vigorously engaged in the growing challenges of new emerging domains. Interacting, exploring, and working with humans, the new generation of robots will increasingly touch people and their lives. The credible prospect of practical robots among humans is the result of the scientific endeavour of a half a century of robotic developments that established robotics as a modern scientific discipline. The ongoing vibrant expansion and strong growth of the field during the last decade has fueled this second edition of the Springer Handbook of Robotics. The first edition of the handbook soon became a landmark in robotics publishing and won the American

Association of Publishers PROSE Award for Excellence in Physical Sciences & Mathematics as well as the organization's Award for Engineering & Technology. The second edition of the handbook, edited by two internationally renowned scientists with the support of an outstanding team of seven part editors and more than 200 authors, continues to be an authoritative reference for robotics researchers, newcomers to the field, and scholars from related disciplines. The contents have been restructured to achieve four main objectives: the enlargement of foundational topics for robotics, the enlightenment of design of various types of robotic systems, the extension of the treatment on robots moving in the environment, and the enrichment of advanced robotics applications. Further to an extensive update, fifteen new chapters have been introduced on emerging topics, and a new generation of authors have joined the handbook's team. A novel addition to the second edition is a comprehensive collection of multimedia references to more than 700 videos, which bring valuable insight into the contents. The videos can be viewed directly augmented into the text with a smartphone or tablet using a unique and specially designed app. Springer Handbook of Robotics Multimedia Extension Portal: http://handbookofrobotics.org/

Build a variety of awesome robots that can see, sense, move, and do a lot more using the powerful Robot Operating System About This Book Create and program cool robotic projects using powerful ROS libraries Work through concrete examples that will help you build your own robotic systems of varying complexity levels This book provides relevant and fun-filled examples so you can make your own robots that can run and work Who This Book Is For This book is for robotic enthusiasts and researchers who would like to build robot applications using ROS. If you are looking to explore advanced ROS features in your projects, then this book is for you. Basic knowledge of ROS, GNU/Linux, and programming concepts is assumed. What You Will Learn Create your own self-driving car using ROS Build an intelligent robotic application using deep learning and ROS Master 3D object recognition Control a robot using virtual reality and ROS Build your own AI chatter-bot using ROS Get to know all about the autonomous navigation of robots using ROS Understand face detection and tracking using ROS Get to grips with teleoperating robots using hand gestures Build ROS-based applications using Matlab and Android Build interactive applications using TurtleBot In Detail Robot Operating System is one of the most widely used software frameworks for robotic research and for companies to model, simulate, and prototype robots. Applying your knowledge of ROS to actual robotics is much more difficult than people realize, but this title will give you what you need to create your own robotics in no time! This book is packed with over 14 ROS robotics projects that can be prototyped without requiring a lot of hardware. The book starts with an introduction of ROS and its installation procedure. After discussing the basics, you'll be taken through great projects, such as building a self-driving car, an autonomous mobile robot, and image recognition using deep learning and ROS. You can find ROS robotics applications for beginner, intermediate, and expert levels inside! This book will be the perfect companion for a robotics enthusiast who really wants to do something big in the field. Style and approach This book is packed with fun-filled, end-to-end projects on mobile, armed, and flying robots, and describes the ROS implementation and execution of these models.

This book presents the outcomes of the 7th International Conference in Methodologies and Intelligent Systems for Technology Enhanced Learning (MIS4TEL'17), hosted by the Polytechnic of Porto, Portugal from 21 to 23 June 2017. Expanding on the topics of the previous conferences, it provided an open forum for discussing intelligent systems for technology enhanced learning (TEL) and their roots in novel learning theories, empirical methodologies for their design or evaluation, stand-alone and web-based solutions, and makerspaces. It also fostered entrepreneurship and business startup ideas, bringing together researchers and developers from industry, education and the academic world to report on the latest scientific research, technical advances and methodologies.

This book is used at the graduate or advanced undergraduate level and many others. Manned and unmanned ground, aerial and marine vehicles enable many promising and revolutionary civilian and military applications that will change our life in the near future. These applications include, but are not limited to, surveillance, search and rescue, environment monitoring, infrastructure monitoring, self-driving cars, contactless last-mile delivery vehicles, autonomous ships, precision agriculture and transmission line inspection to name just a few. These vehicles will benefit from advances of deep learning as a subfield of machine learning able to endow these vehicles with different capability such as perception, situation awareness, planning and intelligent control. Deep learning models also have the ability to generate actionable insights into the complex structures of large data sets. In recent years, deep learning research has received an increasing amount of attention from researchers in academia, government laboratories and industry. These research activities have borne some fruit in tackling some of the challenging problems of manned and unmanned ground, aerial and marine vehicles that are still open. Moreover, deep learning methods have been recently actively developed in other areas of machine learning, including reinforcement training and transfer/meta-learning, whereas standard, deep learning methods such as recent neural network (RNN) and coevolutionary neural networks (CNN). The book is primarily meant for researchers from academia and industry, who are working on in the research areas such as engineering, control engineering, robotics, mechatronics, biomedical engineering, mechanical engineering and computer science. The book chapters deal with the recent research problems in the areas of reinforcement learning-based control of UAVs and deep learning for unmanned aerial systems (UAS) The book chapters present various techniques of deep learning for robotic applications. The book chapters contain a good literature survey with a long list of references. The book chapters are well written with a good exposition of the research problem, methodology, block diagrams and mathematical techniques. The book chapters are lucidly illustrated with numerical examples and simulations. The book chapters discuss details of applications and future research areas.

This book presents programming by demonstration for robot learning from observations with a focus on the trajectory level of task abstraction Discusses methods for optimization of task reproduction, such as reformulation of task planning as a constrained optimization problem

Focuses on regression approaches, such as Gaussian mixture regression, spline regression, and locally weighted regression Concentrates on the use of vision sensors for capturing motions and actions during task demonstration by a human task expert

This book gathers a selection of papers presented at ROBOT 2019 – the Fourth Iberian Robotics Conference, held in Porto, Portugal, on November 20th–22nd, 2019. ROBOT 2019 is part of a series of conferences jointly organized by the SPR – Sociedade Portuguesa de Robótica (Portuguese Society for Robotics) and SEIDROB – Sociedad Española para la Investigación y Desarrollo en Robótica (Spanish Society for Research and Development in Robotics). ROBOT 2019 built upon several previous successful events, including three biannual workshops and the three previous installments of the Iberian Robotics Conference, and chiefly focused on presenting the latest findings and applications in robotics from the Iberian Peninsula, although the event was also open to research and researchers from other countries. The event featured five plenary talks on state-of-the-art topics and 16 special sessions, plus a main/general robotics track. In total, after a stringent review process, 112 high-quality papers written by authors from 24 countries were selected for publication.

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.

This proceedings volume comprises the latest achievements in research and development in educational robotics presented at the 9th International Conference on Robotics in Education (RiE) held in Qawra, St. Paul's Bay, Malta, during April 18-20, 2018. Researchers and educators will find valuable methodologies and tools for robotics in education that encourage learning in the fields of science, technology, engineering, arts and mathematics (STEAM) through the design, creation and programming of tangible artifacts for creating personally meaningful objects and addressing real-world societal needs. This also involves the introduction of technologies ranging from robotics platforms to programming environments and languages. Extensive evaluation results are presented that highlight the impact of robotics on the students' interests and competence development. The presented approaches cover the whole educative range from elementary school to the university level in both formal as well as informal settings.

The two-volume set LNAI 12468 and 12469 constitutes the proceedings of the 19th Mexican International Conference on Artificial Intelligence, MICAI 2020, held in Mexico City, Mexico, in October 2020. The total of 77 papers presented in these two volumes was carefully reviewed and selected from 186 submissions. The contributions are organized in topical as follows: Part I: machine and deep learning, evolutionary and metaheuristic algorithms, and soft computing. Part II: natural language processing, image processing and pattern recognition, and intelligent applications and robotics.

Medical and Service Robotics integrate the most recent achievements in mechanics, mechatronics, computer science, haptic and teleoperation devices together with adaptive control algorithms. The book includes topics such as surgery robotics, assist devices, rehabilitation technology, surgical instrumentation and Brain-Machine Interface (BMI) as examples for medical robotics. Autonomous cleaning, tending, logistics, surveying and rescue robots, and elderly and healthcare robots are typical examples of topics from service robotics. This is the Proceedings of the Third International Workshop on Medical and Service Robots, held in Lausanne, Switzerland in 2014. It presents an overview of current research directions and fields of interest. It is divided into three sections, namely 1) assistive and rehabilitation devices; 2) surgical robotics; and 3) educational and service robotics. Most contributions are strongly anchored on collaborations between technical and medical actors, engineers, surgeons and clinicians. Biomedical robotics and the rapidly growing service automation fields have clearly overtaken the "classical" industrial robotics and automatic control centered activity familiar to the older generation of roboticists.

This proceeding is a compilation of selected papers from the 8th International Workshop of Advanced Manufacturing and Automation (IWAMA 2018), held in Changzhou, China on September 25 - 26, 2018. Most of the topics are focusing on novel techniques for manufacturing and automation in Industry 4.0 and smart factory. These contributions are vital for maintaining and improving economic development and quality of life. The proceeding will assist academic researchers and industrial engineers to implement the concepts and theories of Industry 4.0 in industrial practice, in order to effectively respond to the challenges posed by the 4th industrial revolution and smart factory.

This book presents the proceedings of 24th International Conference Series on Climbing and Walking Robots. CLAWAR 2021 is the twenty-fourth edition of International Conference series on Climbing and Walking Robots and the Support Technologies for Mobile Machines. The conference is organized by CLAWAR Association in collaboration with Kwansei Gakuin University on a virtual platform in Takarazuka, Japan, during 30 August-1 September 2021. CLAWAR 2021 brings new developments and new research findings in robotics technologies within the framework of Robotics for Sustainable Future. The topics covered include biped locomotion, human-machine/human-robot interaction, innovative actuators, power supplies and design of CLAWAR, inspection, legged locomotion, modelling and simulation of CLAWAR, outdoor and field robotics, planning and control, and wearable devices and assistive robotics. The intended readership includes participants of CLAWAR 2021 conference, international robotic researchers, scientists, professors of related topics worldwide, and professors and students of postgraduate courses in Robotics and Automation, Control Engineering, Mechanical Engineering, and Mechatronics.