Frameslam From Bundle Adjustment To Realtime Visual Mappping

This book covers all aspects of robot intelligence from perception at sensor level and reasoning at cognitive level to behavior planning at execution level for each low level segment of the machine. It also presents the technologies for cognitive reasoning, social interaction with humans, behavior generation, ability to cooperate with other robots, ambience awareness, and an artificial genome that can be passed on to other robots. These technologies are to materialize cognitive intelligence, social intelligence, behavioral intelligence, collective intelligence, ambient intelligence and genetic intelligence. The book aims at serving researchers and practitioners with a timely dissemination of the recent progress on robot intelligence technology and its applications, based on a collection of papers presented at the 3rd International Conference on Robot Intelligence Technology and Applications (RiTA), held in Beijing, China, November 6 - 8, 2014. For better readability, this edition has the total 74 papers grouped into 3 chapters: Chapter I: Ambient, Behavioral, Cognitive, Collective, and Social Robot Intelligence, Chapter II: Computational Intelligence and Intelligent Design for Advanced Robotics, Chapter III: Applications of Robot Intelligence Technology, where individual chapters, edited respectively by Peter Sincak, Hyun Myung, Jun Jo along with Weimin Yang and Jong-Hwan Kim, begin with a brief introduction written by the respective chapter editors.

The interest in robotics has remarkably augmented over recent years. Novel solutions for complex and very diverse application fields (exploration/intervention in severe environments, assistive, social, personal services, emergency rescue operations, transportation, entertainment, unmanned aerial vehicles, medical, etc.), has been anticipated by means of a large progress in this area of robotics. Moreover, the amalgamation of original ideas and related innovations, the search for new potential applications and the use of state of the art supporting technologies permit to foresee an important step forward and a significant socio-economic impact of advanced robot technology in the forthcoming years. In response to the technical challenges in the development of these sophisticated machines, a significant research and development effort has yet to be undertaken. It concerns embedded technologies (for power sources, actuators, sensors, information systems), new design methods, adapted control techniques for highly redundant systems, as well as operational and decisional autonomy and human/robot co-existence. This book contains the proceedings of the ROBOT 2013: FIRST IBERIAN ROBOTICS CONFERENCE and it can be said that included both state of the art and more practical presentations dealing with implementation problems, support technologies and future applications. A growing interest in Assistive Robotics, Agricultural Robotics, Field Robotics, Grasping and Dexterous Manipulation, Humanoid Robots, Intelligent Systems and Robotics, Marine Robotics, has been demonstrated by the very relevant number of contributions. Moreover, ROBOT2013 incorporates a special session on Legal and Ethical Aspects in Robotics that is becoming a topic of key relevance. This Conference will be held in Madrid (28-29 November 2013), organised by the Sociedad Española para la Investigación y Desarrollo en Robótica (SEIDROB) and by the Centre for Automation and Robotics - CAR (Universidad Politécnica de Madrid (UPM) and Consejo Superior de Investigaciones Científicas (CSIC)), along with the co-operation of Grupo Temático de Robótica CEA-GTRob, Sociedade Portuguesa de Robotica (SPR), and Asociación Española de Promoción de la Investigación en Agentes Físicos (RedAF).

Incorporating papers from the 12th International Symposium on Experimental Robotics (ISER), December 2010, this book examines the latest advances across the various fields of robotics. Offers insights on both theoretical concepts and experimental results.

Presents a hands-on view of the field of multi-view stereo with a focus on practical algorithms. It frames the multiview stereo problem as an image/geometry consistency optimization problem and describesits main two ingredients: robust implementations of photometric consistency measures and efficient optimization algorithms.

Automatic Laser Calibration, Mapping, and Localization for Autonomous Vehicles

Zurich, Switzerland, September 6-7 and 12, 2014, Proceedings, Part I

Proceedings of the 15th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines, Baltimore, USA, 23-26 July, 2012

Robotics

Medical, Satellite and Video Processing Applications with Quality Metrics

Second International Conference, ICTCC 2016, Rach Gia, Vietnam, March 17-18, 2016, Revised Selected Papers

This book constitutes the refereed proceedings of the International Conference on Computer Vision and Graphics, ICCVG 2014, held in Warsaw, Poland, in September 2014. The 81 full papers presented were carefully reviewed and selected from various submissions. They cover various important aspects of computer vision and graphics.

The two volumes LNAI 11649 and 11650 constitute the refereed proceedings of the 20th Annual Conference "Towards Autonomous Robotics", TAROS 2019, held in London, UK, in July 2019. The 87 full papers and 12 short papers presented were carefully reviewed and selected from 101 submissions. The papers present and discuss significant findings and advances in autonomous robotics research and applications. They are organized in the following topical sections: robotic grippers and manipulation; soft robotics, sensing and mobile robots; robotic learning, mapping and planning; human-robot interaction; and robotic systems and applications.

The five-volume set LNCS 9003--9007 constitutes the thoroughly refereed post-conference proceedings of the 12th Asian Conference on Computer Vision, ACCV 2014, held in Singapore, Singapore, in November 2014. The total of 227 contributions presented in these volumes was carefully reviewed and selected from 814 submissions. The papers are organized in topical sections on recognition; 3D vision; low-level vision and features; segmentation; face and gesture, tracking; stereo, physics, video and events; and poster sessions 1-3.

Thomas Glotzbach spotlights that navigation within marine robotics can benefit from cooperative teams in a way that justifies the increased effort to operate several vehicles at once. He features discussions of different scenarios, modeling of systems, and estimation algorithms for comparable situations. The chapter on the used methodologies may allow a reader with only basic knowledge in control theory to obtain deeper insight in advanced concepts such as observability and state estimation, even without any background in marine robotics.

Advances in Future Computer and Control Systems

Navigation of Autonomous Marine Robots

Computer Vision – ACCV 2016

ROBOT2013: First Iberian Robotics Conference

Computer Vision

Nature of Computation and Communication

Pattern Recognition and Computer Vision

[FIRST EDITION] This accessible textbook presents an introduction to computer vision algorithms for industrially-relevant applications of X-ray testing. Features: introduces the mathematical background for monocular and multiple view geometry; describes the main techniques for image processing used in X-ray testing; presents a range of different representations for X-ray images, explaining how these enable new features to be extracted from the original image; examines a range of known X-ray image classifiers and classification strategies; discusses some basic concepts for the simulation of X-ray images and presents simple geometric and imaging models that can be used in the simulation; reviews a variety of applications for X-ray testing, from industrial inspection and baggage screening to the quality control of natural products; provides supporting material at an associated website, including a database of X-ray images and a Matlab toolbox for use with the book's many examples.

Smart Sensors and SystemsTechnology Advancement and Application DemonstrationsSpringer Nature

This book discusses various aspects of real-world applications of optimization algorithms, presenting insights from the 5th International Conference on Harmony Search, Soft Computing and Applications, held at Kunming, China on July 20–22, 2019. The book focuses on the recent advances in soft computing techniques such as harmony search, PSO and DE and their application to solve engineering problems. Presenting research on various real-world engineering problems concerning crowd evacuation strategies, adaptive learning systems, economic impact analysis, cyber-attack detection, urban drainage systems, water management models, feature selection and inventory systems, it is a valuable resource for researchers wanting a state-of-the-art overview of the latest advances in soft computing and related areas.

The International Symposium on Experimental Robotics (ISER) is a series of bi-annual meetings, which are organized, in a rotating fashion around North America, Europe and Asia/Oceania. The goal of ISER is to provide a forum for research in robotics that focuses on novelty of theoretical contributions validated by experimental results. The meetings are conceived to bring together, in a small group setting, researchers from around the world who are in the forefront of experimental robotics research. This unique reference presents the latest advances across the various fields of robotics, with ideas that are not only conceived conceptually but also explored experimentally. It collects robotics contributions on the current developments and new directions in the field of experimental robotics, which are based on the papers presented at the 13the ISER held in Québec City, Canada, at the Fairmont Le Château Frontenac, on June 18-21, 2012. This present thirteenth edition of Experimental Robotics edited by Jaydev P. Desai, Gregory Dudek, Oussama Khatib, and Vijay Kumar offers a collection of a broad range of topics in field and human-centered robotics.

Foundations and Practical Applications of Cognitive Systems and Information Processing

Results of the 8th International Conference

International Conference, ICCVG 2014, Warsaw, Poland, September 15-17, 2014, Proceedings

Probabilistic Robotics

Image, Video and 3D Data Registration

Man–Machine Interactions 4

10th International Symposium, ISVC 2014, Las Vegas, NV, USA, December 8-10, 2014, Proceedings, Part I

"Foundations and Practical Applications of Cognitive Systems and Information Processing" presents selected papers from the First International Conference on Cognitive Systems and Information Processing, held in Beijing, China on December 15-17, 2012 (CSIP2012). The aim of this conference is to bring together experts from different fields of expertise to discuss the state-of-the-art in artificial cognitive systems and advanced information processing, and to present new findings and perspectives on future development. This book introduces multidisciplinary perspectives on the subject areas of Cognitive Systems and Information Processing, including cognitive sciences and technology, autonomous vehicles, cognitive psychology, cognitive metrics, information fusion, image/video understanding, brain-computer interfaces, visual cognitive processing, neural computation, bioinformatics, etc. The book will be beneficial for both researchers and practitioners in the fields of Cognitive Science, Computer Science and Cognitive Engineering. Fuchun Sun and Huaping Liu are both professors at the Department of Computer Science & Technology, Tsinghua University, China. Dr. Dewen Hu is a professor at the College of Mechatronics and Automation, National University of Defense Technology, Changsha, China.

This book constitutes the post-conference proceedings of the Second International Conference on Nature of Computation and Communication, ICTCC 2016, held in March 2016 in Rach Gia, Vietnam. The 36 revised full papers presented were carefully reviewed and selected from over 100 submissions. The papers cover formal methods for self-adaptive systems and discuss natural approaches and techniques for computation and communication.

This three volume set, CCIS 771, 772, 773, constitutes the refereed proceedings of the CCF Chinese Conference on Computer Vision, CCCV 2017, held in Tianjin, China, in October 2017. The total of 174 revised full papers presented in three volumes were carefully reviewed and selected from 465 submissions. The papers are organized in the following topical sections: biological vision inspired visual method; biomedical image analysis; computer vision applications; deep neural network; face and posture analysis; image and video retrieval; image color and texture; image composition; image quality assessment and analysis; image restoration; image segmentation and classification; image-based modeling; object detection and classification; object identification; photography and video; robot vision; shape representation and matching; statistical methods and learning; video analysis and event recognition; visual salient detection.

This dissertation presents several related algorithms that enable important capabilities for self-driving

vehicles. Using a rotating multi-beam laser rangefinder to sense the world, our vehicle scans millions of 3D points every second. Calibrating these sensors plays a crucial role in accurate perception, but manual calibration is unreasonably tedious, and generally inaccurate. As an alternative, we present an unsupervised algorithm for automatically calibrating both the intrinsics and extrinsics of the laser unit from only seconds of driving in an arbitrary and unknown environment. We show that the results are not only vastly easier to obtain than traditional calibration techniques, they are also more accurate. A second key challenge in autonomous navigation is reliable localization in the face of uncertainty. Using our calibrated sensors, we obtain high resolution infrared reflectivity readings of the world. From these, we build large-scale self-consistent probabilistic laser maps of urban scenes, and show that we can reliably localize a vehicle against these maps to within centimeters, even in dynamic environments, by fusing noisy GPS and IMU readings with the laser in realtime. We also present a localization algorithm that was used in the DARPA Urban Challenge, which operated without a prerecorded laser map, and allowed our vehicle to complete the entire six-hour course without a single localization failure. Finally, we present a collection of algorithms for the mapping and detection of traffic lights in realtime. These methods use a combination of computer-vision techniques and probabilistic approaches to incorporating uncertainty in order to allow our vehicle to reliably ascertain the state of traffic-light-controlled intersections.

Advances in Visual Computing
4th International Conference, AVR 2017, Ugento, Italy, June 12-15, 2017, Proceedings, Part II
Monocular Pose and Shape Estimation of Moving Targets, for Autonomous Rendezvous and Docking
Science and Systems VIII
Smart Sensors and Systems
Handling Uncertainty and Networked Structure in Robot Control
Robotics Research
This book constitutes the refereed proceedings of the 12th Latin American Robotics Symposium and Third Brazilian Symposium on Robotics, LARS 2015 / SBR 2015, held in Uberlândia, Brazil, in October/November 2015. The 17 revised full papers presented were carefully reviewed and selected from 80 submissions. The selected papers present a complete and solid reference of the state-of-the-art of intelligent robotics and automation research, covering the following areas: autonomous mobile robots, tele-operated and telepresence robots, human-robot interaction, trajectory control for mobile robots, autonomous vehicles, service-oriented robotic systems, semantic mapping, environment mapping, visual odometry, applications of RGB-D sensors, humanoid and biped robots, Robocup soccer robots, robot control, path planning, multiple vehicles and teams of robots. /div
The 2-volume set LNCS 10324 and 10325 constitutes the refereed proceedings of the 4th International Conference on Augmented Reality, Virtual Reality, and Computer Graphics, AVR 2017, held in Ugento, Italy, in June 2017. The 54 full papers and 24 short papers presented were carefully reviewed and selected from 112 submissions. The papers are organized in the following topical sections: virtual reality; augmented and mixed reality; computer graphics; human-computer interaction; applications of VR/AR in medicine; and applications of VR/AR in cultural heritage.
The four-volume set LNCS 11056, 110257, 11258, and 11073 constitutes the refereed proceedings of the First Chinese Conference on Pattern Recognition and Computer Vision, PRCV 2018, held in Guangzhou, China, in November 2018. The 179 revised full papers presented were carefully reviewed and selected from 399 submissions. The papers have been organized in the following topical sections: Part I: Biometrics, Computer Vision Application. Part II: Deep Learning. Part III: Document Analysis, Face Recognition and Analysis, Feature Extraction and Selection, Machine Learning. Part IV: Object Detection and Tracking, Performance Evaluation and Database, Remote Sensing.
An introduction to the techniques and algorithms of the newest field in robotics. Probabilistic robotics is a new and growing area in robotics, concerned with perception and control in the face of uncertainty. Building on the field of mathematical statistics, probabilistic robotics endows robots with a new level of robustness in real-world situations. This book introduces the reader to a wealth of techniques and algorithms in the field. All algorithms are based on a single overarching mathematical foundation. Each chapter provides example implementations in pseudo code, detailed mathematical derivations, discussions from a practitioner's perspective, and extensive lists of exercises and class projects. The book's Web site, www.probabilistic-robotics.org, has additional material. The book is relevant for anyone involved in robotic software development and scientific research. It will also be of interest to applied statisticians and engineers dealing with real-world sensor data.
13th Asian Conference on Computer Vision, Taipei, Taiwan, November 20-24, 2016, Revised Selected Papers, Part IV
Advances in Harmony Search, Soft Computing and Applications
Multi-View Stereo
Volume 2
Advances in Robotics and Automatic Control: Reviews, Vol. 1
The 13th International Symposium on Experimental Robotics
New Geometric Data Structures for Collision Detection and Haptics

FSR, the International Conference on Field and Service Robotics, is the leading single track conference of robotics for field and service applications. This book presents the results of FSR2012, the eighth conference of Field and Service Robotics, which was originally planned for 2011 with the venue of Matsushima in Tohoku region of Japan. However, on March 11, 2011, a magnitude M9.0 earthquake occurred off the Pacific coast of Tohoku, and a large-scale disaster was caused by the Tsunami which resulted, therefore the conference was postponed by one year to July, 2012. In fact, this earthquake raised issues concerning the contribution of field and service robotics technology to emergency scenarios. A number of precious lessons were learned from operation of robots in the resulting, very real and challenging, disaster environments. Up-to-date study on disaster response, relief and recovery was then featured in the conference. This book offers 43 papers on a broad range of topics including: Disaster Response, Service/Entertainment Robots, Inspection/Maintenance Robots, Mobile Robot Navigation, Agricultural Robots, Robots for Excavation, Planetary Exploration, Large Area Mapping, SLAM for Outdoor Robots, and Elemental Technology for Mobile Robots.

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.

This book focuses on two challenges posed in robot control by the increasing adoption of robots in the everyday human environment: uncertainty and networked communication. Part I of the book describes learning control to address environmental uncertainty. Part II discusses state estimation, active sensing, and complex scenario perception to tackle sensing uncertainty. Part III completes the book with control of networked robots and multi-robot teams. Each chapter features in-depth technical coverage and case studies highlighting the applicability of the techniques, with real robots or in simulation. Platforms include mobile ground, aerial, and underwater robots, as well as humanoid robots and robot arms. Source code and experimental data are available at http://extras.springer.com. The text gathers contributions from academic and industry experts, and offers a valuable resource for researchers or graduate students in robot control and perception. It also benefits researchers in related areas, such as computer vision, nonlinear and learning control, and multi-agent systems. The fully automated estimation of the 6 degrees of freedom camera motion and the imaged 3D scenario using as the only input the pictures taken by the camera has been a long term aim in the computer vision community. The associated line of research has been known as Structure from Motion (SfM). An intense research effort during the latest decades has produced spectacular advances; the topic has reached a consistent state of maturity and most of its aspects are well known nowadays. 3D vision has immediate applications in many and diverse fields like robotics, videogames and augmented reality; and technological transfer is starting to be a reality. This book describes one of the first systems for sparse point-based 3D reconstruction and egomotion estimation from an image sequence; able to run in real-time at video frame rate and assuming quite weak prior knowledge about camera calibration, motion or scene. Its chapters unify the current perspectives of the robotics and computer vision communities on the 3D vision topic: As usual in robotics sensing, the explicit estimation and propagation of the uncertainty hold a central role in the sequential video processing and is shown to boost the efficiency and performance of the 3D estimation. On the other hand, some of the most relevant topics discussed in SfM by the computer vision scientists are addressed under this probabilistic filtering scheme; namely projective models, spurious rejection, model selection and self-calibration.

First Chinese Conference, PRCV 2018, Guangzhou, China, November 23-26, 2018, Proceedings, Part IV

7th National Conference, NCVPRIPG 2019, Hubballi, India, December 22–24, 2019, Revised Selected Papers

20th Annual Conference, TAROS 2019, London, UK, July 3–5, 2019, Proceedings, Part II

Towards Autonomous Robotic Systems

Simultaneous Localization and Mapping for Mobile Robots: Introduction and Methods

Computer Vision and Graphics

Imaging, Systems, Image Databases, and Algorithms

The four-volume set LNCS 8925, 8926, 8927, and 8928 comprises the refereed post-proceedings of the Workshops that took place in conjunction with the 13th European Conference on Computer Vision, ECCV 2014, held in Zurich, Switzerland, in September 2014. The 203 workshop papers were carefully reviewed and selected for inclusion in the proceedings. They were presented at workshops with the following themes: where computer vision meets art; computer vision in vehicle technology; spontaneous facial behavior analysis; consumer depth cameras for computer vision; "chalearn" looking at people: pose, recovery, action/interaction, gesture recognition; video event categorization, tagging and retrieval towards big data; computer vision with local binary pattern variants; visual object tracking challenge; computer vision + ontology applies cross-disciplinary technologies; visual perception of affordance and functional visual primitives for scene analysis; graphical models in computer vision; light fields for computer vision; computer vision for road scene understanding and autonomous driving; soft biometrics; transferring and adapting source knowledge in computer vision; surveillance and re-identification; color and photometry in computer vision; assistive computer vision and robotics; computer vision problems in plant phenotyping; and non-rigid shape analysis and deformable image alignment. Additionally, a panel discussion on video segmentation is included. .

This volume presents a collection of papers presented at the 15th International Symposium of Robotic Research (ISRR). ISRR is the biennial meeting of the International Foundation of Robotic Research (IFRR) and its 15th edition took place in Flagstaff, Arizona on December 9 to December 12, 2011. As for the previous symposia, ISRR 2011 followed up on the successful concept of a mixture of invited contributions and open submissions. Therefore approximately half of the 37 contributions were invited contributions from outstanding researchers selected by the IFRR officers and the program committee, and the other half were chosen among the open submissions after peer review. This selection process resulted in a truly excellent technical program which featured some of the very best of robotic research. The program was organized around oral presentation in a single-track format and included for the first time a small number of interactive presentations. The symposium contributions contained in this volume report on a variety of new robotics research results covering a broad spectrum including perception, manipulation, grasping, vehicles and design, navigation, control and integration, estimation and SLAM.

The five-volume set LNCS 10111-10115 constitutes the thoroughly refereed post-conference proceedings of the 13th Asian Conference on Computer Vision, ACCV 2016, held in Taipei, Taiwan, in November 2016. The total of 143 contributions presented in these volumes was carefully reviewed and selected from 479 submissions. The papers are organized in topical sections on Segmentation and Classification; Segmentation and Semantic Segmentation; Dictionary Learning, Retrieval, and Clustering; Deep Learning; People Tracking and Action Recognition; People and Actions; Faces; Computational Photography; Face and Gestures; Image Alignment; Computational Photography and Image Processing; Language and Video; 3D Computer Vision; Image Attributes, Language, and Recognition; Video Understanding; and 3D Vision.

This monograph introduces a unifying framework for mapping, planning and exploration with mobile robots considering uncertainty, linking such problems with a common SLAM approach, adopting Pose SLAM as the basic state estimation machinery. Pose SLAM is the variant of SLAM where only the robot trajectory is estimated and where landmarks are used to produce relative motion measurements between robot poses. With regards to extending the original Pose SLAM formulation, this monograph covers the study of such measurements when they are obtained with stereo cameras, develops the appropriate noise propagation models for such case, extends the Pose SLAM formulation to SE(3), introduces information-theoretic loop closure tests, and presents a technique to compute traversability maps from the 3D volumetric maps obtained with Pose SLAM. A relevant topic covered in this monograph is the introduction of a novel path planning approach that exploits the modeled uncertainties in Pose SLAM to search for the path in the pose graph that allows the robot to navigate to a given goal with the least probability of becoming lost. Another relevant topic is the introduction of an autonomous exploration method that selects the appropriate actions to drive the robot so as to maximize coverage, while minimizing localization and map uncertainties. This monograph is appropriate for readers interested in an information-theoretic unified perspective to the SLAM, path planning and exploration problems, and is a reference book for people who work in mobile robotics research in general.

Structure from Motion using the Extended Kalman Filter

Adaptive Mobile Robotics
Computer Vision -- ACCV 2014
Computer Vision - ECCV 2014 Workshops
Robot Intelligence Technology and Applications 3
Technology Advancement and Application Demonstrations
Second CCF Chinese Conference, CCCV 2017, Tianjin, China, October 11–14, 2017, Proceedings, Part III

This book describes for readers technology used for effective sensing of our physical world and intelligent processing techniques for sensed information, which are essential to the success of Internet of Things (IoTs). The authors provide a multidisciplinary view of sensor technology from materials, process, circuits, and big data domains and showcase smart sensor systems in real applications including smart home, transportation, medical, environmental, agricultural, etc. Unlike earlier books on sensors, this book will provide a "global" view on smart sensors covering abstraction levels from device, circuit, systems, and algorithms. Profiles active research on smart sensors based on CMOS microelectronics; Describes applications of sensors and sensor systems in cyber physical systems, the social information infrastructure in our modern world; Includes coverage of a variety of related information technologies supporting the application of sensors; Discusses the integration of computation, networking, actuation, databases, and various sensors, in order to embed smart sensor systems into actual social systems.

This book provides state-of-the-art scientific and engineering research findings and developments in the area of mobile robotics and associated support technologies. The book contains peer reviewed articles presented at the CLAWAR 2012 conference. Robots are no longer confined to industrial and manufacturing environments. A great deal of interest is invested in the use of robots outside the factory environment. The CLAWAR conference series, established as a high profile international event, acts as a platform for dissemination of research and development findings and supports such a trend to address the current interest in mobile robotics to meet the needs of mankind in various sectors of the society. These include personal care, public health, services in the domestic, public and industrial environments. The editors of the book have extensive research experience and publications in the area of robotics in general and in mobile robotics specifically, and their experience is reflected in editing the contents of the book.

Papers from a flagship conference reflect the latest developments in the field, including work in such rapidly advancing areas as human-robot interaction and formal methods. Robotics: Science and Systems VIII spans a wide spectrum of robotics, bringing together contributions from researchers working on the mathematical foundations of robotics, robotics applications, and analysis of robotics systems. This volume presents the proceedings of the eighth annual Robotics: Science and Systems (RSS) conference, held in July 2012 at the University of Sydney. The contributions reflect the exciting diversity of the field, presenting the best, the newest, and the most challenging work on such topics as mechanisms, kinematics, dynamics and control, human-robot interaction and human-centered systems, distributed systems, mobile systems and mobility, manipulation, field robotics, medical robotics, biological robotics, robot perception, and estimation and learning in robotic systems. The conference and its proceedings reflect not only the tremendous growth of robotics as a discipline but also the desire in the robotics community for a flagship event at which the best of the research in the field can be presented.

FCCS2012 is an integrated conference concentrating its focus on Future Computer and Control Systems. "Advances in Future Computer and Control Systems" presents the proceedings of the 2012 International Conference on Future Computer and Control Systems(FCCS2012) held April 21-22,2012, in Changsha, China including recent research results on Future Computer and Control Systems of researchers from all around the world.

12th Asian Conference on Computer Vision, Singapore, Singapore, November 1-5, 2014, Revised Selected Papers, Part II

Novel Approaches Using Cooperating Teams

Augmented Reality, Virtual Reality, and Computer Graphics

Results from the 3rd International Conference on Robot Intelligence Technology and Applications

Proceedings of the First International Conference on Cognitive Systems and Information Processing, Beijing, China, Dec 2012 (CSIP2012)

4th International Conference on Man– Machine Interactions, ICMMI 2015 Kocierz Pass, Poland, October 6– 9, 2015

Field and Service Robotics

This book provides an overview of the current state of research on development and application of methods, algorithms, tools and systems associated with the studies on man-machine interaction. Modern machines and computer systems are designed not only to process information, but also to work in dynamic environment, supporting or even replacing human activities in areas such as business, industry, medicine or military. The interdisciplinary field of research on man-machine interactions focuses on broad range of aspects related to the ways in which human make or use computational artifacts, systems and infrastructure. This monograph is the fourth edition in the series and presents new concepts concerning analysis, design and evaluation of man-machine systems. The selection of high-quality, original papers covers a wide scope of research topics focused on the main problems and challenges encountered within rapidly evolving new forms of human-machine relationships. The presented material is structured into following sections: human-computer interfaces, robot, control, embedded and navigation systems, bio-data analysis and mining, biomedical signal processing, image and motion data processing, decision support and expert systems, pattern recognition, fuzzy systems, algorithms and optimisation, computer networks and mobile technologies, and data management systems.

This thesis describes the design and implementation of an algorithm for tracking a moving (e.g., `tumbling') target. No a priori information about the target is assumed, and only a single camera is used. The motivation is to enable autonomous rendezvous, inspection, and docking by robots in remote environments, such as space and underwater. Tracking refers to the simultaneous estimation of both the target's 6DOF pose and 3D shape (in the form of a point cloud of recognizable features), a problem of the SLAM (`Simultaneous Localization and Mapping') and SFM (`Structure from Motion') research fields. This research extends SLAM/SFM to deal with non-communicative moving targets (rigid bodies) with unknown, arbitrary 6DOF motion and no a priori knowledge of mass properties, dynamics, shape, or appearance. Specifically, a hybrid algorithm for real-time frame-to-frame pose estimation and shape reconstruction is presented. The algorithm combines concepts from two existing approaches to pose tracking, Bayesian estimation methods and nonlinear optimization techniques, to achieve a real-time capable, feasible, smooth estimate of the relative pose between a robotic platform and a moving target. The rationale for a hybrid approach is explained, and an algorithm is presented. A specific implementation using a modified Rao-Blackwellized

particle filter is described and tested. Field demonstrations were performed in conjunction with the Monterey Bay Aquarium Research Institute, using the camera-equipped Remotely Operated Vehicle (ROV) Ventana to observe, reconstruct, and track the pose of an underwater tethered target in Monterey Bay. Results are included which demonstrate the performance and viability of the hybrid approach.

Papers from a flagship robotics conference that cover topics ranging from kinematics to human-robot interaction and robot perception. Robotics: Science and Systems VI spans a wide spectrum of robotics, bringing together researchers working on the foundations of robotics, robotics applications, and the analysis of robotics systems. This volume presents the proceedings of the sixth Robotics: Science and Systems conference, held in 2010 at the University of Zaragoza, Spain. The papers presented cover a wide range of topics in robotics, spanning mechanisms, kinematics, dynamics and control, human-robot interaction and human-centered systems, distributed systems, mobile systems and mobility, manipulation, field robotics, medical robotics, biological robotics, robot perception, and estimation and learning in robotic systems. The conference and its proceedings reflect not only the tremendous growth of robotics as a discipline but also the desire in the robotics community for a flagship event at which the best of the research in the field can be presented.

The two volume set LNCS 8887 and 8888 constitutes the refereed proceedings of the 10th International Symposium on Visual Computing, ISVC 2014, held in Las Vegas, NV, USA. The 74 revised full papers and 55 poster papers presented together with 39 special track papers were carefully reviewed and selected from more than 280 submissions. The papers are organized in topical sections: Part I (LNCS 8887) comprises computational bioimaging, computer graphics; motion, tracking, feature extraction and matching, segmentation, visualization, mapping, modeling and surface reconstruction, unmanned autonomous systems, medical imaging, tracking for human activity monitoring, intelligent transportation systems, visual perception and robotic systems. Part II (LNCS 8888) comprises topics such as computational bioimaging , recognition, computer vision, applications, face processing and recognition, virtual reality, and the poster sessions.

Computer Vision for X-Ray Testing

The 12th International Symposium on Experimental Robotics

Experimental Robotics

A Tutorial

Computer Vision, Pattern Recognition, Image Processing, and Graphics

Science and Systems VI

Advances in Robotics, Vol.2

Data registration refers to a series of techniques for matching or bringing similar objects or datasets together into alignment. These techniques enjoy widespread use in a diverse variety of applications, such as video coding, tracking, object and face detection and recognition, surveillance and satellite imaging, medical image analysis and structure from motion. Registration methods are as numerous as their manifold uses, from pixel level and block or feature based methods to Fourier domain methods. This book is focused on providing algorithms and image and video techniques for registration and quality performance metrics. The authors provide various assessment metrics for measuring registration quality alongside analyses of registration techniques, introducing and explaining both familiar and state-of-the-art registration methodologies used in a variety of targeted applications. Key features: Provides a state-of-the-art review of image and video registration techniques, allowing readers to develop an understanding of how well the techniques perform by using specific quality assessment criteria Addresses a range of applications from familiar image and video processing domains to satellite and medical imaging among others, enabling readers to discover novel methodologies with utility in their own research Discusses quality evaluation metrics for each application domain with an interdisciplinary approach from different research perspectives

This book constitutes the refereed proceedings of the 7th National Conference on Computer Vision, Pattern Recognition, Image Processing, and Graphics, NCVPRIPG 2019, held in Hubballi, India, in December 2019. The 55 revised full papers 3 short papers presented in this volume were carefully reviewed and selected from 210 submissions. The papers are organized in topical sections on vision and geometry, learning and vision, image processing and document analysis, detection and recognition.

Starting with novel algorithms for optimally updating bounding volume hierarchies of objects undergoing arbitrary deformations, the author presents a new data structure that allows, for the first time, the computation of the penetration volume. The penetration volume is related to the water displacement of the overlapping region, and thus corresponds to a physically motivated and continuous force. The practicability of the approaches used is shown by realizing new applications in the field of robotics and haptics, including a user study that evaluates the influence of the degrees of freedom in complex haptic interactions. New Geometric Data Structures for Collision Detection and Haptics closes by proposing an open source benchmarking suite that evaluates both the performance and the quality of the collision response in order to guarantee a fair comparison of different collision detection algorithms. Required in the fields of computer graphics, physically-based simulations, computer animations, robotics and haptics, collision detection is a fundamental problem that arises every time we interact with virtual objects. Some of the open challenges associated with collision detection include the handling of deformable objects, the stable computation of physically-plausible contact information, and the extremely high frequencies that are required for haptic rendering. New Geometric Data Structures for Collision Detection and Haptics presents new solutions to all of these challenges, and will prove to be a valuable resource for researchers and practitioners of collision detection in the haptics, robotics and computer graphics and animation domains.

The 15th International Symposium ISRR

Mapping, Planning and Exploration with Pose SLAM

12th Latin American Robotics Symposium and Third Brazilian Symposium on Robotics, LARS 2015/SBR 2015, Uberlândia, Brazil, October 28 - November 1, 2015, Revised Selected Papers

Introduction and Methods