

Extended Kalman Filter Based Methods For Pose Estimation

Thank you very much for reading **Extended Kalman Filter Based Methods For Pose Estimation** . Maybe you have knowledge that, people have look numerous times for their favorite readings like this Extended Kalman Filter Based Methods For Pose Estimation , but end up in infectious downloads. Rather than reading a good book with a cup of coffee in the afternoon, instead they are facing with some harmful bugs inside their computer.

Extended Kalman Filter Based Methods For Pose Estimation is available in our digital library an online access to it is set as public so you can get it instantly.

Our book servers saves in multiple countries, allowing you to get the most less latency time to download any of our books like this one.

Merely said, the Extended Kalman Filter Based Methods For Pose Estimation is universally compatible with any devices to read

Nanoelectronic Materials, Devices and Modeling - Qiliang Li 2019-07-15

As CMOS scaling is approaching the fundamental physical limits, a wide range of new nanoelectronic materials and devices have been proposed and explored to extend and/or replace the current electronic devices and circuits so as to maintain progress with respect to speed and integration density. The major limitations, including low carrier mobility, degraded subthreshold slope, and heat dissipation, have become more challenging to address as the size of silicon-based metal oxide semiconductor field effect transistors (MOSFETs) has decreased to nanometers, while device integration density has increased. This book aims to present technical approaches that address the need for new nanoelectronic materials and devices. The focus is on new concepts and knowledge in nanoscience and nanotechnology for applications in logic, memory, sensors, photonics, and renewable energy. This research on nanoelectronic materials and

devices will be instructive in finding solutions to address the challenges of current electronics in switching speed, power consumption, and heat dissipation and will be of great interest to academic society and the industry.

Depth Map and 3D Imaging Applications: Algorithms and Technologies - Malik, Aamir Saeed 2011-11-30

Over the last decade, significant progress has been made in 3D imaging research. As a result, 3D imaging methods and techniques are being employed for various applications, including 3D television, intelligent robotics, medical imaging, and stereovision. *Depth Map and 3D Imaging Applications: Algorithms and Technologies* present various 3D algorithms developed in the recent years and to investigate the application of 3D methods in various domains. Containing five sections, this book offers perspectives on 3D imaging algorithms, 3D shape recovery, stereoscopic vision and autostereoscopic vision, 3D vision

for robotic applications, and 3D imaging applications. This book is an important resource for professionals, scientists, researchers, academics, and software engineers in image/video processing and computer vision.

RiTA 2020 - Eysin Chew 2021-09-05

This book gathers the Proceedings of the 8th International Conference on Robot Intelligence Technology and Applications (RITA 2020). The areas covered include: Instrumentation and Control, Automation, Autonomous Systems, Biomechatronics and Rehabilitation Engineering, Intelligent Systems, Machine Learning, Mobile Robotics, Social Robotics and Humanoid Robotics, Sensors and Actuators, and Machine Vision, as well as Signal and Image Processing. As a valuable asset, the book offers researchers and practitioners a timely overview of the latest advances in robot intelligence technology and its applications.

Novel Design and Applications of Robotics Technologies - Zhang, Dan 2018-09-14

Through expanded intelligence, the use of robotics has fundamentally transformed a variety of fields, including manufacturing, aerospace, medical, social services, and agriculture. Providing successful techniques in robotic design allows for increased autonomous mobility, which leads to a greater productivity level. *Novel Design and Applications of Robotics Technologies* provides innovative insights into the state-of-the-art technologies in the design and development of robotic technologies and their real-world applications. The content within this publication represents the work of interactive learning, microrobot swarms, and service robots. It is a vital reference source for computer engineers, robotic developers, IT professionals, academicians, and

researchers seeking coverage on topics centered on the application of robotics to perform tasks in various disciplines.

Signal and Image Processing for Biometrics - Amine Nait-Ali 2012-12-17

The aim of this book is to deal with biometrics in terms of signal and image processing methods and algorithms. This will help engineers and students working in digital signal and image processing deal with the implementation of such specific algorithms. It discusses numerous signal and image processing techniques that are very often used in biometric applications. In particular, algorithms related to hand feature extraction, speech recognition, 2D/3D face biometrics, video surveillance and other interesting approaches are presented. Moreover, in some chapters, Matlab codes are provided so that readers can easily reproduce some basic simulation results. This book is suitable for final-year undergraduate students, postgraduate students, engineers and researchers in the field of computer engineering and applied digital signal and image processing. 1. Introduction to Biometrics, Bernadette Dorizzi. 2. Introduction to 2D Face Recognition, Amine Nait-Ali and Dalila Cherifi. 3. Facial Soft Biometrics for Person Recognition, Antitza Dantcheva, Christelle Yemdji, Petros Elia and Jean-Luc Dugelay. 4. Modeling, Reconstruction and Tracking for Face Recognition, Catherine Herold, Vincent Despiegel, Stéphane Gentric, Séverine Dubuisson and Isabelle Bloch. 5. 3D Face Recognition, Mohsen Ardabilian, Przemyslaw Szeptycki, Di Huang and Liming Chen. 6. Introduction to Iris Biometrics, Kamel Aloui, Amine Nait-Ali, Régis Fournier and Saber Naceur. 7. Voice Biometrics: Speaker Verification and

Identification, Foezur Chowdhury, Sid-Ahmed Selouani and Douglas O'Shaughnessy. 8. Introduction to Hand Biometrics, Régis Fournier and Amine Nait-Ali. 9. Multibiometrics, Romain Giot, Baptiste Hemery, Estelle Cherrier and Christophe Rosenberger. 10. Hidden Biometrics, Amine Nait-Ali, Régis Fournier, Kamel Aloui and Nouredine Belgacem. 11. Performance Evaluation of Biometric Systems, Mohamad El-Abed, Romain Giot, Baptiste Hemery, Julien Mahier and Christophe Rosenberger. 12. Classification Techniques for Biometrics, Amel Bouchemha, Chérif Nait-Hamoud, Amine Nait-Ali and Régis Fournier. 13. Data Cryptography, Islam Naveed and William Puech. 14. Visual Data Protection, Islam Naveed and William Puech. 15. Biometrics in Forensics, Guillaume Galou and Christophe Lambert.

Advances in Guidance, Navigation and Control - Liang Yan 2021-11-12

This book features the latest theoretical results and techniques in the field of guidance, navigation, and control (GNC) of vehicles and aircraft. It covers a range of topics, including, but not limited to, intelligent computing communication and control; new methods of navigation, estimation, and tracking; control of multiple moving objects; manned and autonomous unmanned systems; guidance, navigation, and control of miniature aircraft; and sensor systems for guidance, navigation, and control. Presenting recent advances in the form of illustrations, tables, and text, it also provides detailed information of a number of the studies, to offer readers insights for their own research. In addition, the book addresses fundamental concepts and studies in the development of GNC, making it a valuable resource for both beginners and researchers wanting to further

their understanding of guidance, navigation, and control.

AI, sensors and robotics in plant phenotyping and precision agriculture - Yongliang Qiao 2022-12-27

Proceedings of the 12th International Conference on Computer Engineering and Networks - Qi Liu 2022-10-19

This conference proceeding is a collection of the papers accepted by the CENet2022 – the 12th International Conference on Computer Engineering and Networks held on November 4-7, 2022 in Haikou, China. The topics focus but are not limited to Internet of Things and Smart Systems, Artificial Intelligence and Applications, Communication System Detection, Analysis and Application, and Medical Engineering and Information Systems. Each part can be used as an excellent reference by industry practitioners, university faculties, research fellows and undergraduates as well as graduate students who need to build a knowledge base of the most current advances and state-of-practice in the topics covered by this conference proceedings. This will enable them to produce, maintain, and manage systems with high levels of trustworthiness and complexity.

Augmented Environments for Computer-Assisted Interventions - Cristian A Linte 2015-10-06

This book constitutes the refereed proceedings of the 10th International Workshop on Augmented Environments for Computer-Assisted Interventions, held in conjunction with MICCAI 2015, in Munich, Germany in October 2015. The 15 revised full papers presented were carefully reviewed and selected from 21 submissions. The objective of the AE-CAI workshop was to attract scientific contributions that offer solutions to the technical problems in the area of augmented and virtual environments for computer-assisted

interventions, and to provide a venue for dissemination of papers describing both complete systems and clinical applications.

Pattern Recognition. ICPR International Workshops and Challenges - Alberto Del Bimbo
2021-02-20

This 8-volumes set constitutes the refereed of the 25th International Conference on Pattern Recognition Workshops, ICPR 2020, held virtually in Milan, Italy and rescheduled to January 10 - 11, 2021 due to Covid-19 pandemic. The 416 full papers presented in these 8 volumes were carefully reviewed and selected from about 700 submissions. The 46 workshops cover a wide range of areas including machine learning, pattern analysis, healthcare, human behavior, environment, surveillance, forensics and biometrics, robotics and egovision, cultural heritage and document analysis, retrieval, and women at ICPR2020.

Lyapunov-Based Control of Robotic Systems - Aman Behal 2009-12-17

Lyapunov-Based Control of Robotic Systems describes nonlinear control design solutions for problems that arise from robots required to interact with and manipulate their environments. Since most practical scenarios require the design of nonlinear controllers to work around uncertainty and measurement-related issues, the authors use Lyapunov's direct method as an effective tool to design and analyze controllers for robotic systems. After describing the evolution of real-time control design systems and the associated operating environments and hardware platforms, the book presents a host of standard control design tools for robotic systems using a common Lyapunov-based framework. It then discusses several problems in visual servoing control, including the design of homography-based visual servo control methods

and the classic structure from motion problem. The book also deals with the issues of path planning and control for manipulator arms and wheeled mobile robots. With a focus on the emerging research area of human machine interaction, the final chapter illustrates the design of control schemes based on passivity such that the machine is a net energy sink. Including much of the authors' own research work in controls and robotics, this book facilitates an understanding of the application of Lyapunov-based control design techniques to up-and-coming problems in robotics.

Face Geometry and Appearance Modeling - Zicheng Liu 2011-04-18

Human faces are familiar to our visual systems. We easily recognize a person's face in arbitrary lighting conditions and in a variety of poses; detect small appearance changes; and notice subtle expression details. Can computer vision systems process face images as well as human vision systems can? Face image processing has potential applications in surveillance, image and video search, social networking and other domains. A comprehensive guide to this fascinating topic, this book provides a systematic description of modeling face geometry and appearance from images, including information on mathematical tools, physical concepts, image processing and computer vision techniques, and concrete prototype systems. The book will be an excellent reference for researchers and graduate students in computer vision, computer graphics and multimedia, as well as application developers who would like to gain a better understanding of the state of the art.

Switchable Constraints for Robust Simultaneous Localization and Mapping and Satellite-Based Localization - Niko Sünderhauf 2023-04-07

Simultaneous Localization and Mapping (SLAM) has been a long-standing research problem in robotics. It describes the problem of a robot mapping an unknown environment, while simultaneously localizing in it with the help of the incomplete map. This book describes a technique called Switchable Constraints. Switchable Constraints help to increase the robustness of SLAM against data association errors and in particular against false positive loop closure detections. Such false positive loop closure detections can occur when the robot erroneously assumes it re-observed a landmark it has already mapped or when the appearance of the observed surroundings is very similar to the appearance of other places in the map. Ambiguous observations and appearances are very common in human-made environments such as office floors or suburban streets, making robustness against spurious observations a key challenge in SLAM. The book summarizes the foundations of factor graph-based SLAM techniques. It explains the problem of data association errors before introducing the novel idea of Switchable Constraints. We present a mathematical derivation and probabilistic interpretation of Switchable Constraints along with evaluations on different datasets. The book shows that Switchable Constraints are applicable beyond SLAM problems and demonstrates the efficacy of this technique to improve the quality of satellite-based localization in urban environments, where multipath and non-line-of-sight situations are common error sources.

Distributed Space Missions for Earth System Monitoring - Marco D'Errico 2012-09-13

This title analyzes distributed Earth observation missions from different perspectives. In particular, the issues arising when the payloads are

distributed on different satellites are considered from both the theoretical and practical points of view. Moreover, the problems of designing, measuring, and controlling relative trajectories are thoroughly presented in relation to theory and applicable technologies. Then, the technological challenges to design satellites able to support such missions are tackled. An ample and detailed description of missions and studies complements the book subject.

Technological Innovation for Cyber-Physical Systems - Luis M. Camarinha-Matos 2016-03-24

This book constitutes the refereed proceedings of the 7th IFIP WG 5.5/SOCOLNET Advanced Doctoral Conference on Computing, Electrical and Industrial Systems, DoCEIS 2016, held in Costa de Caparica, Portugal, in April 2016. The 53 revised full papers were carefully reviewed and selected from 112 submissions. The papers present selected results produced in engineering doctoral programs and focus on research, development, and application of cyber-physical systems. Research results and ongoing work are presented, illustrated and discussed in the following areas: enterprise collaborative networks; ontologies; Petri nets; manufacturing systems; biomedical applications; intelligent environments; control and fault tolerance; optimization and decision support; wireless technologies; energy: smart grids, renewables, management, and optimization; bio-energy; and electronics.

Robotics Diploma and Engineering Interview Questions and Answers: Exploring Robotics - Chetan Singh 2023-05-20

"Robotics Diploma and Engineering Interview Questions and Answers: Exploring Robotics" is an extensive guide designed to help individuals navigate the competitive world of

robotics interviews. Whether you are a fresh graduate, an experienced professional, or an aspiring robotics engineer, this robotics book equips you with the knowledge and confidence to ace your interviews. Structured as a question-and-answer format, this book covers a wide range of topics relevant to robotics diploma and engineering interviews. It begins with an overview of the fundamentals, including the history, evolution, and importance of robotics, ensuring you have a solid foundation before diving into the interview-specific content. Delve into various technical areas of robotics, such as mechanical engineering, electrical and electronic engineering, computer science and programming, control and automation, sensing and perception, and more. Each section presents commonly asked interview questions along with detailed, extended answers, ensuring you are well-prepared to showcase your expertise and problem-solving skills. Explore mechanical engineering for robotics, including the components, kinematics, dynamics, and structures that form the backbone of robotic systems. Gain insights into actuators and motors, their applications, and how they enable precise and controlled robot movements. Dive into electrical and electronic engineering specific to robotics, understanding the role of sensors and transducers in capturing environmental data and enabling robot interaction. Learn about electronics, circuit analysis, control systems, and power systems tailored for robotic applications. Uncover the essentials of computer science and programming in the context of robotics. Discover the programming languages commonly used in robotics, understand algorithms and data structures optimized for efficient robot behaviors, and explore the fields of perception and computer

vision, machine learning, and artificial intelligence as they apply to robotics. Master control and automation in robotics, including feedback control systems, the PID control algorithm, various control architectures, trajectory planning, motion control, and techniques for robot localization and mapping. Develop a deep understanding of robot sensing and perception, covering environmental sensing, object detection and recognition, localization and mapping techniques, simultaneous localization and mapping (SLAM), and the critical aspects of human-robot interaction and perception. Furthermore, this book provides valuable guidance on robot programming and simulation, including programming languages specific to robotics, the Robot Operating System (ROS), robot simulation tools, and best practices for software development in the robotics field. The final sections of the robotics engineering book explore the design and development process for robotics, safety considerations, and emerging trends in the industry. Gain insights into the future of robotics and engineering, the integration of robotics in Industry 4.0, and the ethical and social implications of these advancements. "Robotics Diploma and Engineering Interview Questions and Answers: Exploring Robotics" is your ultimate resource to prepare for robotics interviews, offering a complete collection of interview questions and in-depth answers. Arm yourself with the knowledge and confidence needed to succeed in landing your dream job in the dynamic and rapidly evolving field of robotics.

Progress in Optomechatronic Technologies - Amalia Martínez-García
2019-10-11

This book gathers high-quality papers presented at the International

Symposium on Optomechatronic Technology (ISOT 2018), which was organized by the International Society for Optomechatronics (ISOM) and Centro de Investigaciones en Óptica (CIO) in Cancun, Mexico on November 5–8, 2018. The respective papers address the evolution of optomechatronic devices and systems, and their implementation in problem-solving and various other applications. Moreover, they cover a broad range of topics at the interface of optical, mechanical and electrical technologies and methods.

Advances in Swarm Intelligence - Ying Tan 2021-07-07

This two-volume set LNCS 12689-12690 constitutes the refereed proceedings of the 12th International Conference on Advances in Swarm Intelligence, ICSI 2021, held in Qingdao, China, in July 2021. The 104 full papers presented in this volume were carefully reviewed and selected from 177 submissions. They cover topics such as: Swarm Intelligence and Nature-Inspired Computing; Swarm-based Computing Algorithms for Optimization; Particle Swarm Optimization; Ant Colony Optimization; Differential Evolution; Genetic Algorithm and Evolutionary Computation; Fireworks Algorithms; Brain Storm Optimization Algorithm; Bacterial Foraging Optimization Algorithm; DNA Computing Methods; Multi-Objective Optimization; Swarm Robotics and Multi-Agent System; UAV Cooperation and Control; Machine Learning; Data Mining; and Other Applications.

Environmental Perception Technology for Unmanned Systems - Xin Bi 2020-09-30

This book focuses on the principles and technology of environmental perception in unmanned systems. With the rapid development of a new generation of information technologies such as automatic

control and information perception, a new generation of robots and unmanned systems will also take on new importance. This book first reviews the development of autonomous systems and subsequently introduces readers to the technical characteristics and main technologies of the sensor. Lastly, it addresses aspects including autonomous path planning, intelligent perception and autonomous control technology under uncertain conditions. For the first time, the book systematically introduces the core technology of autonomous system information perception.

Structure from Motion using the Extended Kalman Filter - Javier Civera 2011-11-09

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.

Pose and Motion Estimation Using Dual Quaternion-Based Extended Kalman Filtering - 1998

A solution to the remote three-dimensional (3-D) measurement problem is presented for a dynamic system given a sequence of two-dimensional (2-D) intensity images of a moving object. The 3-D transformation is modeled as a nonlinear stochastic system with the state estimate providing the six-degree-of-freedom motion and position values as well as structure. The stochastic model uses the iterated extended Kalman filter (IEKF) as a nonlinear estimator and a screw representation of the 3-D transformation based on dual quaternions. Dual quaternions, whose elements are dual numbers, provide a means to represent both rotation and translation in a unified notation. Linear object features, represented as dual vectors, are transformed using the dual quaternion transformation and are then projected to linear features in the image plane. The method has been implemented and tested with both simulated and actual experimental data. Simulation results are provided, along with comparisons to a point-based IEKF method using rotation and translation, to show the relative advantages of this method. Experimental results from testing using a camera mounted on the end effector of a robot arm are also given.

Human-Robot Interaction - Daisuke

Chugo 2010-02-01

Human-robot interaction (HRI) is the study of interactions between people (users) and robots. HRI is multidisciplinary with contributions from the fields of human-computer interaction, artificial intelligence, robotics, speech recognition, and social sciences (psychology, cognitive science, anthropology, and human factors). There has been a great deal of work done in the area of human-robot interaction to understand how a human interacts with a computer. However, there has been very little work done in understanding how people interact with robots. For robots becoming our friends, these studies will be required more and more.

Intelligent Robotics and Applications

- Haibin Yu 2019-08-01

The volume set LNAI 11740 until LNAI 11745 constitutes the proceedings of the 12th International Conference on Intelligent Robotics and Applications, ICIRA 2019, held in Shenyang, China, in August 2019. The total of 378 full and 25 short papers presented in these proceedings was carefully reviewed and selected from 522 submissions. The papers are organized in topical sections as follows: Part I: collective and social robots; human biomechanics and human-centered robotics; robotics for cell manipulation and characterization; field robots; compliant mechanisms; robotic grasping and manipulation with incomplete information and strong disturbance; human-centered robotics; development of high-performance joint drive for robots; modular robots and other mechatronic systems; compliant manipulation learning and control for lightweight robot. Part II: power-assisted system and control; bio-inspired wall climbing robot; underwater acoustic and optical signal processing for environmental

cognition; piezoelectric actuators and micro-nano manipulations; robot vision and scene understanding; visual and motional learning in robotics; signal processing and underwater bionic robots; soft locomotion robot; teleoperation robot; autonomous control of unmanned aircraft systems. Part III: marine bio-inspired robotics and soft robotics: materials, mechanisms, modelling, and control; robot intelligence technologies and system integration; continuum mechanisms and robots; unmanned underwater vehicles; intelligent robots for environment detection or fine manipulation; parallel robotics; human-robot collaboration; swarm intelligence and multi-robot cooperation; adaptive and learning control system; wearable and assistive devices and robots for healthcare; nonlinear systems and control. Part IV: swarm intelligence unmanned system; computational intelligence inspired robot navigation and SLAM; fuzzy modelling for automation, control, and robotics; development of ultra-thin-film, flexible sensors, and tactile sensation; robotic technology for deep space exploration; wearable sensing based limb motor function rehabilitation; pattern recognition and machine learning; navigation/localization. Part V: robot legged locomotion; advanced measurement and machine vision system; man-machine interactions; fault detection, testing and diagnosis; estimation and identification; mobile robots and intelligent autonomous systems; robotic vision, recognition and reconstruction; robot mechanism and design. Part VI: robot motion analysis and planning; robot design, development and control; medical robot; robot intelligence, learning and linguistics; motion control; computer integrated manufacturing;

robot cooperation; virtual and augmented reality; education in mechatronics engineering; robotic drilling and sampling technology; automotive systems; mechatronics in energy systems; human-robot interaction.

Robot Systems for Rail Transit

Applications - Hui Liu 2020-06-27

Robot Systems for Rail Transit Applications presents the latest advances in robotics and artificial intelligence for railway systems, giving foundational principles and running through special problems in robot systems for rail transit. State-of-the art research in robotics and railway systems is presented alongside a series of real-world examples. Eight chapters give definitions and characteristics of rail transit robot systems, describe assembly and collaborative robots in manufacturing, introduce automated guided vehicles and autonomous rail rapid transit, demonstrate inspection robots, cover trench robots, and explain unmanned aerial vehicles. This book offers an integrated and highly-practical way to approach robotics and artificial intelligence in rail-transit. Introduces robot and artificial intelligence (AI) systems for rail transit applications Presents research alongside step-by-step coverage of real-world cases Gives the theoretical foundations underlying practical application Offers solutions for high-speed railways from the latest work in robotics Shows how robotics and AI systems afford new and efficient methods in rail transit

Proceedings of 2019 Chinese Intelligent Automation Conference - Zhidong Deng 2019-09-07

The proceedings present selected research papers from the CIAC2019, held in Jiangsu, China on September 20-22, 2019. It covers a wide range of topics including intelligent

control, robotics, artificial intelligence, pattern recognition, unmanned systems, IoT and machine learning. It includes original research and the latest advances in the field of intelligent automation. Engineers and researchers from academia, industry, and government can gain valuable insights into solutions combining ideas from multiple disciplines in this field.

Wearable Sensors and Robots - Canjun Yang 2016-09-30

These proceedings present the latest information on regulations and standards for medical and non-medical devices, including wearable robots for gait training and support, design of exoskeletons for the elderly, innovations in assistive robotics, and analysis of human-machine interactions taking into account ergonomic considerations. The rapid development of key mechatronics technologies in recent years has shown that human living standards have significantly improved, and the International Conference on Wearable Sensor and Robot was held in Hangzhou, China from October 16 to 18, 2015, to present research mainly focused on personal-care robots and medical devices. The aim of the conference was to bring together academics, researchers, engineers and students from across the world to discuss state-of-the-art technologies related to various aspects of wearable sensors and robots.

Intelligent Computing Methodologies - De-Shuang Huang 2020-10-15

This two-volume set of LNCS 12463 and LNCS 12464 constitutes - in conjunction with the volume LNAI 12465 - the refereed proceedings of the 16th International Conference on Intelligent Computing, ICIC 2020, held in Bari, Italy, in October 2020. The 162 full papers of the three proceedings volumes were carefully reviewed and selected from 457

submissions. The ICIC theme unifies the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. The theme for this conference is "Advanced Intelligent Computing Methodologies and Applications." Papers related to this theme are especially solicited, addressing theories, methodologies, and applications in science and technology.

On Pose Estimation in Room-Scaled Environments - Hanna E. Nyqvist 2016-11-22

Pose (position and orientation) tracking in room-scaled environments is an enabling technique for many applications. Today, virtual reality (vr) and augmented reality (ar) are two examples of such applications, receiving high interest both from the public and the research community. Accurate pose tracking of the vr or ar equipment, often a camera or a headset, or of different body parts is crucial to trick the human brain and make the virtual experience realistic. Pose tracking in room-scaled environments is also needed for reference tracking and metrology. This thesis focuses on an application to metrology. In this application, photometric models of a photo studio are needed to perform realistic scene reconstruction and image synthesis. Pose tracking of a dedicated sensor enables creation of these photometric models. The demands on the tracking system used in this application is high. It must be able to provide sub-centimeter and sub-degree accuracy and at same time be easy to move and install in new photo studios. The focus of this thesis is to investigate and develop methods for a pose tracking system that satisfies the requirements of the intended metrology application. The Bayesian

filtering framework is suggested because of its firm theoretical foundation in informatics and because it enables straightforward fusion of measurements from several sensors. Sensor fusion is in this thesis seen as a way to exploit complementary characteristics of different sensors to increase tracking accuracy and robustness. Four different types of measurements are considered; inertial measurements, images from a camera, range (time-of-flight) measurements from ultra wide band (uwb) radio signals, and range and velocity measurements from echoes of transmitted acoustic signals. A simulation study and a study of the Cramér-Rao lower filtering bound (crlb) show that an inertial-camera system has the potential to reach the required tracking accuracy. It is however assumed that known fiducial markers, that can be detected and recognized in images, are deployed in the environment. The study shows that many markers are required. This makes the solution more of a stationary solution and the mobility requirement is not fulfilled. A simultaneous localization and mapping (slam) solution, where naturally occurring features are used instead of known markers, are suggested solve this problem. Evaluation using real data shows that the provided inertial-camera slam filter suffers from drift but that support from uwb range measurements eliminates this drift. The slam solution is then only dependent on knowing the position of very few stationary uwb transmitters compared to a large number of known fiducial markers. As a last step, to increase the accuracy of the slam filter, it is investigated if and how range measurements can be complemented with velocity measurement obtained as a result of the Doppler effect. Especially, focus is put on analyzing the correlation

between the range and velocity measurements and the implications this correlation has for filtering. The investigation is done in a theoretical study of reflected known signals (compare with radar and sonar) where the crlb is used as an analyzing tool. The theory is validated on real data from acoustic echoes in an indoor environment.

Proceedings of 2021 Chinese Intelligent Systems Conference - Yingmin Jia 2021-10-06

This book presents the proceedings of the 17th Chinese Intelligent Systems Conference, held in Fuzhou, China, on Oct 16-17, 2021. It focuses on new theoretical results and techniques in the field of intelligent systems and control. This is achieved by providing in-depth study on a number of major topics such as Multi-Agent Systems, Complex Networks, Intelligent Robots, Complex System Theory and Swarm Behavior, Event-Triggered Control and Data-Driven Control, Robust and Adaptive Control, Big Data and Brain Science, Process Control, Intelligent Sensor and Detection Technology, Deep learning and Learning Control Guidance, Navigation and Control of Flight Vehicles and so on. The book is particularly suited for readers who are interested in learning intelligent system and control and artificial intelligence. The book can benefit researchers, engineers, and graduate students.

Computers in Railways XVIII - G. Passerini 2022-11-23

Originating from papers presented at the 18th International Conference on Railway Engineering Design and Operation, this book provides up-to-date research on the use of advanced systems, promoting their general awareness throughout the management, design, manufacture and operation of railways and other emerging passenger, freight and transit

systems. A key emphasis is placed on the use of computer systems in advanced railway engineering. The included works are compiled from a variety of specialists interested in the development of railways, including managers, consultants, railway engineers, designers of advanced train control systems and computer specialists. Topics covered include: Traffic safety, security and monitoring; Train and railways analysis; Operation of rail networks; Advanced train control; Energy-efficient design; Traffic modelling and simulation.

Multisensor Attitude Estimation -
Hassen Fourati 2016-11-03

There has been an increasing interest in multi-disciplinary research on multisensor attitude estimation technology driven by its versatility and diverse areas of application, such as sensor networks, robotics, navigation, video, biomedicine, etc. Attitude estimation consists of the determination of rigid bodies' orientation in 3D space. This research area is a multilevel, multifaceted process handling the automatic association, correlation, estimation, and combination of data and information from several sources. Data fusion for attitude estimation is motivated by several issues and problems, such as data imperfection, data multi-modality, data dimensionality, processing framework, etc. While many of these problems have been identified and heavily investigated, no single data fusion algorithm is capable of addressing all the aforementioned challenges. The variety of methods in the literature focus on a subset of these issues to solve, which would be determined based on the application in hand. Historically, the problem of attitude estimation has been introduced by Grace Wahba in 1965 within the estimate of satellite

attitude and aerospace applications. This book intends to provide the reader with both a generic and comprehensive view of contemporary data fusion methodologies for attitude estimation, as well as the most recent researches and novel advances on multisensor attitude estimation task. It explores the design of algorithms and architectures, benefits, and challenging aspects, as well as a broad array of disciplines, including: navigation, robotics, biomedicine, motion analysis, etc. A number of issues that make data fusion for attitude estimation a challenging task, and which will be discussed through the different chapters of the book, are related to: 1) The nature of sensors and information sources (accelerometer, gyroscope, magnetometer, GPS, inclinometer, etc.); 2) The computational ability at the sensors; 3) The theoretical developments and convergence proofs; 4) The system architecture, computational resources, fusion level.

Image Analysis and Recognition -
Aurélio Campilho 2014-10-09

The two volumes LNCS 8814 and 8815 constitute the thoroughly refereed proceedings of the 11th International Conference on Image Analysis and Recognition, ICIAR 2014, held in Vilamoura, Portugal, in October 2014. The 107 revised full papers presented were carefully reviewed and selected from 177 submissions. The papers are organized in the following topical sections: image representation and models; sparse representation; image restoration and enhancement; feature detection and image segmentation; classification and learning methods; document image analysis; image and video retrieval; remote sensing; applications; action, gestures and audio-visual recognition; biometrics; medical image processing and

analysis; medical image segmentation; computer-aided diagnosis; retinal image analysis; 3D imaging; motion analysis and tracking; and robot vision.

Robotics Research - Paolo Dario
2005-02-17

ISRR, the "International Symposium on Robotics Research", is one of robotics' pioneering symposia, which has established some of the field's most fundamental and lasting contributions over the past two decades. This book presents the results of the eleventh edition of "Robotics Research" ISRR03, offering a broad range of topics in robotics. The contributions provide a wide coverage of the current state of robotics research: the advances and challenges in its theoretical foundation and technology basis, and the developments in its traditional and new emerging areas of applications. The diversity, novelty, and span of the work unfolding in these areas reveal the field's increased maturity and expanded scope, and define the state of the art of robotics and its future direction.

Mobile Mapping Technologies - Pablo Rodríguez-González 2019-12-18
Mobile Mapping technologies have seen a rapid growth of research activity and interest in the last years, due to the increased demand of accurate, dense and geo-referenced 3D data. Their main characteristic is the ability of acquiring 3D information of large areas dynamically. This versatility has expanded their application fields from the civil engineering to a broader range (industry, emergency response, cultural heritage...), which is constantly widening. This increased number of needs, some of them specially challenging, is pushing the Scientific Community, as well as companies, towards the development of

innovative solutions, ranging from new hardware / open source software approaches and integration with other devices, up to the adoption of artificial intelligence methods for the automatic extraction of salient features and quality assessment for performance verification. The aim of the present book is to cover the most relevant topics and trends in Mobile Mapping Technology, and also to introduce the new tendencies of this new paradigm of geospatial science.

Advances in Neural Networks - ISSN 2005 - Jun Wang 2005-05-04

The three volume set LNCS 3496/3497/3498 constitutes the refereed proceedings of the Second International Symposium on Neural Networks, ISSN 2005, held in Chongqing, China in May/June 2005. The 483 revised papers presented were carefully reviewed and selected from 1.425 submissions. The papers are organized in topical sections on theoretical analysis, model design, learning methods, optimization methods, kernel methods, component analysis, pattern analysis, systems modeling, signal processing, image processing, financial analysis, control systems, robotic systems, telecommunication networks, incidence detection, fault diagnosis, power systems, biomedical applications, industrial applications, and other applications.

Computer Aided Systems Theory -- EUROCAST 2011 - Roberto Moreno Díaz 2012-02-02

The two-volume proceedings, LNCS 6927 and LNCS 6928, constitute the papers presented at the 13th International Conference on Computer Aided Systems Theory, EUROCAST 2011, held in February 2011 in Las Palmas de Gran Canaria, Spain. The total of 160 papers presented were carefully reviewed and selected for inclusion in the books. The contributions are organized in topical sections on

concepts and formal tools; software applications; computation and simulation in modelling biological systems; intelligent information processing; heuristic problem solving; computer aided systems optimization; model-based system design, simulation, and verification; computer vision and image processing; modelling and control of mechatronic systems; biomimetic software systems; computer-based methods for clinical and academic medicine; modeling and design of complex digital systems; mobile and autonomous transportation systems; traffic behaviour, modelling and optimization; mobile computing platforms and technologies; and engineering systems applications.

Designing Wireless Sensor Network Solutions for Tactical ISR - Timothy D. Cole 2020-09-30

This comprehensive resource demonstrates how wireless sensor network (WSN) systems, a key element of the Internet of Things (IoT), are designed and evaluated to solve problems associated with autonomous sensing systems. Functional blocks that form WSN-based systems are described, chapter by chapter, providing the reader with a progressive learning path through all aspects of designing remote sensing capabilities using a WSN-based system. The development and a full description of fundamental performance equations and technological solutions required by these real-time systems are included. This book explores the objectives and goals associated with tactical intelligence, surveillance, and reconnaissance (T-ISR) missions. Readers gain insight into the correlation between fine-grained sensor resolution associated with WSN-based system complexities and the difficult requirements associated with T-ISR missions. The book demonstrates how to wield emergent

technologies to arrive at reliable and robust wireless networking for T-ISR and associated tasks using low-cost, low-power persistent sensor nodes. WSN is broken down into constituent subsystems, key components, functional descriptions, and attendant mathematical descriptions. This resource explains how the design of each element can be approached and successfully integrated into a viable and responsive sensor system that is autonomous, adaptable to mission objectives and environments, and deployable worldwide. It also provides examples of what not to do based on lessons learned from past (and current) systems that failed to provide end users with the required information. Chapters are linked together, in order of system assembly (concepts to operation), to provide the reader with a full toolset that can help deliver versatility in design decisions, solutions, and understanding of such systems, end to end.

Structure from Motion using the Extended Kalman Filter - Javier Civera 2011-11-05

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.

Method for Kalman Filtering Pose Estimates from Lidar Scans During the Landing Phase - Dakota Lee Wenberg 2021

The Massachusetts Institute of Technology's Lincoln Laboratory is developing a Lidar scanner to be used on a notional lander mission to Europa, a moon of Jupiter. The goal of this mission is to land safely on the unexplored rough terrain of the moon and analyze samples to detect the possibility of life in the

subsurface oceans. A critical component to a safe landing is the ability to accurately estimate the state of the lander as it descends. This paper proposes the application of sensor fusion system that combines Inertial Measurement Unit measurements with relative pose data extracted from Lidar scans using an Extended Kalman Filter. The results show that the proposed system can accurately estimate the state in the Z and X axes while further improvements are required to increase the accuracy of the Y axis and the orientation.

Filtering Techniques for Pose Estimation with Applications to Unmanned Air Vehicles - Bryce Benson Ready 2012

The second key contribution of this work is the Manifold EKF, a generalized version of the Extended Kalman Filter which is explicitly designed to estimate manifold-valued states. This filter works for a large number of commonly useful manifolds, and may have applications to other manifolds as well. In our testss, the Manifold EKF demonstrated significant advantages in terms of consistency when compared to other filtering methods. We feel that these promising initial results merit further study of the Manifold EKF, related filters, and their properties.