

Kitti Benchmark Dataset For Visual Odometry

Slam Cvlbs

Introduction to Visual SLAM Development of Robust Visual Odometry Algorithms for SLAM Systems Visual Sensors Intelligent Vehicles Advanced Intelligent Computing Technology and Applications Household Service Robotics Cooperative Localization and Navigation RGB-D Image Analysis and Processing Frontiers in Robotics and AI editor's picks 2024 ROBOT 2017: Third Iberian Robotics Conference Quality, Reliability, Security and Robustness in Heterogeneous Systems Overview of RGBD-SLAM Approaches Sivo Cooperative SLAM for Multi-Robot Systems Using Visual Odometry and Range Measurements Edge Assisted Mobile Visual SLAM Unmanned Systems Technology Eighth International Conference on Quality Control by Artificial Vision Significance of Omnidirectional Fisheye Cameras for Feature-based Visual SLAM Geomatica Implementation of a Visual SLAM System Xiang Gao Oscar Reinoso David Fernández-Llorca De-Shuang Huang Yangsheng Xu Chao Gao Paul L. Rosin Anibal Ollero Xi Wu Tobias Hollarek Pranav Ganti Young-Hee Lee Jingao Xu David Fofi Raphael Chang (M. Eng.) Jaime Tarrasó Martínez

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this book offers a systematic and comprehensive introduction to the visual simultaneous localization and mapping vslam technology which is a fundamental and essential component for many applications in robotics wearable devices and autonomous driving vehicles the book starts from very basic mathematic background knowledge such as 3d rigid body geometry the pinhole camera projection model and nonlinear optimization techniques before introducing readers to traditional computer vision topics like feature matching optical flow and bundle adjustment the book employs a light writing style instead of the rigorous yet dry approach that is common in academic literature in addition it

includes a wealth of executable source code with increasing difficulty to help readers understand and use the practical techniques the book can be used as a textbook for senior undergraduate or graduate students or as reference material for researchers and engineers in related areas

visual sensors are able to capture a large quantity of information from the environment around them a wide variety of visual systems can be found from the classical monocular systems to omnidirectional rgb d and more sophisticated 3d systems every configuration presents some specific characteristics that make them useful for solving different problems their range of applications is wide and varied including robotics industry agriculture quality control visual inspection surveillance autonomous driving and navigation aid systems in this book several problems that employ visual sensors are presented among them we highlight visual slam image retrieval manipulation calibration object recognition navigation etc

this book presents the results of the successful sensors special issue on intelligent vehicles that received submissions between march 2019 and may 2020 the guest editors of this special issue are dr david fernández llorca dr ignacio parra alonso dr iván garcía daza and dr noelia parra alonso all from the computer engineering department at the university of Alcalá Madrid Spain a total of 32 manuscripts were finally accepted between 2019 and 2020 presented by top researchers from all over the world the reader will find a well representative set of current research and developments related to sensors and sensing for intelligent vehicles the topics of the published manuscripts can be grouped into seven main categories 1 assistance systems and automatic vehicle operation 2 vehicle positioning and localization 3 fault diagnosis and fail x systems 4 perception and scene understanding 5 smart regenerative braking systems for electric vehicles 6 driver behavior modeling and 7 intelligent sensing we the guest editors hope that the readers will find this book to contain interesting papers for their research papers that they will enjoy reading as much as we have enjoyed organizing this special issue

this 20 volume set Incs 15842 15861 constitutes in conjunction with the 4 volume set Inai 15862 15865 and the 4 volume set Inbi 15866 15869 the refereed proceedings of the 21st international conference on intelligent computing icic 2025 held in ningbo china during july 26 29 2025 the total of 1206 regular papers were carefully reviewed and selected from 4032 submissions this year the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing its aim was to unify 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 therefore the theme for this conference was advanced intelligent computing technology and applications

copyright 2015 zhejiang university press published by elsevier inc household service robotics is a collection of the latest technological advances in household service robotics in five main areas robot systems manipulation navigation object recognition and human

robot interaction the book enables readers to understand developments and apply them to their own working areas including robotic technologies for assisted living and elderly care domestic cleaning automation household surveillance guiding systems for public spaces service robotics is a highly multidisciplinary field requiring a holistic approach this handbook provides insights to the disciplines involved in the field as well as advanced methods and techniques that enable the scale up of theory to actual systems it includes coverage of functionalities such as vision systems location control and hci which are important in domestic settings provides a single source collection of the latest development in domestic robotic systems and control covers vision systems location control and hci important in domestic settings focuses on algorithms for object recognition manipulation human robot interaction and navigation for household robotics

this book captures the latest results and techniques for cooperative localization and navigation drawn from a broad array of disciplines it provides the reader with a generic and comprehensive view of modeling strategies and state estimation methodologies in that fields it discusses the most recent research and novel advances in that direction exploring the design of algorithms and architectures benefits and challenging aspects as well as a potential broad array of disciplines including wireless communication indoor localization robotics emergency rescue motion analysis etc

this book focuses on the fundamentals and recent advances in rgb d imaging as well as covering a range of rgb d applications the topics covered include data acquisition data quality assessment filling holes 3d reconstruction slam multiple depth camera systems segmentation object detection saliency detection pose estimation geometric modelling fall detection autonomous driving motor rehabilitation therapy people counting and cognitive service robots the availability of cheap rgb d sensors has led to an explosion over the last five years in the capture and application of colour plus depth data the addition of depth data to regular rgb images vastly increases the range of applications and has resulted in a demand for robust and real time processing of rgb d data there remain many technical challenges and rgb d image processing is an ongoing research area this book covers the full state of the art and consists of a series of chapters by internationally renowned experts in the field each chapter is written so as to provide a detailed overview of that topic rgb d image analysis and processing will enable both students and professional developers alike to quickly get up to speed with contemporary techniques and apply rgb d imaging in their own projects

for the third year in a row we are very happy to offer our readership an ebook of 11 articles that have achieved widespread acceptance within our core audience and beyond this time it concerns articles published in 2024 these papers are among the large number that attained significant interest last year but we selected just 11 which we consider to be the best these articles have already made an impact in the form of original research or comprehensive reviews as the field chief editor i would like to stand alongside our journal staff to honor all authors who contributed very high level papers to the journal last year and are contributing to our success we also thank the editors and reviewers of these

papers and of all papers this past year for their invaluable contribution

these volumes of advances in intelligent systems and computing highlight papers presented at the third iberian robotics conference robot 2017 held from 22 to 24 november 2017 in seville spain the conference is a part of a series of conferences co organized by seidrob spanish society for research and development in robotics and spr portuguese society for robotics the conference is focused on robotics scientific and technological activities in the iberian peninsula although open to research and delegates from other countries thus it has more than 500 authors from 21 countries the volumes present scientific advances but also robotic industrial applications looking to promote new collaborations between industry and academia

this book constitutes the refereed post conference proceedings of the 15th eai international conference on quality reliability security and robustness in heterogeneous networks qshine 2020 held in november 2020 due to covid 19 pandemic the conference was held virtually the 19 revised full papers were carefully reviewed and selected from 49 submissions the papers are organized thematically in tracks on network reliability and security an emerging applications

seminar paper from the year 2012 in the subject computer science applied grade 1 3 technical university of munich lehrstuhl für echtzeitsysteme und robotik course hauptseminar computer vision visual tracking for robotic applications ss2012 language english abstract in this paper i will introduce the reader to rgb d slam which has become the focus of interest for many researchers lately this is due to the development and distribution of cheap rgb d sensor devices such as the microsoft kinect after an introduction i will present which steps have to be taken to implement a working slam system using rgb d data in section three i will introduce three different approaches and will present how they implemented the slam and what they did to increase speed accuracy and robustness of their algorithms i will then compare the results of all approaches in the next section i will present what optimization methods two of these approaches implemented to improve their mapping by optimizing with a global approach these implementations also are reviewed and compared as far as that was possible in section five i will present how two different approaches store the mapping after all calculation is done in a sophisticated and compact way finally i will conclude over the results i collected and give an outlook on possible future developments

accurate localization is a requirement for any autonomous mobile robot in recent years cameras have proven to be a reliable cheap and effective sensor to achieve this goal visual simultaneous localization and mapping slam algorithms determine camera motion by tracking the motion of reference points from the scene however these references must be static as well as viewpoint scale and rotation invariant in order to ensure accurate localization this is especially paramount for long term robot operation where we require our references to be stable over long durations and also require careful point selection to maintain the runtime and storage complexity of the algorithm while the robot navigates

through its environment in this thesis we present sivo semantically informed visual odometry and mapping a novel feature selection method for visual slam which incorporates machine learning and neural network uncertainty into an information theoretic approach to feature selection the emergence of deep learning techniques has resulted in remarkable advances in scene understanding and our method supplements traditional visual slam with this contextual knowledge our algorithm selects points which provide significant information to reduce the uncertainty of the state estimate while ensuring that the feature is detected to be a static object repeatedly with a high confidence this is done by evaluating the reduction in shannon entropy between the current state entropy and the joint entropy of the state given the addition of the new feature with the classification entropy of the feature from a bayesian neural network our method is evaluated against orb slam2 and the ground truth of the kitti odometry dataset overall sivo performs comparably to orb slam2 average of 0.17 translation error difference 6.2×10^{-5} deg m rotation error difference while removing 69 of the map points on average as the reference points selected are from static objects building traffic signs etc the map generated using our algorithm is suitable for long term localization

in an age where real time processing and interaction with the physical world through digital lenses are paramount visual slam technology has become the backbone of mobile ar vr applications robotics and autonomous systems however the demanding computational load of visual slam often strains the limited resources of mobile devices hindering performance and accuracy this is exactly where edge computing comes to the forefront offering a potent solution by performing data processing at the edge of the network closer to the source of data this monograph is a pioneering exploration into how edge computing can elevate visual slam systems overcoming the traditional challenges of computational intensity and resource constraints edge computing not only offloads heavy duty processing from mobile devices to edge servers but also mitigates latency enhances efficiency and ensures robust real time performance this monograph unveils the transformative potential of edge assisted visual slam presenting groundbreaking research and the latest advancements in task decoupling collaborative mapping and environmental interaction this monograph could serve as a scholarly resource for those within the fields of computer vision and mobile computing it presents a detailed exploration of current research in edge assisted visual slam and anticipates future developments offering readers a comprehensive understanding of the field s trajectory and its implications for the next generation of mobile applications and autonomous systems

proceedings of spie present the original research papers presented at spie conferences and other high quality conferences in the broad ranging fields of optics and photonics these books provide prompt access to the latest innovations in research and technology in their respective fields proceedings of spie are among the most cited references in patent literature

robust gps denied navigation of mobile robots is becoming increasingly important as robots become more ubiquitous cameras are powerful sensors for this application due to

their low cost and high information density the task of using camera based computer vision techniques for navigation is typically referred to as visual simultaneous localization and mapping slam where a robot both estimates its pose and reconstructs its environment simultaneously using only cameras most existing work for visual slam relies on the use of the pinhole camera model which requires that images from wider angle more distorted lenses be rectified before they are usable this limits the field of view well below 180 degrees however cameras with omnidirectional fisheye lenses can see much more of their surroundings which suggests they may be beneficial for the visual slam task this hypothesis is supported by the trend that recent commercial products that rely on robust visual navigation use fisheye cameras in this thesis we explore the apparent discrepancy between the types of cameras traditionally used for navigation tasks in the research community and in industry where robustness is critical we propose that the scarcity of work using omnidirectional cameras is due to an ill formed belief that adapting fisheye lenses into traditional computer vision algorithms is infeasible or not worth the effort required to redesign those algorithms to show this a benchmarking suite for stereo visual slam was developed using traditional feature based visual odometry algorithms the building block components of visual slam including feature correspondence odometry and reconstruction were evaluated for both fisheye and perspective cameras the results show that not only do omnidirectional fisheye cameras easily plug into existing algorithms with minimal modification they also result in better performance for navigation tasks than perspective cameras with limited field of view

the goal of this project is to develop a system to compute the position and orientation of an uav using a monocular camera to achieve that the wolf library will be used wolf is a library thought to solve generalized simultaneous localization and mapping slam and visual odometry problems derived classes will implement the algorithms needed to track features from the images obtained through the sensors constraints between the features and other features or with landmarks will be created to form a factor graph an external solver will iterate to find the optimal state by minimizing the cost associated to all the constraints ideally our system can be used together with an inertial model measuring rotational velocities and translational accelerations and tested with an unmanned aerial vehicle uav in simulation and in real environments

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