Keywords: Slam

List of Publications

2022

Journal Articles

[J1] L. von Stumberg and D. Cremers,
DM-VIO: Delayed Marginalization Visual-Inertial Odometry,

Conference and Workshop Papers

[C1] D Muhle, L Koestler, N Demmel, F Bernard and D Cremers,
The Probabilistic Normal Epipolar Constraint for Frame-To-Frame Rotation Optimization under Uncertain Feature Positions,
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

[C2] S Weber, N Demmel, T Chon Chan and D Cremers,
Power Bundle Adjustment for Large-Scale 3D Reconstruction,
submission, 2022.

2021

Journal Articles

[J1] J. Chui, S. Klenk and D. Cremers,
Event-Based Feature Tracking in Continuous Time with Sliding Window Optimization,

Conference and Workshop Papers

[C1] F. Wimbauer, N. Yang, L. von Stumberg, N. Zeller and D Cremers,
MonoRec: Semi-Supervised Dense Reconstruction in Dynamic Environments from a Single Moving Camera,

[C2] M. Gladkova, R. Wang, N. Zeller and D. Cremers,
Tight Integration of Feature-based Relocalization in Monocular Direct Visual Odometry,

[C3] Y. Xia, Y. Xu, S. Li, R. Wang, J. Du, D. Cremers and U. Stilla,
SOE-Net: A Self-Attention and Orientation Encoding Network for Point Cloud based Place Recognition,

[C4] N Demmel, C Sommer, D Cremers and V Usenko,
Square Root Bundle Adjustment for Large-Scale Reconstruction,

[C5] N Demmel, D Schubert, C Sommer, D Cremers and V Usenko,
Square Root Marginalization for Sliding-Window Bundle Adjustment,
IEEE International Conference on Computer Vision (ICCV), 2021.
Keywords: Slam

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[C6] MW Wudenka, MG Müller, N Demmel, A Wedler, R Triebel, D Cremers and W Stuerzl, 
Towards Robust Monocular Visual Odometry for Flying Robots on Planetary Missions,

[C7] S Klenk, J Chui, N Demmel and D Cremers,
TUM-VIE: The TUM Stereo Visual-Inertial Event Dataset,

[C8] L Koestler, N Yang, N Zeller and D Cremers,
TANDEM: Tracking and Dense Mapping in Real-time using Deep Multi-view Stereo,
Conference on Robot Learning (CoRL), 2021, 3DV’21 Best Demo Award.

[C9] S Weber, N Demmel and D Cremers,
Multidirectional Conjugate Gradients for Scalable Bundle Adjustment,
German Conference on Pattern Recognition (GCPR), 2021, Oral Presentation.

2020
Journal Articles

[J1] V. Usenko, N. Demmel, D. Schubert, J. Stueckler and D. Cremers,
Visual-Inertial Mapping with Non-Linear Factor Recovery,

[J2] L. von Stumberg, P. Wenzel, Q. Khan and D. Cremers,
GN-Net: The Gauss-Newton Loss for Multi-Weather Relocalization,

Conference and Workshop Papers

[C1] R. Wang, N. Yang, J. Stueckler and D. Cremers,
DirectShape: Photometric Alignment of Shape Priors for Visual Vehicle Pose and Shape Estimation,

[C2] C. Sommer, V. Usenko, D. Schubert, N. Demmel and D. Cremers,
Efficient Derivative Computation for Cumulative B-Splines on Lie Groups,

[C3] N. Yang, L. von Stumberg, R. Wang and D. Cremers,
D3VO: Deep Depth, Deep Pose and Deep Uncertainty for Monocular Visual Odometry,

[C4] J. Du, R. Wang and D. Cremers,
DH3D: Deep Hierarchical 3D Descriptors for Robust Large-Scale 6DoF Relocalization,
European Conference on Computer Vision (ECCV), 2020, Spotlight Presentation.
Keywords: Slam

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4Seasons: A Cross-Season Dataset for Multi-Weather SLAM in Autonomous Driving,

[C6] N Demmel, M Gao, E Laude, T Wu and D Cremers,
Distributed Photometric Bundle Adjustment,

[C7] L. von Stumberg, P. Wenzel, N. Yang and D. Cremers,
LM-Reloc: Levenberg-Marquardt Based Direct Visual Relocalization,

2019
Conference and Workshop Papers

[C1] D. Schubert, N. Demmel, L. von Stumberg, V. Usenko and D. Cremers,
Rolling-Shutter Modelling for Visual-Inertial Odometry,

[C2] F. Steidle, W. Stürzl and R. Triebel,
Visual-inertial sensor fusion with a bio-inspired polarization compass for navigation of MAVs,
11th International Micro Air Vehicle Competition and Conference (IMAV), 2019.

2018
Journal Articles

[J1] J. Engel, V. Koltun and D. Cremers,
Direct Sparse Odometry,

[J2] N. Yang, R. Wang, X. Gao and D. Cremers,
Challenges in Monocular Visual Odometry: Photometric Calibration, Motion Bias and Rolling Shutter Effect,

[J3] P. Bergmann, R. Wang and D. Cremers,
Online Photometric Calibration of Auto Exposure Video for Realtime Visual Odometry and SLAM,

Omnidirectional DSO: Direct Sparse Odometry with Fisheye Cameras,

Conference and Workshop Papers
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[C1] C. Sommer and D. Cremers, 
Joint Representation of Primitive and Non-primitive Objects for 3D Vision, 

[C2] R Scona, M Jaimez, YR. Petillot, M Fallon and D Cremers, 
StaticFusion: Background Reconstruction for Dense RGB-D SLAM in Dynamic Environments, 

[C3] L. von Stumberg, V. Usenko and D. Cremers, 
Direct Sparse Visual-Inertial Odometry using Dynamic Marginalization, 
International Conference on Robotics and Automation (ICRA), May 2018.

The TUM VI Benchmark for Evaluating Visual-Inertial Odometry, 

[C5] X. Gao, R. Wang, N. Demmel and D. Cremers, 
LDSO: Direct Sparse Odometry with Loop Closure, 

[C6] N. Yang, R. Wang, J. Stueckler and D. Cremers, 
Deep Virtual Stereo Odometry: Leveraging Deep Depth Prediction for Monocular Direct Sparse Odometry, 
European Conference on Computer Vision (ECCV), September 2018, Oral Presentation.

[C7] D. Schubert, N. Demmel, V. Usenko, J. Stueckler and D. Cremers, 
Direct Sparse Odometry With Rolling Shutter, 
European Conference on Computer Vision (ECCV), September 2018, Oral Presentation.

[C8] V. Usenko, N. Demmel and D. Cremers, 
The Double Sphere Camera Model, 

2017

Conference and Workshop Papers

[C1] G. Kuschk, A. Bozic and D. Cremers, 
Real-time variational stereo reconstruction with applications to large-scale dense SLAM, 

[C2] M. Dzitsiuk, J. Sturm, R. Maier, L. Ma and D. Cremers, 
De-noising, Stabilizing and Completing 3D Reconstructions On-the-go using Plane Priors, 

[C3] L. von Stumberg, V. Usenko, J. Engel, J. Stueckler and D. Cremers, 
From Monocular SLAM to Autonomous Drone Exploration, 
European Conference on Mobile Robots (ECMR), September 2017.
Keywords: Slam

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2016
Conference and Workshop Papers

[C4] R. Maier, R. Schaller and D. Cremers,
Efficient Online Surface Correction for Real-time Large-Scale 3D Reconstruction,
British Machine Vision Conference (BMVC), London, United Kingdom, September 2017.

[C5] A. Kasyanov, F. Engelmann, J. Stueckler and B. Leibe,
Keyframe-Based Visual-Inertial Online SLAM with Relocalization,

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Journal Articles

[C1] V. Usenko, J. Engel, J. Stueckler and D. Cremers,
Direct Visual-Inertial Odometry with Stereo Cameras,
International Conference on Robotics and Automation (ICRA), May 2016.

[C2] L. Ma, C. Kerl, J. Stueckler and D. Cremers,
CPA-SLAM: Consistent Plane-Model Alignment for Direct RGB-D SLAM,
International Conference on Robotics and Automation (ICRA), May 2016.

[C3] J. Engel, V. Usenko and D. Cremers,
A Photometrically Calibrated Benchmark For Monocular Visual Odometry,

[C4] J. Engel, V. Koltun and D. Cremers,
Direct Sparse Odometry,

[C5] D. Bender, F. Rouatbi, M. Schikora, D. Cremers and W. Koch,
Scaling the world of monocular SLAM with INS-measurements for UAS navigation,

2015
Conference and Workshop Papers

[J1] M. Jaimez and J. Gonzalez-Jimenez,
Fast Visual Odometry for 3-D Range Sensors,

[J2] D. Droeschel, M. Nieuwenhuisen, M. Beul, J. Stueckler, D. Holz and S. Behnke,
Multi-Layered Mapping and Navigation for Autonomous Micro Aerial Vehicles,

Conference and Workshop Papers

[C1] J. Engel, J. Stueckler and D. Cremers,
Large-Scale Direct SLAM with Stereo Cameras,
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[C2] D. Caruso, J. Engel and D. Cremers,
Large-Scale Direct SLAM for Omnidirectional Cameras,

[C3] V. Usenko, J. Engel, J. Stueckler and D. Cremers,
Reconstructing Street-Scenes in Real-Time From a Driving Car,

[C4] C. Kerl, J. Stueckler and D. Cremers,
Dense Continuous-Time Tracking and Mapping with Rolling Shutter RGB-D Cameras,
*IEEE International Conference on Computer Vision (ICCV)*, Santiago, Chile, 2015.

2014

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[J1] J. Engel, J. Sturm and D. Cremers,
Scale-Aware Navigation of a Low-Cost Quadrocopter with a Monocular Camera,

[J2] J. Stueckler and S. Behnke,
Multi-Resolution Surfel Maps for Efficient Dense 3D Modeling and Tracking,

Conference and Workshop Papers

[C1] D. B. AD. C J. C D. Weikersdorfer,
Event-based 3D SLAM with a depth-augmented dynamic vision sensor,

[C2] F. Steinbruecker, J. Sturm and D. Cremers,
Volumetric 3D Mapping in Real-Time on a CPU,

[C3] H. Alvarez, L.M. Paz, J. Sturm and D. Cremers,
Collision Avoidance for Quadrotors with a Monocular Camera,

[C4] J. Engel, T. Schöps and D. Cremers,
LSD-SLAM: Large-Scale Direct Monocular SLAM,
*European Conference on Computer Vision (ECCV)*, September 2014, Oral Presentation.

[C5] T. Schöps, J. Engel and D. Cremers,
Semi-Dense Visual Odometry for AR on a Smartphone,

[C6] R. Maier, J. Sturm and D. Cremers,
Submap-based Bundle Adjustment for 3D Reconstruction from RGB-D Data,
*German Conference on Pattern Recognition (GCPR)*, Münster, Germany, September 2014, Oral Presentation.
Keywords: Slam

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[C7] O. Dunkley, J. Engel, J. Sturm and D. Cremers,
Visual-Inertial Navigation for a Camera-Equipped 25g Nano-Quadrotor,

[C8] D. Droeschel, J. Stueckler and S. Behnke,
Local Multi-Resolution Surfel Grids for MAV Motion Estimation and 3D Mapping,

[C9] J. Stueckler, A. Gutt and S. Behnke,
Combining the Strengths of Sparse Interest Point and Dense Image Registration for RGB-D Odometry,
Proc. of the Joint 45th International Symposium on Robotics (ISR) and 8th German Conference on Robotics (ROBOTIK), to appear, jun 2014.

[C10] D. Droeschel, J. Stueckler and S. Behnke,
Local multi-resolution representation for 6D motion estimation and mapping with a continuously rotating 3D laser scanner,
Proc. of the IEEE Int. Conf. on Robotics and Automation (ICRA), 5221-5226, may 2014.

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[M1] T Schöps,
Semi-dense visual SLAM on mobile devices,
Technical University Munich, Germany, May 2014.

[M2] M. Shelley,
Monocular Visual Inertial Odometry on a Mobile Device,
Technical University Munich, Germany, Aug. 2014.

[M3] OMW Dunkley,
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Technical University Munich, Germany, Sept. 2014.

2013
Journal Articles

[J1] F. Endres, J. Hess, J. Sturm, D. Cremers and W. Burgard,
3D Mapping with an RGB-D Camera,

Conference and Workshop Papers

[C1] C. Kerl, J. Sturm and D. Cremers,
Robust Odometry Estimation for RGB-D Cameras,
International Conference on Robotics and Automation (ICRA), May 2013, Best Vision Paper Award - Finalist.

[C2] E. Bylow, J. Sturm, C. Kerl, F. Kahl and D. Cremers,
Real-Time Camera Tracking and 3D Reconstruction Using Signed Distance Functions,
Keywords: Slam

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[C3] E. Bylow, J. Sturm, C. Kerl, F. Kahl and D. Cremers,

Direct Camera Pose Tracking and Mapping With Signed Distance Functions,
Demo Track of the RGB-D Workshop on Advanced Reasoning with Depth Cameras at the

[C4] C. Kerl, J. Sturm and D. Cremers,

Dense Visual SLAM for RGB-D Cameras,

[C5] J. Sturm, E. Bylow, F. Kahl and D. Cremers,

Dense Tracking and Mapping with a Quadrocopter,
Unmanned Aerial Vehicle in Geomatics (UAV-g), Rostock, Germany, September 2013.

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Semi-Dense Visual Odometry for a Monocular Camera,
IEEE International Conference on Computer Vision (ICCV), Sydney, Australia, December 2013.

[C7] F. Steinbruecker, C. Kerl, J. Sturm and D. Cremers,

Large-Scale Multi-Resolution Surface Reconstruction from RGB-D Sequences,
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[C8] M. Schadler, J. Stueckler and S. Behnke,

Multi-resolution surfel mapping and real-time pose tracking using a continuously rotating 2D laser scanner,

[C9] M. McElhone, J. Stueckler and S. Behnke,

Joint detection and pose tracking of multi-resolution surfel models in RGB-D,

[C10] J. Stueckler and S. Behnke,

Hierarchical Object Discovery and Dense Modelling From Motion Cues in
RGB-D Video,

MastersThesis

[M1] R. Maier,

Out-of-Core Bundle Adjustment for 3D Workpiece Reconstruction,
Technische Universität München, Germany, September 2013.

2012

Conference and Workshop Papers

[C1] F. Endres, J. Hess, N. Engelhard, J. Sturm, D. Cremers and W. Burgard,

An Evaluation of the RGB-D SLAM System,

[C2] J. Engel, J. Sturm and D. Cremers,

Camera-Based Navigation of a Low-Cost Quadrocopter,
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List of Publications

[C3] J. Sturm, N. Engelhard, F. Endres, W. Burgard and D. Cremers,
A Benchmark for the Evaluation of RGB-D SLAM Systems,

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Accurate Figure Flying with a Quadrocopter Using Onboard Visual and Inertial Sensing,

[C5] J. Sturm, W. Burgard and D. Cremers,
Evaluating Egomotion and Structure-from-Motion Approaches Using the TUM RGB-D Benchmark,

[C6] J. Stueckler and S. Behnke,
Integrating depth and color cues for dense multi-resolution scene mapping using RGB-D cameras,
Proc. of the IEEE Int. Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI), 162-167, sep 2012.

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[M1] C. Kerl,
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2011

Conference and Workshop Papers

[C1] N. Engelhard, F. Endres, J. Hess, J. Sturm and W. Burgard,
Real-time 3D visual SLAM with a hand-held camera,

Towards a benchmark for RGB-D SLAM evaluation,

[C3] F. Steinbruecker, J. Sturm and D. Cremers,
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Autonomous Camera-Based Navigation of a Quadrocopter,
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2010
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[C1] J. Stühmer, S. Gumhold and D. Cremers,
Real-Time Dense Geometry from a Handheld Camera,
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[C2] J. Stühmer, S. Gumhold and D. Cremers,
Parallel Generalized Thresholding Scheme for Live Dense Geometry from a Handheld Camera,
ECCV Workshop on Computer Vision on GPUs (CVGPU), Heraklion, Greece, September 2010.

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Improving indoor navigation of autonomous robots by an explicit representation of doors,
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