YIFU WANG

usasuper@126.com | ifwang | 1fwang.github.io | +86 137 1790 1790

Working Experience

ShanghaiTech University & SIMIT China
Postdoctoral Researcher *Apr. 2021 – Now*

Education

Australian National University Australia
Doctor of Philosophy, Engineering and Computer Science *Mar. 2016 – Nov. 2020*
- Advisor: Associate Prof Laurent Kneip and Prof Hongdong Li

Australian National University Australia
B. Eng. Hons Electronics and Communications *Feb. 2014 – Dec. 2015*

Beijing Institute of Technology China
B. Eng. Hons Automation *Sep. 2011 – Jul. 2015*

Research Experience

Extrinsic calibration for multi-perspective cameras Aug 2021 – Sep 2021
Published paper in ICRA 2022
- present a novel closed-form solution for multi-handeye calibration problem
- introduce a practical, simple and accurate extrinsic calibration procedure
- validated on non-overlapping multi-camera systems and outperforms existing solutions

Visual odometry with a Stereo Event-Depth Camera Aug 2021 – Sep 2021
Published paper in ICRA 2022
- generate semi-dense 3d map by using modified time-surface map and depth info
- tracking with 2d-3d alignment strategy
- validated on 6-dof motion estimation case and outperforms regular RGB-D based solutions

Volumetric contrast maximization for event camera Jan 2020 – Oct 2020
On Arxiv now
- contrast maximization is restricted to a image-to-image warping function
- maximizes the contrast via smooth motion parameters in a volumetric ray density field
- validated on AGV motion estimation case and outperforms regular camera solution

Dynamic event camera calibration Aug 2020 – Nov 2020
Published paper in IROS 2021
- event camera calibration methods require flashing patterns but difficult to construct or use
- a novel pattern extraction methods and b-spline based multi-segment optimization
- presents a fast and accurate event-based calibration method on regular calibration board

Bundle adjustment for AGV by using b-splines Jan 2019 – Jun 2020
Published paper in ICRA 2021
- conventional bundle adjustment does not use the kinematic motion constraints of AGV
- uses b-spline parametrization and non-holonomic kinematic constraints in bundle adjustment
- strongly improves accuracy and robustness of monocular visual odometry for AGV

Globally-optimal event camera motion estimation Jul. 2019 – Apr. 2020
Published paper in ECCV 2020 and T-PAMI 2021
- contrast maximisation framework is non-convex, which is sensitive to the initial guess
- uses Branch and Bound method to solve the global maximisation of contrast functions

- applies to different scenario, and significantly outperforms incremental local refinement

Motion estimation for surround-view camera systems Dec. 2018 – Jun. 2019
Published paper in ICRA 2020

- a generalized planar motion solver for multiple cameras appears as a gap in the literature
- formulates epipolar geometry as an uni-variate, multi-eigenvalue minimization problem
- presents a highly accurate and reliable motion estimation for surround-view camera systems

Motion estimation for AGV over multiple views Jul. 2018 – Dec. 2018
Published paper in CVPR 2019

- 1-point Ransac method is restricted to two views and unable to handle line correspondences
- extends the planar tri-focal tensor to multiple views and uses the Ackermann motion model
- outperforms 1-point Ransac when the Ackermann constraint is well fulfilled

Visual odometry for non-overlapping multi-camera systems Apr. 2016 – Mar. 2017
Published paper in ICVS 2017

- non-overlapping multi-camera systems are easily affected by motion degeneracies that cause scale unobservabilities
- solves scaled translations and point depths through a closed-form, linear initialization approach
- presents a novel initialization method and a complete pipeline for non-overlapping MPC systems

---

Publications

Y Wang*, W. Jiang*, K. Huang, S. Schwertfeger, L. Kneip, Accurate calibration of multi-perspective cameras from a generalization of the hand-eye constraint, *In Proceedings of the 2022 IEEE International conference on robotics and automation (ICRA)* **(co-first author)**

Y. Zuo, J. Yang, J. Chen, X. Wang, **Y Wang**$^{\#}$ and L. Kneip$^{\#}$, EDVO: Visual Odometry in Challenging Conditions using a Stereo Event Depth Camera, *In Proceedings of the 2022 IEEE International conference on robotics and automation (ICRA)* **(corresponding author)**

Y Wang, J. Yang, X. Peng, P. Wu, L. Gao, K. Huang, J. Chen, and L. Kneip, Visual odometry with an event camera using continuous ray warping and volumetric contrast maximization. *arXiv preprint arXiv:2107.03011*, 2021.

K Huang, **Y Wang** and L Kneip. Dynamic Event Camera Calibration, *In Proceedings of the 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*, Sep. 2021.

K Huang, **Y Wang** and L Kneip. B-splines for Purely Vision-based Localization and Mapping on Non-holonomic Ground Vehicles, *In Proceedings of the 2021 IEEE International conference on robotics and automation (ICRA)*, Jun. 2021.

X. Peng, L. Gao, **Y Wang** and L. Kneip. Globally-Optimal Contrast Maximisation for Event Cameras, *In IEEE Transactions on Pattern Analysis and Machine Intelligence*, Jan. 2021.

X Peng*, **Y Wang***, L Gao* and L Kneip. Globally-Optimal Event Camera Motion Estimation. *In Proceedings of the European Conference on Computer Vision (ECCV)*, Aug. 2020. **(co-first author)**

Y Wang, K Huang, X Peng, H Li and L Kneip. Reliable frame-to-frame motion estimation for vehicle-mounted surround-view camera systems. *In Proceedings of the 2020 IEEE International conference on robotics and automation (ICRA)*, Jun. 2020.

K Huang, **Y Wang** and L Kneip. Motion estimation of non-holonomic ground vehicles from a single feature correspondence measured over n views. *In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition(CVPR)*, Jun. 2019.

Y Wang and L Kneip. On scale initialization in non-overlapping multi-perspective visual odometry. *In Proceedings of the International Conference on Computer Vision Systems*, Shenzhen, Jul 2017. **Best Student Paper Award**

Internship and Visiting history

Consultant Oct. 2020 – Oct. 2021
Stereye Intelligent Technologies *Shanghai, China*

- Part-time technical consultant at SLAM Group of Stereye Intelligent Technologies.

Visiting Researcher Jul. 2018 – Present
ShanghaiTech University *Shanghai, China*

Intern Jul 2019 –Aug 2019
Motovis Intelligent Technologies *Shanghai, China*

- Internship at v-SLAM Group of Motovis Intelligent Technologies.

Honors and Awards

Third Prize Winner Dec 2020
3rd Innovation and Entrepreneurship Summit of ShhanghaiTech University

- Our project **"ARGUS.AI: Super vision for machines"** won the third prize and 10,000 CNY in startup funds.

Best Student Paper Award Jul 2017
International Conference on Computer Vision Systems 2017

Peer Reviews

International Conference on Robotics and Automation **(ICRA)** 2020, 2021
Conference on Computer Vision and Pattern Recognition **(CVPR)** 2021 2022
International Conference on Computer Vision **(ICCV)** 2021

Skills

Programming Languages: C/C++, Matlab, TeX
Human Languages: Mandarin, English
Developer Tools: Git, CLion, Matlab, OpenCV, Ceres, ROS, Most MS Office products.
Platforms Tools: Windows, Ubuntu, Mac OS.
General Business Skills: Strong sense of responsibility, good at communication and team work.