

YIFU WANG

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Working Experience

ShanghaiTech University & SIMIT

Postdoctoral Researcher

Shanghai, China

Apr. 2021 – Now

Motovis Intelligent Technologies

SLAM Technical Consultant

Shanghai, China

Nov. 2021 – Now

Education

Australian National University

Doctor of Philosophy, Engineering and Computer Science

Australia

Mar. 2016 – Nov. 2020

- Advisor: Associate Prof. Laurent Kneip and Prof. Hongdong Li

Australian National University

B. Eng. Hons Electronics and Communications

Australia

Feb. 2014 – Dec. 2015

Beijing Institute of Technology

B. Eng. Hons Automation

China

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 Depth-Event Camera

May 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

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

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[#], DEVO: Depth-Event Camera Visual Odometry in Challenging Conditions, *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

SLAM Technical Consultant

Stereeye Intelligent Technologies

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

Visiting Researcher

ShanghaiTech University

Intern

Motovis Intelligent Technologies

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

Oct. 2020 – Oct. 2021

Shanghai, China

Jul. 2018 – Present

Shanghai, China

Jul 2019 –Aug 2019

Shanghai, China

Honors and Awards

Third Prize Winner

Dec 2020

3rd Innovation and Entrepreneurship Summit of ShanghaiTech 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.