

YIFU WANG

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Working Experience

- XR Vision Labs at Tencent, (mentor: Prof. Hongdong Li)** Canberra, Australia
Senior Researcher Aug. 2022 – now
- Collaborated on establishing a motion capture lab, including setting up the ground truth data system, designing calibration processes, and evaluating time synchronization accuracy.
 - Design and implementation of a multi-camera SLAM algorithm framework, our solution won the 1st Place on Hilti-SLAM Challenge at ICRA2023.
 - Assisted in drafting and submitting patents as the liaison for Lab patents.
- Motovis Intelligent Technologies, (mentor: Mr. Rugao Zhang)** Shanghai, China
SLAM Technical Consultant and Group Leader Nov. 2021 – Jul. 2022
- Provided insights and suggestion for the development of the SLAM team in alignment with company strategies as the part-time leader of the SLAM team.
 - Collaborated with relevant colleagues to conduct product requirement research, and conduct competitive product analysis, providing suggestions for the development of the SLAM products.
 - Facilitated collaboration between other algorithm teams and relevant departments to drive the application of SLAM team's research and development achievements.
 - Managed projects by decomposing tasks, tracking progress, and ensuring orderly advancement
 - Contributed to the design of core features and partially developed core code for SLAM products, participating in project code reviews.
- SIMIT & ShanghaiTech University, (mentor: Prof. Laurent Kneip)** Shanghai, China
Postdoctoral Researcher Apr. 2021 – Jul. 2022
- Assisted the laboratory PI in supervising students in their research activities.
 - Supervised team members in the completion of papers and patent achievements.
 - Assisted the laboratory PI to manage projects with industry partners, taking joint responsibility for project execution.
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Education

- Australian National University** Australia
Doctor of Philosophy, Engineering and Computer Science Mar. 2016 – Oct. 2020
- Advisor: 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. Automation Sep. 2011 – Jun. 2016
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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

Published paper in Sensors 2022

- 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

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

Wang, Y.*, Ng, Y*, Sa, I., Parra, A., Rodriguez, C., Lin, T.J. and Li, H., 2023. MAVIS: Multi-Camera Augmented Visual-Inertial SLAM using SE2 (3) Based Exact IMU Pre-integration. *In Proceedings of the 2024 IEEE International conference on robotics and automation (ICRA)* (**co-first author**)

Chen, J., Zhu, Y., Lian, D., Yang, J., **Wang, Y.**, Zhang, R., Liu, X., Qian, S., Kneip, L. and Gao, S., 2023. Revisiting Event-based Video Frame Interpolation. *In Proceedings of the 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023)*, Oct. 2023.

Ji, X., Wei, J., **Wang, Y.**, Shang, H. and Kneip, L., 2023. Cross-modal Place Recognition in Image Databases using Event-based Sensors. arXiv preprint arXiv:2307.01047.

Y. Zuo, W. Xu, X. Wang, **Y Wang[#]** and L. Kneip[#], Cross-Modal Semi-Dense 6-DoF Tracking of an Event Camera in Challenging Conditions, *IEEE Transactions on Robotics. (TRO)* (**co-corresponding author**)

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)* (**co-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. *Sensors*, 2022.

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

Oct. 2020 – Oct. 2021

Stereye Intelligent Technologies

Shanghai, China

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

Visiting Researcher

Jul. 2018 – Apr. 2021

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

1st Place in both Vision-Only Single and Multi-Session Tracks

May 2023

HILTI SLAM Challenge at ICRA 2023

- Our team won the 1st place in both the vision-only single-session, and multi-session tracks in Hilti SLAM Challenge 2023.

Third Prize Winner

Dec 2020

3rd Innovation and Entrepreneurship Summit of ShanghaiTech University

- Our project “**ARGUS.AI: Super vision for machines**” won 10,000 CNY in startup funds.

Best Student Paper Award

Jul 2017

International Conference on Computer Vision Systems 2017