

research in the domain of event-based multi-sensor fusion algorithms.

Contributors

Yuda Dong designed the research. Yuda Dong and Yinong Cao processed the data. Zichao Shu contributed to hand eye calibration. Yuda Dong and Zetao Chen drafted the manuscript. Xin HE and Lijun Li helped organize the manuscript. Yuda Dong and Zetao Chen revised and finalized the paper. Xin HE provided research funding.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Alzugaray I, Chli M, 2018. Asynchronous corner detection and tracking for event cameras in real time. *IEEE Rob Autom Lett*, 3(4):3177-3184.
<https://doi.org/10.1109/LRA.2018.2849882>
- Barranco F, Fermuller C, Aloimonos Y, et al., 2016. A dataset for visual navigation with neuromorphic methods. *Front Neurosci*, 10:49.
<https://doi.org/10.3389/fnins.2016.00049>
- Calabrese E, Taverni G, Easthope CA, et al., 2019. DHP19: dynamic vision sensor 3D human pose dataset. *IEEE/CVF Conf on Computer Vision and Pattern Recognition Workshops*, p.1695-1704.
<https://doi.org/10.1109/CVPRW.2019.00217>
- Campos C, Elvira R, Rodríguez JJJ, et al., 2021. ORB-SLAM3: an accurate open-source library for visual, visual-inertial, and multimap SLAM. *IEEE Trans Rob*, 37(6):1874-1890.
<https://doi.org/10.1109/TRO.2021.3075644>
- Delmerico J, Cieslewski T, Rebecq H, et al., 2019. Are we ready for autonomous drone racing? The UZH-FPV drone racing dataset. *Int Conf on Robotics and Automation*, p.6713-6719.
<https://doi.org/10.1109/ICRA.2019.8793887>
- Furgale P, Rehder J, Siegwart R, 2013. Unified temporal and spatial calibration for multi-sensor systems. *IEEE/RSJ Int Conf on Intelligent Robots and Systems*, p.1280-1286.
<https://doi.org/10.1109/IROS.2013.6696514>
- Furrer F, Fehr M, Novkovic T, et al., 2018. Evaluation of combined time-offset estimation and hand-eye calibration on robotic datasets. In: Hutter M, Siegwart R (Eds.), *Field and Service Robotics: Results of the 11th International Conference*. Springer, Cham, p.145-159.
https://doi.org/10.1007/978-3-319-67361-5_10
- Gao L, Liang YX, Yang JQ, et al., 2022. Vector: a versatile event-centric benchmark for multi-sensor slam. *IEEE Rob Autom Lett*, 7(3):8217-8224.
<https://doi.org/10.1109/LRA.2022.3186770>
- Gehrig M, Aarents W, Gehrig D, et al., 2021. DSEC: a stereo event camera dataset for driving scenarios. *IEEE Rob Autom Lett*, 6(3):4947-4954.
<https://doi.org/10.1109/LRA.2021.3068942>
- Geiger A, Lenz P, Stiller C, et al., 2013. Vision meets robotics: the KITTI dataset. *Int J Rob Res*, 32(11):1231-1237.
<https://doi.org/10.1177/0278364913491297>
- Geneva P, Eckenhoff K, Lee W, et al., 2020. OpenVINS: a research platform for visual-inertial estimation. *IEEE International Conference on Robotics and Automation*, p.4666-4672.
<https://doi.org/10.1109/ICRA40945.2020.9196524>
- Hu YH, Liu SC, Delbruck T, 2021. v2e: From video frames to realistic DVS events. *IEEE/CVF Conf on Computer Vision and Pattern Recognition Workshops*, p.1312-1321.
<https://doi.org/10.1109/CVPRW53098.2021.00144>
- Klenk S, Chui J, Demmel N, et al., 2021. TUM-VIE: the TUM stereo visual-inertial event dataset. *IEEE/RSJ Int Conf on Intelligent Robots and Systems*, p.8601-8608.
<https://doi.org/10.1109/IROS51168.2021.9636728>
- Liu YZ, Fu YJ, Chen FD, et al., 2021. Simultaneous localization and mapping related datasets: a comprehensive survey. <https://arxiv.org/abs/2102.04036>.
- Olson E, 2011. "AprilTag: a robust and flexible visual fiducial system. *IEEE Int Conf on Robotics and Automation*, p.3406-3411.
<https://doi.org/10.1109/ICRA.2011.5979561>
- Stachniss J, Engenhard N, Endres F, et al., 2012. A benchmark for the evaluation of RGB-D SLAM systems. *IEEE/RSJ Int Conf on Intelligent Robots and Systems*, p.573-580.
<https://doi.org/10.1109/IROS.2012.6385773>
- Weikersdorfer D, Adrian DB, Cremers D, et al., 2014. Event-based 3D SLAM with a depth-augmented dynamic vision sensor. *IEEE Int Conf on Robotics and Automation*, p.359-364. <https://doi.org/10.1109/ICRA.2014.6906882>
- Zhu AZ, Thakur D, Ozaslan T, et al., 2018. The multivehicle stereo event camera dataset: an event camera dataset for 3D perception. *IEEE Rob Autom Lett*, 3(3):2032-2039.
<https://doi.org/10.1109/LRA.2018.2800793>