Jaehyung Jung

Postdoctoral researcher
Smart Robotics Lab, Technical University of Munich
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GitHub Profile
Homepage

Experience

- **Smart Robotics Lab, Technical University of Munich** *2023 – Present*
  Postdoctoral Researcher (Supervisor: Prof. Stefan Leutenegger)

Education

- **Ph.D. Aerospace Engineering, Seoul National University** *2023*
  Thesis: Visual-Inertial Navigation System on Matrix Lie Group with Semantic Objects
- **M.S. Aerospace Engineering, Seoul National University** *2019*
  Thesis: Self-Calibrated Visual-Inertial Odometry for Rover Localization
- **B.S. Aerospace Engineering, Pusan National University** *2017*
  Magna Cum Laude (94%)

Technical Skills and Interests

Research interests: State estimation, Machine learning for robotics, Flying robots
Programming: C++, ROS/ROS2, Python, MATLAB
Languages: Korean (native), English (advanced)

Research Projects

- **AUTOASSESS** *2023 – Present*
  Scientific Assistant at TUM
  – Funded by EU
  – AI & robotics for safe vessel inspection
- **Indoor and outdoor integrated navigation technology** *2020 – 2023*
  Graduate Research Student at SNU
  – Funded by Korea Government
  – Visual-lidar-inertial SLAM for a ground vehicle
- **Pose estimation technology for mobile devices** *2018 – 2020*
  Graduate Research Student at SNU
  – Funded by Samsung Electronics
  – IMU / Event camera fusion for fast moving hand-held devices
- **Integrated navigation system for lunar rover** *2017 – 2018*
  Graduate Research Student at SNU
  – Funded by Korea Government
  – IMU / Camera fusion for planetary rover localization

Opensource

- **Gaussian Mixture Midway-Merge for Object SLAM** – *IEEE Robotics and Automation Letters* *2022*
- **Ensemble Visual-Inertial-Odometry** – *IEEE Transactions on Robotics* *2022*

Journals

1. Min Seok Lee, **Jae Hyung Jung**, Ye Jun Kim, and Chan Gook Park, "Event-and Frame-based Visual-Inertial Odometry with Adaptive Filtering based on 8-DOF Warping Uncertainty," *IEEE Robotics and Automation Letters*, vol. 9, no. 2, pp. 1003-1010, 2024.
2. **Jae Hyung Jung** and Chan Gook Park, "Gaussian Mixture Midway-Merge for Object SLAM with Pose Ambiguity," *IEEE Robotics and Automation Letters*, vol. 8, no. 1, pp. 400-407, 2023
3. **Jae Hyung Jung**, Yeongkwon Choe, and Chan Gook Park, "Photometric Visual-Inertial Navigation with Uncertainty-Aware Ensembles," *IEEE Transactions on Robotics*, vol. 38, no. 4, pp. 2039-2052, 2022.
4. **Jae Hyung Jung**, Jaehyuck Cha, Jae Young Chung, Tae Ihn Kim, Myung Hwan Seo, Sang Yeon Park, Jong Yun Yeo, and Chan Gook Park, "Monocular Visual-Inertial-Wheel Odometry using Low-Grade IMU in Urban Areas," *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 2, pp. 925-938, 2022.
5. **Jae Hyung Jung**, Sejong Heo, and Chan Gook Park, "Observability Analysis of IMU Intrinsic Parameters in Stereo Visual-Inertial Odometry," *IEEE Transactions on Instrumentation and Measurement*, vol. 69, no. 10, pp. 7530-7541, 2020.
6. **Jae Hyung Jung**, Sejong Heo, and Chan Gook Park, "Patch-based Stereo Direct Visual Odometry Robust to Illumination Changes," *International Journal of Control, Automation, and Systems*, vol.17, no.3, pp. 743-751, 2019.
7. Sejong Heo, **Jae Hyung Jung**, and Chan Gook Park, "Consistent EKF-based visual-inertial navigation using points and lines," *IEEE Sensors Journal*, vol.18, no.18, pp.7638-7649, 2018.

Conferences

1. **Jae Hyung Jung**, Simon Boche, Sebastián Barbas Lainia, and Stefan Leutenegger, "Uncertainty-Aware Visual-Inertial SLAM with Volumetric Occupancy Mapping," *IEEE International Conference on Robotics and Automation (ICRA)*, 2025 (*Accepted*).
2. Hanyeol Lee, **Jae Hyung Jung**, and Chan Gook Park, "2D-3D Object Shape Alignment for Camera-Object Pose Compensation in Object-Visual SLAM," *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.
3. Min Seok Lee, Ye Jun Kim, **Jae Hyung Jung**, and Chan Gook Park, "Fusion of Events and Frames using 8-DOF Warping Model for Robust Feature Tracking," *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
4. **Jae Hyung Jung**, and Chan Gook Park, "Object-based Visual-Inertial Navigation System on Matrix Lie Group," *IEEE International Conference on Robotics and Automation (ICRA)*, 2022.
5. Yeongkwon Choe, **Jae Hyung Jung**, and Chan Gook Park, "Ensemble Kalman Filter Based LiDAR Odometry for Skewed Point Clouds Using Scan Slicing," *IEEE International Conference on Robotics and Automation (ICRA)*, 2022.
6. **Jae Hyung Jung**, and Chan Gook Park, "Constrained Filtering-based Fusion of Images, Events, and Inertial Measurements for Pose Estimation," *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.
7. **Jae Hyung Jung**, and Chan Gook Park, "Localization in High-Speed Motion Using IMU-aided Event Flow Estimation," *The Institute of Navigation GNSS+ (ION GNSS+)*, 2020.
8. **Jae Hyung Jung**, Jae Young Chung, Jaehyuck Cha, and Chan Gook Park, "Rapid initialization using relative constraints in stereo visual-inertial odometry," *IEEE International Conference on Control and Automation (ICCA)*, 2019.
9. **Jae Hyung Jung**, Sejong Heo, and Chan Gook Park, "Stereo visual-inertial odometry with an online calibration and its field testing," *International Symposium on GNSS (ISGNSS)*, 2018.

Awards

- **Best Paper Award** in Avionics Systems Symposium Korea *2019*
- **Best Paper Award** in 33rd Institute of Control, Robotics, and Systems, Annual Conference *2018*
- **The 2nd Prize** in CANSAT competition Korea *2016*
  - Organized by Ministry of Science and ICT
  - Team "To the Space!": 2-DOF camera gimbal stabilizer for CANSAT