Curriculum Vitae

Zongzhou Wu

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Education

- M.Eng. in *Geodesy and Survey Engineering*, Wuhan University, 2024 (supervisor: Prof. Xingxing Li, score: 91)
- B.Eng. in *Navigation Engineering*, Wuhan University, 2021 (GPA: 3.91/4.0, score: 92.4, ranking: 2/50)

Internship

- Algorithm Development Internship, *Automotive Business Unit, DJI*, Shenzhen, China (May-Sep, 2023)

Research Experience

- Interest
  - Global Navigation Satellite System (GNSS), indoor-outdoor seamless positioning
  - multi-sensor fusion, simultaneous localization and mapping (SLAM), sensor calibration
- Project
  - joint development of GREAT (GNSS+ REsearch, Application and Teaching) software, 2020-2024
  - GNSS-assisted LiDAR/inertial/visual odometry and mapping, 2023-2024
  - failure-resilient tightly coupled GNSS/IMU/UWB/camera fusion, 2021-2023
  - online spatiotemporal calibration of GNSS/Multi-IMU/camera integration system, 2021-2022
  - seamless indoor-outdoor localization based on GNSS/IMU/UWB fusion, 2021-2022
  - real-time multi-frequency and multi-GNSS PPP-AR/IMU tightly coupled system, 2020-2021
  - visualization system of low-orbit satellite augmented navigation, 2018-2020
- Teaching
  - assistant, *Applied Optimal Estimation* (Lecturer: Prof. Yun Wu, undergraduate course, 2022 spring)

Contributions to Community

- compareNavPlot (repository in https://github.com/zzwu29/compareNavPlot)
  - A Pyside2 UI for comparing and plotting integrated navigation results.
- traj_eval (repository in https://github.com/zzwu29/traj_eval)
  - A toolbox to process trajectory alignment in localization/SLAM results.
- bag_scripts (repository in https://github.com/zzwu29/bag_scripts)
  - A convenient python script to extract multiple sensor records from a rosbag.
- SuperPointCPP (repository in https://github.com/zzwu29/SuperPointCPP)
  - An implement of SuperPoint feature detector in C++.

Skills

- Knowledge
  - ▷ multi-frequency and multi-constellation GNSS high-precision positioning (RTK, PPP, PPP-RTK)
  - ▷ tighly coupled odometry and mapping (GNSS/IMU/UWB/camera/LiDAR)
  - ▷ state estimation (KF, EKF, UKF, PF, FGO)
  - ▷ sensor calibration (IMU noise, GNSS-IMU/camera-IMU/IMU-IMU spatiotemporal extrinsic)
  - ▷ indoor localization (UWB range-based, WiFi fingerprint-based, magnetic-based)
  - ▷ inertial navigation algorithm (IMU mechanization, pedestrian dead reckoning)
  - ▷ automatic control theory, digital signal processing, signal and system, embedded system
- Programming
  - ▷ C++, C, MATLAB, python, R, shell, autolisp
- Tool
  - ▷ linux, git, ROS, LaTeX, word, powerpoint, excel
- Language
  - ▷ Mandarin (native), English (fluent), Cantonese (basic)
  - ▷ IELTS Academic 7.0

Awards and Honors

- *First-class Scholarship*, Wuhan University, 2023
- *First-class Postgraduate Freshmen Scholarship*, Wuhan University, 2023
- *Second-class Scholarship*, Wuhan University, 2022
- *Third Prize of The 7th Internet+ Competition in Wuhan University*, Wuhan University, 2021
- *Outstanding Undergraduate Graduate*, Wuhan University, 2021
- *Guanghua Scholarship*, Wuhan University, 2021
- *Second-class Scholarship*, Wuhan University, 2020
- *Merit Student*, Wuhan University, 2020
- *Honorable Mention of Mathematical Contest in Modeling*, The Consortium for Mathematics and Its Application, 2020
- *Third Prize of Asia and Pacific Mathematical Contest in Modeling*, Beijing Society of Image Graphics, 2019
- *Wang Zhizhuo Innovative Scholarship*, Wuhan University, 2019
- *First-class Scholarship*, Wuhan University, 2019
- *Merit Student*, Wuhan University, 2019
- *Third Prize of Jingtian Cup (Automatic Driving Group) in World Robotics Competition*, Chinese Mechanical Engineering Society, 2019
- *Third Prize of RoboCup China Open (Standard Platform Group)*, Chinese Association of Automation, 2019
- *First Prize of National Undergraduate Mathematics Competition*, Chinese Mathematical Society, 2018
- *First Prize of Hubei Undergraduate Mathematics Competition*, Hubei Mathematical Society, 2018
- *Advanced Individual of Summer Social Practice*, Wuhan University, 2018
- *Second-class Scholarship*, Wuhan University, 2018
- *Merit Student*, Wuhan University, 2018

Leadership

- *interior minister*, WHUAI Robot Team, Wuhan University, 2019-2020
- *deputy minister of arts*, student union of School of Geodesy and Geomatics, Wuhan University, 2018-2019

Publications

- Journal Publications

  1. Z. Shen, X. Li†, X. Wang, **Z. Wu**, X. Li, Y. Zhou and S. Li, "A novel factor graph framework for tightly coupled GNSS/INS integration with carrier-phase ambiguity resolution," *IEEE Transactions on Intelligent Transportation Systems*, in press.
  2. Z. Shen, X. Li†, X. Li, Z. Xu, **Z. Wu** and Y. Zhou, "Precise and robust IMU-centric vehicle navigation via tightly integrating multiple homogeneous GNSS terminals," *IEEE Transactions on Instrumentation and Measurement*, vol. 73, no. 9501214, pp. 1-14, Nov. 2023. link
  3. X. Li, **Z. Wu**, Z. Shen†, Z. Xu, X. Li, S. Li and J. Han, "An indoor and outdoor seamless positioning system for low-cost UGV using PPP/INS/UWB tightly coupled integration," *IEEE Sensors Journal*, vol. 23, no. 20, pp. 24895-24906, Oct. 2023. link
  4. X. Li, J. Han, X. Li†, J. Huang, Z. Shen and **Z. W**, "A grid-based ionospheric weighted method for PPP-RTK with diverse network scales and ionospheric activity levels," *GPS Solutions*, vol. 27, no. 4, p. 191, Oct. 2023. link
  5. C. Long, **Z. Wu**† and Z. Shen, "UWB enhanced GNSS precise point positioning based on raw measurements," *Navigation Positioning and Timing*, vol. 10, no. 4, p. 123, Jul. 2023. link
  6. Z. Xu, Z. Yan, X. Li†, Z. Shen, Y. Zhou, **Z. Wu** and X. Li, "Review of high-precision multi-sensor integrated positioning toward intelligent driving," *Navigation Positioning and Timing*, vol. 10, no. 3, p. 1, May 2023. link

- Master Dissertation

  ▷ **Z. Wu**, *Research on Failure-Resilient Positioning Method and Mapping Application via Multi-Sensor Tight Fusion across Diverse Scenarios*, Wuhan University, China, 2024.

- Bachelor Dissertation

  ▷ **Z. Wu**, *Research on Key Technologies of Real-time Multi-frequency and Multi-GNSS PPP-AR/INS Integration*, Wuhan University, China, 2021.