YULIN YANG

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EDUCATION

University of Delaware July 2015 – Present
Ph.D. Candidate in Mechanical Engineering

University of Delaware July 2015 – May 2020
Master of Science in Mathematics

Xian Jiaotong University, Xi'an, China Sept. 2009 – July 2012
Master of Engineering in Mechanical Engineering

Shandong University, Shandong, China Sept. 2005 – July 2009
Bachelor of Engineering in Mechanical Engineering

RESEARCH EXPERIENCE

University of Delaware July 2015 - Present
Research Assistant *Newark, DE*

- Aided inertial navigation with points, lines and planes.
- Multi-sensor fusion (IMUs, cameras, LiDAR, wheel and GPS).
- Analytic Combined IMU Integration (ACI^2).
- Map-based localization under adversarial attacks.

Xi'an Jiaotong University July 2009 - July 2012
Research Assistant *Xi'an, China*

- Extrinsic and intrinsic calibration for large-scale object measurement system with a camera and total station.

INDUSTRY EXPERIENCE

Facebook Reality Lab Jan. 2021 - Apr. 2021
Research Intern *Redmond, WA*

- Visual-inertial navigation system (VINS).

Bosch Research Institute May 2019 - Aug. 2020
Visual Intern *Sunnyvale, CA*

- Analytic combined IMU integration (ACI^2).

Siemens High-Voltage R&D Center July 2012 - May 2015
R&D Engineer *Shanghai, China*

- 110kv and 550kv gas insulated switchgear development and sensor testing.

ACADEMIC SCHOLARSHIPS AND AWARDS

- **Fellowship:** 2019-2020 University Doctoral Fellowship Award (competitive)
- **Travel Award:** 2018 ICRA Travel Award

- **Travel Award:** 2017 IROS-NSF Doctoral Consortium / Travel Award

TEACHING EXPERIENCE

University of Delaware Sept. 2015 - May 2016
Teaching Assistant *Newark, DE*

- Fall 2015: MEEG 310 Vibration and control (Undergraduate Course).
- Spring 2016: MEEG 467 SEMINAR: Applied controls (Undergraduate Course).

PUBLICATIONS

[A] Refereed Journal Publications

[7] **Y. Yang** and G. Huang,"Multi-Visual-Inertial Sensor Calibration: Algorithm and Analysis" in *IEEE Transactions on Robotics (TRO)*(in preparation), 2021.

[6] X. Zuo, W. Ye, **Y. Yang**, R. Zheng, T. Vidal-Calleja, G. Huang and Y. Liu,"Visual-Inertial Localization With Prior LiDAR Map Constraints" in *Journal of Field Robotics (JFR)*, 2020.

[5] X. Zuo, P. Geneva, **Y. Yang**, W. Ye, Y. Liu and G. Huang,"Visual-Inertial Localization With Prior LiDAR Map Constraints" in *IEEE Robotics and Automation Letters (RAL)*, 2019.

[4] **Y. Yang**, P. Geneva, K. Eckenhoff and G. Huang,"Degenerate Motion Analysis for Aided INS with Online Spatial and Temporal Sensor Calibration" in *IEEE Robotics and Automation Letters (RAL)*, 2019.

[3] K. Eckenhoff, **Y. Yang**, P. Geneva and G. Huang,"Tightly-Coupled Visual-Inertial Localization and 3D Rigid-Body Target Tracking" in *IEEE Robotics and Automation Letters (RAL)*, 2019.

[2] **Y. Yang** and G. Huang,"Observability Analysis of Aided INS with Heterogeneous Features of Points, Lines and Planes" in *IEEE Transactions on Robotics (TRO)*, 2019.

[1] X. Yang, S. Fang and **Y. Yang**,"Accurate Template-based Correction Technology for Lens Distortions" in *Optical Engineering (OE)*, Vol. 51, October 2012.

[B] Refereed Conference Proceedings (Peer Reviewed based on Their Entirety)

[16] W. Lee, **Y. Yang** and G. Huang, "Efficient Multi-sensor Aided Inertial Navigation with Online Calibration" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*(accepted), Xi'an, China, May 31 - Aug 31, 2021.

[15] P. Zhu, **Y. Yang**, W. Ren and G. Huang, "Cooperative Visual-Inertial Odometry" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*(accepted), Xi'an, China, May 31 - Aug 31, 2021.

[14] W. Lee, K. Eckenhoff, **Y. Yang**, P. Geneva and G. Huang, "Visual-Inertial-Wheel Odometry with Online Calibration" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.

[13] X. Zuo, **Y. Yang**, P. Geneva, J. Lv, Y. Liu, G. Huang and M. Pollefeys, "LIC-Fusion 2.0: LiDAR-Inertial-Camera Odometry with Sliding-Window Plane-Feature Tracking" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.

[12] P. Geneva, N. Merrill, **Y. Yang**, C. Chen, W. Lee and G. Huang, "Versatile 3D Multi-Sensor Fusion for Lightweight 2D Localization" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.

[11] **Y. Yang**, P. Geneva, X. Zuo and G. Huang, "Online IMU Intrinsic Calibration: Is It Necessary?" in *Proceedings of the Robotics: Science and Systems (RSS)*, Corvallis, OR, USA, July 12 - 16, 2020.

[10] **Y. Yang**, BPW. Babu, C. Chen, G. Huang and R. Liu, "Analytic Combined IMU Integration (ACI2) For Visual Inertial Navigation" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Pairs, France, May 31 - Aug 31, 2020.

[9] P. Geneva, K. Eckenhoff, W. Lee, **Y. Yang** and G. Huang, "Openvins: A research platform for visual-inertial estimation" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Pairs, France, May 31 - Aug 31, 2020.

[8] **Y. Yang**, P. Geneva, K. Eckenhoff and G. Huang, "Visual-Inertial Odometry with Point and Line Features" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Macau, China, November 4 - 8, 2019.

[7] **Y. Yang** and G. Huang, "Aided Inertial Navigation: Unified Feature Representations and Observability Analysis" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 20 - May 24, 2019.

[6] **Y. Yang**, P. Geneva, X. Zuo, K. Eckenhoff, Y. Liu and G. Huang, "Tightly-Coupled Aided Inertial Navigation with Point and Plane Features" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 20 - May 24, 2019.

[5] P. Geneva, K. Eckenhoff, **Y. Yang** and G. Huang, "LIPS: LiDAR-Inertial 3D Plane SLAM" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, October 1 - October 5, 2018.

[4] **Y. Yang** and G. Huang, "Aided Inertial Navigation with Geometric Features: Observability Analysis" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 21 - May 25, 2018.

[3] **Y. Yang** and G. Huang, "Map-based Localization Under Adversarial Attacks" in *Proceedings of the International Symposium on Robotics Research (ISRR)*, Puerto Varas, Chile, December 11 - December 14, 2017.

[2] **Y. Yang**, J. Maley and G. Huang, "Null-Space-based Marginalization: Analysis and Algorithm" in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, September 24 - September 28, 2017.

[1] **Y. Yang** and G. Huang, "Acoustic-Inertial Underwater Navigation" in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 28 - June 3, 2017.

[C] Posters and Presentations

[1] **Y. Yang** (Presenter) and G. Huang, "Attack-Resilient Map-based Localization", in *Workshop: Challenges in Adversarial Robotics at Robotics: Science and Systems (RSS)*, Pittsburgh, Pennsylvania, June 26 - 30, 2018.

PATENTS

- **Y. Yang**, J. Wang, C. Wu, *A Direct Conductor Connection Mechanism and Conductor Connection Module for Gas Insulated Switchgear*, China patent CN201510463693.2. (Application)
- **Y. Yang**, B. Liu, Q. Liu and C. Wu, *A Direct Conductor Connection Module for Gas Insulated Switchgear*, China patent CN201510020903.0. (Application)
- **Y. Yang**, S. Fang, X. Yang, Y. Li and X. Zhu, *A Linking and Supporting Device for Camera and Total Station*, China patent CN201410184465.7.

PROFESSIONAL ACTIVITIES

Membership

- Graduate student member of **IEEE**
- Graduate student member of **Robotics & Automation Society**
- Graduate student member of **Control Systems Society**

Paper Reviewer

- **Conferences**
  - IEEE Transactions On Robotics (TR-O)
  - IEEE Robotics and Automation Letters (RA-L)
  - IEEE International Conference on Robotics and Automation (ICRA)
  - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  - American Control Conference (ACC)