Mingkun Yang

mingkunyang@std.uestc.edu.cn

(+86) 17603606117

Education

Sep 2014— Jun 2018

Degree: Bachelor of Engineering in Information and Communication
Where: University of Electronic Science and Technology of China, Chengdu
GPA: 3.58 of 4.0 (Major)

- Top 13% in the same-year group
- Thesis: Pedestrian indoor positioning based on inertial navigation system
- Advisor: Prof. Zhuoling Xiao

Sep 2018— Jun 2021

Degree: Master of Engineering in Electronic and Communication
Where: University of Electronic Science and Technology of China, Chengdu
GPA: 3.77 of 4.0 (Major)

- Top 4% in the same-year group
- Thesis: Pedestrian navigation based on multi-source data fusion
- Advisor: Prof. Zhuoling Xiao

Research Interests

- Ego-motion Pose Estimation
- Learning-based Detection & Classification
- Data Fusion Algorithms
- Application of Attention Mechanism

Research Experience

October 2018—Now

Project: Research on self-contained pedestrian navigation based on micro-IMU (NSFC)

Advisor: Prof. Zhuoling Xiao

Contributions:

- Collected and labeled the foot-mounted inertial data of 87 trajectories with the total length of 15km. This data set contained 27 individuals in various indoor and outdoor scenes.
- Realized the ZUPT-aided INS, and improved the update algorithm by applying the attenuation factor to the KF.
- Devised a novel adaptive zero velocity detector leveraging the RCNNs, and its symmetrical framework enhanced the performance of detection, which outperformed the competing approaches in both accuracy and robustness.

May 2019—Now

Project: Research on evolutional autonomous positioning technology based on data fusion (NSFC)

Advisor: Prof. Zhuoling Xiao

Contributions:

- Devised a learning-based VO, and a loose-coupled VIO leveraging the KF. The penalty factor was used in the update process, which avoided the excessive correction on the translation estimation.
- Applied the attention mechanism to the end-to-end VO framework, which enabled the model to concentrate on pixels in distinct motion.
- Developed an end-to-end loop closure detector, which contained the CNN-based feature extraction, and adaptive weighted similarity calculation.
- Researched the evolutional data fusion algorithm of inertial data and GNSS signals leveraging the deep reinforcement learning.

Publications

- M. Yang, J. Liang, Z. Xiao, B. Yan, L. Zhou, S. Lin, and X. Liu. "The Research of Stance-Phase Detection to Improve ZUPT-Aided Pedestrian Navigation System". In: *2019 IEEE International Symposium on Circuits and Systems (ISCAS)*. 2019, pp. 1–5. DOI: 10.1109/ISCAS.2019.8702815
- Z. Guo, M. Yang, N. Chen, Z. Xiao, B. Yan, S. Lin, and L. Zhou. "LightVO: Lightweight Inertial-Assisted Monocular Visual Odometry with Dense Neural Networks". In: *2019 IEEE Global Communications Conference (GLOBECOM)*. 2019, pp. 1–6. DOI: 10.1109/GLOBECOM38437.2019.9013757
- R. Zhu, Z. Xiao, Y. Li, M. Yang, Y. Tan, L. Zhou, S. Lin, and H. Wen. "Efficient Human Activity Recognition Solving the Confusing Activities Via Deep Ensemble Learning". In: *IEEE Access* 7 (2019), pp. 75490–75499. DOI: 10.1109/ACCESS.2019.2922104
- Mingkun Yang, Ran Zhu, Zhuoling Xiao, and Bo Yan. "Symmetrical-Net: Adaptive Zero Velocity Detection for ZUPT-Aided Pedestrian Navigation System". In: *IEEE Sensors Journal* (2021)
- Ran Zhu, Mingkun Yang, Wang Liu, Rujun Song, Bo Yan, and Zhuoling Xiao. "DeepAVO: Efficient Pose Refining with Feature Distilling for Deep Visual Odometry". In: *NEUROCOMPUTING* (2021)
- Ran Wei, Hongda Xu, Mingkun Yang, Xinguo Yu, Zhuoling Xiao, and Bo Yan. "Real-time pedestrian tracking terminal based on adaptive zero velocity update". In: *Sensors* 21.11 (2021), p. 3808

Preprints

- K. Li, M. Yang, R. Zhu, H. Lian, N. Wu, B. Yan, and Z. Xiao. "Visual Inertial Map Matching for Indoor Positioning using Architectural Constraints". In: *IEEE Internet of Things Journal (Under Review)* (2020)
- Y. Li, R. Zhu, M. Yang, Z. Xiao, Y. Zhang, and B. Yan. "MetricNet: A Loop Closure Detection Method for Appearance Variation using Adaptive Weighted Similarity Matrix". In: *Robotics and Autonomous Systems (Under Review)* (2020)

Technical experience

Keras/Pytorch, Python, Matlab, ROS, LaTeX
Teaching Assistant of *The Advanced Application of IOT* (Undergraduate course) (2018)

Honors and awards

- Outstanding graduates of Sichuan province (2021)
- Outstanding graduates of UESTC (2021)
- First-class academic scholarship × 2 (2019-2020)
- Outstanding Student Awards of UESTC × 2 (2019-2020)
- The tide of Sichuan scholarship (2020)
- Gold award in *China Graduate Electronics Design Contest* (Top 1%) (2020)
- Gold award in *China College Students' 'Internet +' Innovation and Entrepreneurship Competition* (Sichuan district competition) (2020)
- Silver award in *China Graduate Electronics Design Contest* (Southwest district competition) (2020)
- People scholarship of UESTC × 4 (2015-2018)