Yiran Guo

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No.5 Zhongguancun South Street, Haidian district, Beijing, China, ZIP:100081

Education

- **Beijing Institute of Technology** *Sep 2022 - Up to now*

  Master of Armament Science and Technology (affiliated discipline), with a specific specialization in Mechatronics Engineering Beijing, China
  - GPA: 3.90/4.00 (Ranking Top 2/122)
  - Weighted Average Score on a 100-Point Scale: 90.00
  - Core Modules: Machine Learning and Image Processing, Transient Information Processing Technology, Multi-sensor fusion for navigation, Matrix Analysis, Aircraft Control Theory

- **Beijing Institute of Technology** *Sep 2018 - July 2022*

  Bachelor of Mechatronics Engineering Beijing, China
  - GPA: 3.60/4.00
  - Weighted Average Score on a 100-Point Scale: 87.84
  - Core Modules: Programming in C/C++ and Python, Mathematical Analysis, Probability Theory and Mathematical Statistics, Digital Signal Processing, Optimization Method, Signals and Systems

Scholarships Previously Awarded

- **National Scholarship for Graduate Students** *2024*

  Ministry of Education of the People's Republic of China
  - Amount: 20000RMB. Only 40/13,000+ master's students in BIT are eligible for this scholarship each year.
  - The National Graduate Student Scholarship is awarded to graduate students who demonstrate outstanding academic performance, significant research abilities, and exceptional development potential. Recipients of this scholarship can be regarded as highly qualified graduate talents.

- **Xiaomi Scholarship Grand Prize** *2023*

  Xiaomi Corporation
  - Amount: 20000RMB. Only 40/10,000+ master's students in BIT are eligible for this scholarship each year.
  - This scholarship recognizes students who have excelled and developed their own research character.

- **Scholarship of Academic Excellence** *2023, 2024*

  Beijing Institute of Technology
  - Amount: 6000RMB. Only the top 5% of graduate students in BIT are eligible for this scholarship.
  - This scholarship is designed to recognize students with high academic achievement and a high level of research output or contribution.

Honors, Awards And Prizes

- **Outstanding Graduate Student Pacesetter of BIT** *2023*

  Beijing Institute of Technology
  - The honor usually selects only 8 students per college in Beijing Institute of Technology.
  - This honor recognizes students who have demonstrated academic excellence and community contributions.

- **Outstanding Student of Beijing Institute of Technology** *2024*

  Beijing Institute of Technology
  - The honor usually selects only 20 students per college in Beijing Institute of Technology.
  - This honor recognizes students who have demonstrated academic excellence and community contributions.

- **2023 BRICS SKILLS COMPETITION (BRICS Future Skills & Tech Challenge)** *2023*

  China Invention Association, China Center for International People-to-People Exchange, Ministry of Education
  - Won **The Third Prize** of the 2023 BRICS SKILLS COMPETITION.

◦ I ranked first in the award I received.

- **The 13th APMCM Asia-Pacific Regional Student Mathematical Modeling Competition** *2023*
  Organizing Committee of APMCM, Beijing Society of Image and Graphics
  ◦ Won **The Third Prize** of the 13th APMCM Asia-Pacific Regional Student Mathematical Modeling Competition.
  ◦ I ranked first in the award I received.

- **Beijing City and Tsinghua University Virtual Simulation Creative Design Competition** *2023*
  Tsinghua University, Beijing Institute of Technology, University of Science and Technology Beijing
  ◦ Won **The First Prize** of the First Beijing and The Fourth Tsinghua University Virtual Simulation Creative Design Competition.
  ◦ Our team's work is a virtual reality simulation on precision landing control of UAVs and I ranked first in the award I received.

- **Wu Yunduo Cup Youth Programming Competition** *2023*
  Beijing Institute of Technology
  ◦ Won **The First Prize** of the programming competition and I led the only team to win two awards.
  ◦ Our team's topic is about the positional coordinate transformation of UAV cameras and the design and training of target recognition models. I ranked first in the awards I received.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, R=UNDERGOING REVIEW, S=SOFTWARE COPYRIGHT

[J.1] **Yiran Guo**, Qiang Shen, et al. (2024). **Sea-IoUTracker: A more stable and reliable maritime target tracking scheme for unmanned vessel platforms**. *Ocean Engineering*, CiteScore=7.3, IF=4.8, Volume 299. 1 May 2024, DOI: 10.1016/j.oceaneng.2024.117243

[J.2] **Yiran Guo**, Qiang Shen, et al. (2023). **Research on a super-resolution and low-complexity positioning algorithm using FMCW radar based on OMP and FFT in 2D driving scene**. *Sensors*, IF=3.9, Volume 23(9). 6 May 2023, DOI: 10.3390/s23094531

[J.3] Hanyu Wang, **Yiran Guo**, et al. (2024). **A Classwise Vulnerable Part Detection Method for Military Targets**. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, IF=4.7, Volume 17. 13 April 2024, DOI: 10.1109/JSTARS.2024.3389072

[J.4] Hanyu Wang, **Yiran Guo**, et al. (2024). **A Joint Detection Method for Military Targets and Their Key Parts for UAV Images**. *IEEE Transactions on Instrumentation and Measurement*, IF=5.6, Volume 73. 18 September 2024, DOI: 10.1109/TIM.2024.3460951

[R.5] **Yiran Guo**, Qiang Shen, et al. (2025). **SeaScale-Net: A Robust Framework for Cross-Scale Vessel Detection and Tracking in Maritime Intelligent Transportation Systems**. Manuscript submitted for publication in *IEEE Transactions on Intelligent Transportation Systems*, which is currently undergoing review.

[C.1] **Yiran Guo**, Qiang Shen, et al. (2023). **An Airborne Target Recognition Model Based on SPD, PConv and LADH Detection Heads**. In *Proceedings of 3rd 2023 International Conference on Autonomous Unmanned Systems*, ICAUS 2023. Volume 1173. Singapore, 23 April 2024, DOI: 10.1007/978-981-97-1087-4_31

[P.1] **Yiran Guo**, Qiang Shen, Zilong Deng, et al. (2024). **A detection model training method for low-resolution small targets**. China National Intellectual Property Administration, Patent No. 2024107248054. Registration Date: 2024.5.21, Grant Date: 2024.6.17, Publication Date: Now is pending.

[P.2] Wenyang Pu, **Yiran Guo**, Qiang Shen, et al. (2024). **Design of a UAV Positional Optimization Algorithm**. China National Intellectual Property Administration, Patent No. 2024104691731. Registration Date: 2024.4.18, Grant Date: 2024.6.2, Publication Date: Now is pending.

[S.1] **Yiran Guo**, Qiang Shen, Zilong Deng, et al. (2024). **A simulation software for optimal landing position of unmanned aerial vehicle**. National Copyright Administration of the People's Republic of China, Software Copyright No. 2024R11L0800976. Registration Date: 2024.4.19, Publication Date: 2024.6.12.

RESEARCH EXPERIENCE

- **Multi-scale Targets Detection at Sea Based on Satellite Remote Sensing Video** *Feb 2024 - Jul 2024*
  Research Assistant funded by the National Natural Science Foundation of China Beijing, China
  ◦ Developed a spatial attention mechanism Deformable Scale Attention based on Deformable Convolutional DCNv3.
  ◦ Designed a multi-level bidirectional feature fusion pyramid structure, named as SDI-FPN.
  ◦ Completed the construction of the overall network structure based on Resnet skeleton, and named it BDSS-Net.
  ◦ Conducted a lot of test on four public datasets in remote sensing (DOTAv2.0, SSDD+, HRSC2016, DIOR-R), and did the corresponding ablation experiments on each module composing BDSS-Net.

- In terms of detection accuracy and AP values, BDSS-Net exhibited an improvement in performance of between 2% and 10% in comparison to the four SOTA detectors on the aforementioned four datasets. However, this was accompanied by a reduction in real-time frame rate.
- Wrote an SCI paper and published it in IEEE Transactions on Geoscience and Remote Sensing (JCR Q1, IF=7.5, CiteScore=11.5).

- **Maritime Multi-target Tracking for Unmanned Vessel Platforms** *May 2023 - Dec 2023*
  Research Assistant funded by the National Natural Science Foundation of China Beijing, China
  - Completed the construction of a target tracking model suitable for wind and wave bumps and multiple similar target scenarios, and the tracker is named as Sea-IoUTracker.
  - Added a position prediction of the buffered anchor frame region with re-matching after performing two BIoU-based feature matches.
  - Validated the performance of my tracking solution and other SOTA Trackers such as ByteTrack, BoT Tracker and CenterTrack on the Singapore Maritime dataset (SMD) and it outperformed.
  - Wrote an SCI paper and published it in Ocean Engineering (JCR Q1, IF=4.6, CiteScore=7.3).
- **Millimeter-Wave Radar-Based Super-Resolution Localization in Two-Dimensional Planes** *Nov 2022 - Apr 2023*
  Research Assistant funded by the National Natural Science Foundation of China Beijing, China
  - Developed a super-resolution localization algorithm for FMCW radar in a two-dimensional plane based on sparse decomposition and FFT.
  - Conducted simulation and real machine test experiments for the algorithm and performed an in-depth analysis of the experimental results.
  - My algorithm achieved a maximum angular resolution of 0.02°, setting a new state-of-the-art accuracy for angular localization in millimeter-wave radar.
  - Wrote an SCI paper and published it in Sensors (JCR Q2, IF=3.9, CiteScore=6.8).
- **Training Data Collection for ChatGLM** *Jan 2023 - Apr 2023*
  Data Mining Assistant, collaborated with SIST, Tsinghua University Beijing, China
  - Conducted long conversations with ChatGPT and judged the quality of the conversation data.
  - Collected conversations from Claude and other large models as data for training the large language model: ChatGLM.
  - Trained my own German-to-English translator based on the BPE word segmenter model.
- **Precision Landing of A Drone Using A Monocular/Depth Camera** *Jul 2020 - Dec 2020*
  Research Assistant of the subject under National Natural Science Foundation of China Beijing, China
  - Wrote recognition algorithms and utilized a camera-equipped drone to accurately identify various landing marks on the ground.
  - Calculated the orientation deviation between the mark's center and the UAV by measuring the distance between the center of each mark and the center of the camera.
  - Wrote serial communication code and transmitted the data back to the ground station in real time via wifi, enabling precise control adjustments.
  - Identified the landing markers within a 20-meter-long track and completed the landing in the designated area within 60s.

SKILLS

- **Programming Languages:** C/C++, Python, Matlab, R Project
- **Data Science & Machine Learning:** Data Modeling, Data Visualization(Origin), Linear Algebra, Statistics, Deep Learning, Advanced Signal Processing Techniques
- **Familiar Sensors & Development Boards:** Intel Realsense Depth Camera D435i & D455, OpenMV Monocular Camera, Texas Intruments AWR2944 mmWave Sensor, Pixhawk, NVIDIA Jeston, Micro control system 51 Series, Intel NUC 11
- **Other Development Tools:** ROS Kinetic & Melodic
- **Deep learning Framework:** Pytorch, Tensorflow, Transformer, Mxnet, PaddlePaddle, Keras
- **Research Skills:** Git, LaTeX, Matplotlib
- **Languages:** Chinese (Native), English (Academic Writing & Reading, Fluent), German (Learning, Ordinary)