Zhang Han

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EDUCATION

Guilin University of Technology **B.S. in Geographic Information Science** 09/2021 – 06/2025

- GPA: 88/100 *(View Transcript)* *Rank: 3/96*
- **Coursework:** Cartography (94), UAV Remote Sensing (95), Design of Python Programming (95), Principles and Applications of Spatial Database (91), Secondary Development of GIS (95)
- Ranked 1st in major for both comprehensive evaluation and cumulative GPA (92/100) during junior year; Scored $\geq$95 in 50 courses and $\geq$90 in 59 courses throughout the undergraduate program

Guilin University of Technology *Minor in Big Data Intelligent Mapping and Simulation* 09/2023 – 06/2025

- GPA: 92/100
- **Coursework:** Intelligent Mapping Engineering (91), Location-Based Service Network and Big Data Technology (95), Artificial Intelligence Methods and Applications (90), Virtual Reality and Real 3D Modeling (95)

RESEARCH EXPERIENCE

1. Undergraduate Thesis: Optimization of Tropical Cyclone Detection and Area Estimation Algorithm Based on DynamiCyclone-YOLO 03/2025 – 06/2025

Supervisor: Prof. Jingwen Li

- Tropical cyclone **object detection**: Constructed the **DynamiCyclone-YOLO** model and performed on 4,800 Himawari satellite images obtained by Python web scraping over the Northwest Pacific from 2000 to 2024.
- Tropical cyclone **track prediction**: Combined the detection boxes and coordinate outputs of DynamiCyclone-YOLO with historical cyclone track data, and fed them into MobileNetV3 to achieve end-to-end, multi-step regression forecasting of 24-hour future tracks.
- Tropical cyclone **area calculation**: Applied a fixed brightness-temperature threshold to binarize the output images, counted the valid bright-region pixels, and converted them to physical area using the imagery's spatial resolution.

2. Thesis: YOLOv8-MDA: Multi-Scale Dilated Attention Fusion for Infrared Small Object Detection 12/2024 – Present

Supervisor: Prof. Jingwen Li

- Constructed the **YOLOv8-MDA** model, using mAP50-95, mAP50, F1-score, precision, recall, FPS, parameter count, and FLOPs as evaluation metrics.
- Performed module ablation experiments and comparative evaluations with YOLOv5, YOLOv6, and YOLOv8 on three open-source datasets to assess small-object detection performance on infrared imagery.
- Presented detection results using various visualization techniques.
- **Outcomes**: The architecture is finalized, implementation and evaluation are forthcoming, and a manuscript is planned for submission to an SCI Q4 journal.

3. Estimation of daytime all-sky sea surface temperature from Himawari-8 based on multilayer stacking machine learning 11/2023 – 12/2023

Project Team Leader Supervisor: Donglin Fan (Associate Professor)

- Designed a **three-layer stacked machine learning model** (TLSM) with 22-dimensional input features and evaluated its performance using R^2, RMSE, and bias.
- Constructed a training and testing sample set covering nine cloud types by matching Himawari-8 gridded imagery with cloud property products and in situ sea surface temperature (SST) data through three-level collocation in time, space, and quality flags.
- Conducted multiple comparative experiments—such as SVR baseline model comparisons, cloud-type-specific evaluations, input configuration tests, and additional comparative studies—to achieve all-weather sea surface

temperature retrieval.

- **Outcomes**: Won the Grand Prize in the Guangxi Geography Innovation Contest; work formed the basis for subsequent journal submission by the supervisor.

4. Road Extraction from Remote Sensing Imagery Based on Deep Learning 04/2023 – 04/2024

Project Team Member Supervisor: Chao Ren (Professor)

- Proposed a **CoTPANeXt** road extraction model integrating multi-scale features to address the poor extraction of fine roads and ensure the integrity of primary roads at intersections and curves.
- Annotated over 3,000 high-resolution UAV images of rural towns in Guilin using LabelMe and evaluated performance using precision, recall, F1-score, and MIoU.
- Compared experimental results against existing networks—U-Net, ResNet, and CoTNeXt—to analyze model effectiveness.
- **Outcomes**: Undergraduate Innovation & Entrepreneurship Project – Provincial-Level – Rated "Excellent"

5. Inversion of Coastal Chlorophyll-a Concentration Using Mixture Density Network 04/2022 – 04/2023

Project Team Member Supervisor: Donglin Fan (Associate Professor)

- Constructed a **mixture density network** (MDN) employing a Gaussian distribution as the kernel function and evaluated its precision using metrics such as R^2 and RMSE.
- Performed spatiotemporal collocation of Himawari-8 satellite data with in situ chlorophyll-a measurements from the Hong Kong Environmental Protection Department, applied atmospheric correction, and obtained real reflectance.
- Employed model inversion to derive nearshore chlorophyll-a concentrations and assess potential water pollution in Hong Kong's coastal areas.
- **Outcomes**: Undergraduate Innovation & Entrepreneurship Project – University-Level - Rated "Good"

Supplementary Research Projects

1. Term Paper: AOD Retrieval via Multilayer Stacking ML (Physical Geography) 01/2024

- Independently authored a literature review integrating Himawari-8 satellite and AERONET ground data to assess feasibility of multilayer stacking machine learning for aerosol optical depth retrieval.

2. Preventing Fatigue Before It Happens 10/2023 – 06/2024

- Analyzed 1,200+ survey responses with descriptive statistics, cross-analysis, and clustering to model factors influencing alert-device purchase intention.
- Conducted multinomial logistic regression, chi-square tests, and fuzzy comprehensive evaluation to examine user-group differences and satisfaction.
- Employed web crawlers for text mining to extract user concerns, suggestions, and sentiments.
- **Outcomes**: Market Research and Analysis Competition — National Third Prize & Provincial First Prize

3. Silent dried fruits — a Promise with Yongfu. 10/2022 – 04/2023

- Analyzed 639 surveys using descriptive statistics to evaluate dried-fruit purchase behavior and poverty-alleviation awareness.
- Applied logistic regression to assess purchase intention.
- Leveraged K-means clustering and Random Forest to identify potential users and key drivers of consumer preferences.
- **Outcomes**: Market Research and Analysis Competition — Provincial First Prize

PUBLICATIONS

Xie, J., ***Zhang, H.***, Wang, F., & Zhou, B. (2024). Analysis and evaluation of multi-scale spatial characteristics of rural residential areas. *Geomatics & Spatial Information Technology*, 47(6), 4–7. *DOI: 10.3969/j.issn.1672-5867.2024.06.003*

You, Y., Yang, Y., & ***Zhang, H.*** (2023). Priority options for the 17 UN Sustainable Development Strategies: Based on the model network perspective. *BCP Business & Management EMEHSS*, 49, 266–279. *DOI: https://doi.org/10.54691/bcpbm.v49i.5432*

COMPETITIONS

National Level

- 3rd Prize – The China National University Student Market Survey and Analysis Competition 2024
- Excellence Award, 12th National College GIS Application Skills Competition 2023

Provincial Level

- 1st Prize, 14th and 13th Market Research and Analysis Competition 2023 & 2024
- Outstanding Project, Innovation Program on "Road Extraction using Deep Learning" 2024
- Special Prize, Paper Competition – Guangxi Geo-Science Innovation Contest 2023
- 3rd Prize, National Mathematical Modeling Competition 2023
- Special & 2nd & 3rd & Excellence Prize, English Competitions 2021 - 2023

SCHOLARSHIPS & HONORS

Scholarships

- National Scholarship 2024
- The Special Prize Scholarship 2024
- The First Prize Scholarship 2022 & 2023

Honors & Titles

- Outstanding Graduate 2025
- Excellent League Member 2024
- Merit Student 2022 - 2024

WORK EXPERIENCE

Hangzhou SensingX Technology Co., Ltd. *Data Processing & Analysis Engineer* 02/2024 – 04/2024

- Annotated urban underground pipeline defects using proprietary software and technical manuals, classifying 10,000+ images into corrosion, leakage, displacement, and other categories.
- Maintained strict annotation quality and consistency, enabling downstream defect detection models to achieve high precision.

Zaozhuang Public Security Bureau, Shizhong Branch Traffic Police Unit 12/2022 – 02/2023

- Classified and labelled 5,000+ traffic-accident images per official severity/type protocols (e.g., collision, rear-end, rollover).
- Honed visual-detail acuity and maintained high annotation accuracy under real-world, time-constrained conditions.

On-campus Internships

- Surveying Practice — Total Station, Level Instrument
- Fundamental GIS Practice — SuperMap, ArcGIS, Handheld GPS
- GIS Spatial Analysis Practice — ArcMap, ArcScene, Excel
- Photogrammetry and Remote Sensing — VirtuoZo, ENVI
- Spatial Database Practice — PostgreSQL, PostGIS, pgAdmin, ArcMap, CAD, GeoServer
- LBS Development and Application Practice — HTML, CSS, JavaScript, PostgreSQL, Baidu Map API
- GIS Comprehensive Practice — pycharm, pytorch, python

CAMPUS ACTIVITIES

Leaderships

- Secretary of the Youth League Branch & Class President 09/2024 – 06/2025
- Lecturer, Peer Teaching Program "Zhihui" 05/2024 – 06/2025
- Deputy Director, Student Department, University Youth League Committee 10/2023 – 10/2024

- Study Secretary 09/2023 – 09/2024
- Deputy Head of Archives Department, Party Affairs Center 09/2022 – 09/2023
- Deputy Head, Secretariat, Math Modeling Association 06/2022 – 06/2023
- Secretary of the Youth League Branch 09/2021 – 09/2022

Social Practice

- "Two Bombs, One Satellite" Spirit Volunteer Lecture Series 2023
- "Colorful Holiday" Rural Children Education Program 2023
- "Dream Fulfillment Project" for Underprivileged Students 2023
- 2023 Green Long March Scientific Expedition 2023
- "Three Going to the Countryside" Summer Social Practice 2022 & 2023

CERTIFICATES & QUALIFICATION

Skills

- Development Tools: Visual Studio, VS Code, PyCharm, PgAdmin
- Programming and Web: C#, Python, HTML/CSS/JavaScript, SQL
- GIS & Remote Sensing Tools: ArcGIS, ENVI, SuperMap, MapGIS, CAD, CASS
- Modeling & Visualization: 3ds Max, Unity, SketchUp, Pix4D

Certifications

- National Certificate of Informatization Engineer – Level 2: GIS Application Practice & Level 1: GIS Fundamental Theory (NCIE-GIS)
- UAV Safety Theory Certificate
- Market Research Analyst Certificate