Hongyi Hao

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EDUCATION BACKGROUND

Shanxi Institute of Technology 09/2022 - 07/2026

Bachelor of Science, Computer Science & Technology

Overall GPA: 3.59/4.5 (89.43/100)

PUBLICATION

CONFERENCE PROCEEDINGS

ECHOES: input sensing and rEconstruCtion model utilizing CNN and LSTM witH mObilE Sensor data.

Hongyi Hao*

ICICC 2025

RESEARCH EXPERIENCES

Distributed Machine Learning 05/2025 – 08/2025

Online Research Seminar, Supervised by Professor Soummya Kar

- Conducted a comprehensive study of distributed and federated learning paradigms, covering supervised learning, stochastic optimization, distributed ML architectures, advanced federated learning, and convergence analysis
- Implemented ML models and stochastic optimization using real-world datasets, thus developing a novel distributed ML algorithm to achieve simple image classification, house price prediction, and traffic monitoring
- Contributed to developing a communication-efficient federated learning variant for imbalanced datasets
- Discussed advanced research applications of federated learning, like autonomous systems and edge computing

INTERNSHIP EXPERIENCES

ArcherMind Technology 06/2023 – 08/2023

Data Analyst Intern

- Collected and organized relevant data generated by in-vehicle AI, and performed data cleaning to remove unreasonable data, ensuring the accuracy of AI decisions and responses, thereby improving user satisfaction

Institute of Automation, Chinese Academy of Sciences 07/2024 – 09/2024

Backend Development Intern

- Carried out simple backend development based on SpringBoot, grasped MySQL and Oracle working principles, Spring Cloud microservices architecture, and studied the workflow of distributed system architecture

PATENTS

Hongyi Hao, "Computer Network Security Protection Software", Software Copyright Registration Number: 2025SR0380865, issued Mar 4, 2025.

Hongyi Hao, "Programming Language Intelligent Learning Assistance Software", Software Copyright Registration Number: 2025SR0328689, issued Feb 25, 2025.

Hongyi Hao, "Tunnel Laser Projection Contour Model Making Software", Software Copyright Registration Number: 2024SR1961537, issued Dec 3, 2024.

Kexin Wang, Hui Sun, Xueshuang Sun, Hangyu Yang, **Hongyi Hao**, Jun Wei, Wenmao Tian, Hongfei Li, Guorui Tian, Gang Li, Dongsheng Wang, Zhihao Liu, Chenglin Song, "Security Robot", Chinese Patent CN308942412S, filed Apr 30, 2024, issued Nov 15, 2024.

Hongyi Hao, Jun Wei, Xueshuang Sun, Bingyu Zhou, Jiahe Wang, Kun Yao, Kun Huang, Xizhe Wang, Yuhui Zhang, Keying Li, "An Automatic Deviation-Correcting Drilling Equipment for Tunnel Inner Wall", Chinese Patent CN118361189B, filed Jun 20, 2024, issued Sep 17, 2024.

Hongran Wang, Jie Bai, Ye Tian, Shiyong Liu, **Hongyi Hao**, Jinxin Zhang, Xuanning Cui, Chufeng Zhang, "Psychological Test Applet", Software Copyright Registration Number: 2024SR0668850, issued May 17, 2024.

AWARDS

Provincial Special Award, College Students' Extracurricular Academic and Scientific Works Competition 06/2025

Provincial Winner, Shanxi Small and Medium Enterprises Innovation and Entrepreneurship Competition 09/2024

College Individual Scholarship, Academic Year 2023-2024 09/2024
Department 3rd Class Scholarship, Academic Year 2023-2024 09/2024
Provincial 2nd Place, Shanxi Central Youth City Innovation and Entrepreneurship Competition 02/2024
Provincial 3rd Prize, *Zhongkong Xinda Cup* Computer Programming Competition for College Students 10/2023
Department 2nd Class Scholarship, Academic Year 2022-2023 09/2023

PROJECT EXPERIENCES

Concrete Inspection Robot Detection System Based on Yolo Model

- Focused on combining 5G, IoT (Internet of Things), and AI techniques to develop novel adsorption detection robots and intelligent monitoring systems to achieve automated and efficient tunnel inspection
- Equipped the robot with functions, such as wireless radar detection, flying, and climbing modes, to adapt to the complex tunnel environment, 3D visualization system to support real-time warning and closed-loop management
- Introduced Deep Learning (DL) algorithms to optimize the robot model and reduce the computational complexity based on Yolo v5s, and constructed the bimodal dataset to enhance the robustness and adaptability

Project I: Tunnel Laser Projection Coordinate Conversion

- Developed a coordinate conversion system that transformed spatial coordinates obtained by laser scanning to the real-world construction coordinate system, maximizing the consistency between design theory and actual data

Project II: Tunnel Laser Projection Contour Model Design

- Employed laser scanning technology to generate an accurate 3D projection outline model of a tunnel, enabling the model to create a tunnel cross-section automatically by incorporating laser distance measurement skills
- Utilized a laser imaging technique to present the tunnel's shape and structure visually, identifying irregular structural challenges to improve the tunnel construction efficiency

Project III: Automatic Deviation Correction & Drilling Equipment for Tunnel Inner Wall

- Designed a deviation correction drilling device, composed of telescopic arms, positioning, and elastic return mechanisms, to solve the angle control and positional offset issues when drilling the inner wall of a curved tunnel

Project IV: Underground Space Concrete Quality Monitoring & Management System

- Developed a system that automatically generates quality inspection reports based on the data sent back by the wireless air-coupled radar on the adsorption detection robot, and inspection results of computing power platforms
- Combined BIM (Building Information Modeling) with detection outcomes to form tunnel diagrams, marking defects with diverse colors, adding a full life cycle monitoring system to conduct closed-loop management of different defective parts' maintenance status, and achieving high-quality engineering

Project V: Automatic Return System of Geological Radar Data

- Formulated a system that automatically transmits the monitoring long image of the wireless air-coupled geological radar to the handheld terminal to the computing power platform for defect detection based on local area and wireless networks, returning detection results and reports precisely

ENTREPRENEURIAL & EXTRACURRICULAR ACTIVITIES

Taiyuan Hongming Intelligent Technology Co., Ltd. 03/2024 – Present

Legal Representative

- Co-founded this company with several classmates as the founder, developed multiple exploration robots listed in *Research Experiences*, thereby participating in contests and winning 4 provincial awards listed in *Awards*
- Undertook technical commissions related to digital and computers from all over the country, developed and improved robot and recognition models, and obtained patents and software copyrights listed in *Patents*

Sesame Algorithm Club 09/2022 – Present

Minister of the Algorithm Department

- Trained team members for ACM algorithm competitions, where the team members won multiple provincial awards, led members to attend programming design contests, and won numerous provincial awards

SKILLS

- Language: English (IELTS)
- Programming: C/C++, Java, Python, MySQL, JavaScript, OpenCV, ROS, Pytorch, Anaconda, NumPy, Linux, Git, Qt, Spring Boot