Haoqin Hong

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Education

- **Southwest University** — Chongqing, China
  College: *Hanhong College (Honor Program)* — *September 2021 – July 2025*
  Degree: *Bachelor of Science in Computer Science and Technology*
  GPA: *4.2/5.0* ***Weighted Average Score:*** *90.6* ***Rank:*** *6/40*

- **University of California, Los Angeles (UCLA)** — Los Angeles, USA
  Project: *Data Science (Visiting Student)* — *September 2022 – December 2022*
  Courses: *Introduction to Data Science (A), Data Science Fundamentals (A-), Machine Learning with Python (A+)*

Publications

- **Haoqin Hong**, Y. Zhou, X. Shu, X. Hu, "CCSPNet-Joint: Efficient Joint Training Method for Traffic Sign Detection Under Extreme Conditions.", International Joint Conference on Neural Networks, IJCNN 2024**(CCF-C Conference)**.

Invention Patents

- "Voice Recognition System and Method Based on Lightweight Transformer Network", Chinese Invention Patent.
- "Memristor-based Text Emotion Detection System and Method", Chinese Invention Patent.

Honors and Awards

- Chongqing Municipal Advanced Individual of Innovation Capacity Enhancement. *Oct 2023*
- Southwest University Undergraduate First Class Scholarship (Rank 1/40). *Oct 2023*
- Special Scholarship for Overseas Study or Internship of Han Hong College. *Nov 2023*
- Southwest University Academic Science and Technology Award. *Oct 2023*

Research and Internship Experience

- **Chongqing Key Laboratory of Brain-inspired Computing and Intelligent Chips** — Chongqing, China
  Undergraduate Research Assistant — *March 2022 – Present*
  - **Research Direction**: Neuromorphic Algorithms and Memristor Circuit Design (Supervisor: Xiaofang Hu).
  - **Research Content**: The key focus of our research group is on the lightweight design of neuromorphic algorithms and their circuit simulation and deployment on memristor chips. My main involvement is in researching improved algorithms for Transformers in the field of computer vision and designing neural network models according to real-world task scenarios. I perform the simulation of memristor neuromorphic circuits on PSpice, completing weight mapping and algorithm functionality verification.

- **Zhejiang Lab Cross-Innovation Research Institute** — Zhejiang, China
  Algorithm Intern (Visual 3D Human Posture Reconstruction and Motion Capture Direction) — *January 2024 – June 2024*
  - **Internship Content**: Our team proposed a method for optimizing lighting and color in 3D Gaussian Splatting (3DGS) models through physical rendering technology based on the Bidirectional Reflectance Distribution Function (BRDF). This approach incorporates layered gradient densification to enhance the quality and clarity of scene detail rendering in the 3DGS model. Furthermore, by utilizing normal vector gradients, the method further improves the model's reconstruction effects on complex lighting parts within the scene.

- **Institute of Automation, Chinese Academy of Sciences** — Beijing, China
  AI Algorithm Research Intern (Visual-Textual Multimodal Direction) — *August 2022 – September 2022*
  - **Internship Content**: This study primarily investigates the CLIP vision-text multimodal algorithm and its application in object detection tasks. It successfully constructed the corresponding model on the PaddlePaddle framework of the Paddle deep learning platform and carried out necessary pre-training, fine-tuning, and optimization. Good performance and visualization results were obtained on an open-source dataset for automatic driving traffic sign detection.

Project Experience

- **Image Processing Based on Multimodal Astronomical Large Models** — Beijing, China
  Chinese Academy of Sciences Innovation and Practice Training Program for Undergraduates — *June 2023 – Present*
  - **Project Background**: Science and Technology Program Internship, Department of Optical Astronomy, National Astronomical Observatories, Chinese Academy of Sciences (Supervisor: Ali Luo).
  - **Project Description**: The aim of this project is to utilize the equatorial and declination coordinates of Galaxy Zoo with the infrared bands collected by the Wide-field Infrared Survey Explorer (WISE) satellite for cross retrieval and cross-modal learning. It also effectively realizes the classification of infrared spiral galaxies by combining a self-supervised learning-based comparison method to extract photometric features of astronomical images and an unsupervised learning-based clustering method.

- **Research and Application of Multi-Layer Attention Networks based on Memristors** — Chongqing, China
  Provincial Innovation Training Program Leader — *June 2023 – November 2023*

- **Project Description**: This project aims to provide a model design and deployment solution on an AI edge computing platform for natural language processing tasks using amnesia multilayer attention network algorithms. The project finally completed the deep learning model design for the text emotion detection task and speech recognition task and realized the peripheral circuit simulation of the algorithm on PSpice and the actual deployment verification on the amnesia chip.

- **Real-Time Robot Visual Object Detection and SLAM 3D Map Building Navigation** Chongqing, China
  Head of Vision Group, Robotics Innovation Lab, Southwest University *March 2023 – July 2024*
  - **Project Description**: Designing a four-point detection model for the robotic armour plate based on YOLOv8, which can accurately identify the four-point coordinates of the numerical markings and light strips on the armour plate, so that the four-point coordinates of the numerical markings and light strips on the armour plate can be accurately identified, and thus solved in SolvePNP. The actual position is solved in SolvePNP and then Kalman filtering is utilized for motion prediction. The LIDAR inertial odometry algorithms Fast-Lio and Point-Lio were deployed using Docker and ROS Humble and thus relied on the Livox Mid-360 LIDAR was used to efficiently implement SLAM 3D point cloud mapping of the real scene, and then Navigation2 was used to build a robot behavior tree to achieve decision-making and navigation functions.

Competition Awards

- Bronze Medal in Kaggle Research Competition: Google - Fast or Slow? Predict AI Model Runtime. *Nov 2023*
- National Second Prize in the China/Contemporary Undergraduate Mathematical Contest in Modeling. *Nov 2023*
- National First Prize in the DJI RoboMaster of the China University Robot Competition. *May 2023*
- National First Prize in the China Robotics and Artificial Intelligence Competition. *Jun 2023*
- National Third Prize in the Chinese Collegiate Computing Contest. *May 2023*
- Provincial First Prize in the National Undergraduate Electronics Design Contest. *Aug 2023*
- Provincial First Prize in the China/Contemporary Undergraduate Mathematical Contest in Modeling. *Nov 2022*
- Provincial Special Prize in the China Robotics and Artificial Intelligence Competition. *May 2023*
- Provincial First Prize in the Chinese Collegiate Computing Contest. *May 2023*

Skills Summary

- **Language**: CET-6(565), IELTS(6.5)
- **Programming**: Python, R, C/C++
- **Tools**: Linux, LaTex, OpenCV, PyTorch, Docker, ROS, SLAM, MATLAB/Simulink

Extracurricular Experience

- **Southwest University Student Union** Chongqing, China
  Head of Life Practice and Rights Department *October 2022 - July 2023*

- **Southwest University Student Union** Chongqing, China
  Staff of Life Practice and Rights Department *October 2021 - July 2022*