Runqiu Wang

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EDUCATION

2024 - 2026   B.S.E in Computer Science at **University of Michigan**   (GPA: 3.97/4.0)
              Coursework: Computer Vision, Computer Network, Machine Learning, Database
2022 - 2026   B.S. in Mechanical Engineering at **Shanghai Jiao Tong University**   (GPA: 3.57/4.0)
              Coursework: Design and Manufacturing, Dynamic Systems, Laboratory

RESEARCH EXPERIENCE

Undergraduate Research Assistant, AMI Lab   Jan. 2025 – present

University of Michigan · Ann Arbor, MI · Advisor: Ke Sun

– Project 1: Towards Practical Moiré-Based Visualization of Airflows with Commodity Cameras
  – Co-first author; designed and implemented a sensing pipeline, using Moiré-patterned wallpaper and low-cost cameras to reveal otherwise invisible heat plumes and gas leaks for real-world applications.
  – Developed a calibration module that aligns the camera to the wallpaper and automatically tunes the pattern frequency to keep a stable Moiré pattern under changing camera poses.
  – Built downstream processing and ML pipeline, collecting 8.25h of data and training PyTorch models for dry/moist-heat classification (99.8% acc.) and oil-temperature regression (MAE$\approx 7°C$).
– Project 2: Wearable IMU-based Activity Recognition and Motion Transcription
  – Surveyed ∼50 papers on wearable IMU sensing and reproduced key baselines.
  – Implemented a transformer-based IMU localization prototype for flexible device combinations.

Undergraduate Research Assistant, DIDIS Lab   April 2024 – Aug. 2024

Shanghai Jiao Tong University · Shanghai, China · Advisor: Youyi Bi

Project: Transformer-Based Motion Planning via Seq2Seq Generation
  – Implemented a loss module to combine configuration, point-cloud matching, and collision losses.
  – Built attention and point-cloud visualization scripts to analyze how the model attends to obstacles.
  – Ran ablation experiments on learning-rate schedulers to study their effects on path quality.

PUBLICATIONS

Runqiu Wang*, Linzhen Zhu*, et al. (submitted 2025). "Towards Practical Moiré-Based Visualization of Airflows with Commodity Cameras". Manuscript under double-blind review for a flagship ACM conference on mobile computing. *Equal contribution.

Boyan Li, **Runqiu Wang**, et al. (Aug. 2025). "Motion Planning Transformers (MP-Former): Treat Motion Planning As Sequence-To-Sequence Generation". In: *Proceedings of the ASME 2025 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE 2025)*. Anaheim, California, USA. DOI: 10.1115/DETC2025-169215.

Selected Projects

Diffusion-Based Face Emoji Generation *(EECS 553: ML)* — March 2025 – April 2025

- Designed and implemented a pipeline that synthesizes a combinatorial emoji dataset, trains an EDM-based diffusion model, and evaluates generation quality and novelty with multiple metrics.
- Ran ablation experiments over model size and training epochs, and analyzed how FID/KID and MeanMSE evolve during training to characterize memorization vs. novelty in generated emojis.

Network Simulation *(EECS 489: Computer Networks)* — Jan. 2025 – April 2025

- Simulated network topologies in Mininet and wrote C++ socket programs to measure RTT and throughput, reproducing bufferbloat and analyzing its impact on latency-sensitive flows.
- Built a video proxy with load balancing and adaptive DASH streaming to improve quality of experience under varying bandwidth conditions.
- Implemented a POX-based SDN controller and a TCP-like reliable transport over UDP, along with an L3 router supporting ARP and ICMP.

AI-Driven AR Drawing Assistant *(EECS 498: AI-Enabled Mixed Reality)* — Jan. 2025 – April 2025

- Designed and implemented an AR system that turns voice descriptions into AI-generated line drawings projected onto paper, allowing users to trace custom sketches.
- Implemented a GPT-4o + DALL·E 3 image pipeline and a Meta Quest 3 AR module (Unity + OpenCV/ArUco + solvePnP) for marker-based projection alignment.

Bluetooth-Controlled Robotics Vehicle *(First Place, 13th SJTU "Liming Cup" Mechanical Innovation Competition For Freshman)* — March 2023 – May 2023

- Developed an Arduino-based Bluetooth control system using the HC-06 module for PS2 controller.
- Designed circuits integrated with the mechanical chassis; collaborated on assembly and testing.

Robotic Arm with Flexible Grippers *(VM 250: Design and Manufacture)* — March 2024 – May 2024

- Led a four-person team in designing and manufacturing a robotic arm with soft silicone grippers.
- Designed and assembled a 5 DOF robotic arm and its circuits to achieve flexible gripping capabilities.
- Developed an Arduino-based control system that connects to a mobile app, enabling remote control.

Honors and Awards

Engineering Continuing Student Scholarship (merit-based), University of Michigan	2025–2026
Dean's List / University Honors, University of Michigan	2024–2025
First Prize, 13th SJTU "Liming Cup" Mechanical Innovation Competition For Freshman	May 2023
UM-SJTU Joint Institute Outstanding Freshman Scholarship	2022–2023

Skills

Programming	C/C++, Python, MATLAB, Jupyter Notebook, SQLite, Bash
Hardware	Solidworks, 3D printing, Arduino, Raspberry Pi, Mechanical Design

Activities

Michigan Hackers, Member	Sep. 2024 – Dec. 2024
Student Union Tech Department of UM-SJTU Joint Institute, Member	Oct. 2022 – Aug. 2023