Ruihao Xi

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Shanghai, China

EDUCATION

- **Tongji University** *Sep. 2022 – Jul. 2026*
  B.S. in Computer Science and Technology Shanghai, China
  - **GPA**: 4.84/5.00 | **Grade**: 93.37/100 | **Rank**: 2/52
  - **Relevant Coursework**:
    * Research Focus: Principles and Techniques of Artificial Intelligence; Pattern Recognition; Neural Network and Deep Learning;
    * Advanced Computer Science Foundations: Advanced Programming Languages; Principles of Compiler Design; Computer System Architecture
    * CS 188 Introduction to Artificial Intelligence (UC Berkeley); CS 15-445: Database Systems (CMU)
  - **Major Accomplishments**:
    * **National Scholarship for Undergraduate Students (2022-2023)**: Top 0.2 % nationwide; China's highest undergraduate government scholarship.
    * **Shanghai Municipal Government Scholarship for Undergraduate Students (2023-2024)**: Awarded to 1-2 students per college annually; provincial-level recognition.
    * **Outstanding Student | Tongji University (2022-2023; 2023-2024)** : Top 5% of students annually; awarded based on academic and extracurricular excellence.

RESEARCH INTERESTS

Multimodal learning with a focus on vision as a foundation for reasoning and knowledge acquisition; Developing **unified models** for integrating vision, language, and other modalities; Exploring **visual understanding** for complex reasoning, causality, and **cross-modal learning**.

PROJECTS

- **Real-Time Vision System for Robotics** *October 2024 – Current*
  C++, OpenVino, YOLO, MPC [🔗]
  - Designed and implemented automated targeting and shooting mechanisms for robotic vehicles, focusing on real-time object detection and tracking to enhance operational performance.
  - Developed and deployed a YOLO-based image recognition model on a custom dataset of armored plates, utilizing C++ and OpenVino for deployment.
  - Addressed environmental challenges (lighting variations, observer movement, motion control errors) through ROI optimization, yaw adjustment, and bitmap-based firing logic.
  - Led cross-functional collaboration: reduced rotational inertia with mechanical team, implemented latency command compensation with electrical team.
  - Enhanced real-time decision-making capabilities by integrating feedback loops and adaptive algorithms, ensuring robust performance in dynamic environments.
  - Achieved multiple top-tier awards, including:
    * RoboMaster 2025 Super Confrontation:
      · Champion (Eastern Region); National Top 8 (National Final)
      · Ranked #1 in overall auto-aim accuracy (Eastern Region).
      · Team robots (Sentry & Standard) earned 10+ MVP awards for performance.
    * RoboMaster 2025 University League:
      · 2nd Runner-up (3rd Place) (Shanghai Regional)

- **Text-Driven 2D Motion Generation** *Jul. 2024 – Jul. 2025*
  Python
  - Developed a model to generate 2D skeletal animations from textual descriptions, focusing on enhancing motion realism and adaptability across diverse input scenarios.
  - Proposed a novel dataset for two-person interaction scenarios, addressing the gap in existing text-driven motion generation research that primarily focuses on single-person 3D motion.

- Curated and preprocessed the dataset by combining publicly available datasets with web-scraped data, followed by annotation using RTMPose and Owl3. Conducted rigorous data cleaning to remove inaccuracies, misidentified frames, and incomplete skeletal data.
- Designed and implemented a Transformer-based model with a custom attention mechanism to improve motion generation quality. Integrated deep reinforcement learning strategies to further optimize the model's performance.
- Contributed to advancing research in text-driven motion generation by addressing limitations in existing datasets and methodologies, paving the way for more realistic and interactive motion synthesis.
- Authored a co-first author manuscript, "Toward Rich Video Human-Motion2D Generation" detailing this work, which is currently under review at the AAAI Conference.

- **Mandelbrot Fractal Antenna Design**   *Feb. 2023 – Apr. 2024*
  Python, MatLab
  - Led automation modeling and simulation programming for antenna design, leveraging a combination of MATLAB, Visual Basic, and Python to enhance traditional algorithms and optimize design parameters.
  - Developed a tile-based strategy in MATLAB to improve the escape-time algorithm, enabling high-precision generation of fractal structures and multi-connected fractal geometries.
  - Automated simulation workflows by integrating Python with HFSS for parametric optimization and design validation, streamlining the antenna design process.
  - Explored advanced design methodologies for high-profile Mandelbrot fractal antennas, contributing to innovative research in the field.
  - Published two first-authored research papers:
    * A Multiband Microstrip Patch Antenna with Mandelbrot Fractal Structure at <conf>
    * An Automatized Simulation Method for Design of Mandelbrot Fractal Antenna at <conf>
  - Secured a patent for the developed antenna design (Patent Application No.: 202311796896.4).

PATENTS AND PUBLICATIONS   UR=UNDER REVIEW, C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

[UR]   Ruihao Xi, et al. (2025). **Toward Rich Video Human-Motion2D Generation**. In *the Association for the Advance of Artificial Intelligence* (AAAI 2026).

[C.2]   Ruihao Xi, et al. (2024).**An Automatized Simulation Method for Design of Mandelbrot Fractal Antenna**. In *International Conference on Microwaves, Communications, Antennas and Electronic Systems* (IEEE COMCAS 2024). DOI: 10.1109/COMCAS58210.2024.10666225

[C.1]   Ruihao Xi, et al. (2023).**A Multiband Microstrip Patch Antenna with Mandelbrot Fractal Structure**. In *PhotonIcs and Electromagnetics Research Symposium* (PIERS 2023). DOI: 10.1109/PIERS59004.2023.10221535

[P.1]   Ruihao Xi, et al. (2023). **Mandelbrot Fractal Antenna Design**. Patent Office. Patent Application No. 202311796896.4. Status: Patent Pending.

AWARDS AND COMPETITIONS

Gold Award (1%-5% - state level),China International College Students' Innovation and Entrepreneurship Competition	2024
Second Prize (approx. 10% - state level), The Contemporary Undergraduate Mathematical Contest in Modeling	2024
Honorable Mention (approx. 21% - international), 2024 Mathematical Contest in Modeling (MCM/ICM, USA)	2024
"Science & Technology Rising Star" Award, 22nd Shanghai International Youth Science & Technology Competition Innovation Contest	2024
"My Favorite Project" Award, The 2024 National Undergraduate Innovation Conference	2023
First Prize,The 18th Challenge Cup National College Students' Extracurricular Academic Science and Technology Contest (High-Tech Track)	2023
First Prize (< 8%), 15th Shanghai Municipal College Student Mathematics Contest (Higher Education Press Cup)	2023
First Prize (< 8%), 15th National College Student Mathematics Contest	2023

SKILLS

- **Programming Languages:** Python(Expert), C++(Expert), Java(Intermediate), MATLAB(Intermediate)
- **AI/ML Frameworks:** PyTorch(Expert), related deep learning libraries(Advanced)
- **Tools & Environments:** Git/GitHub(Advanced), VSCode(Advanced), Linux(Advanced), Anaconda(Advanced)
- **Other:** MySQL(Intermediate), FPGA development(Intermediate), web deployment(Intermediate), network configuration(Intermediate)