

Zichen Zhang (Charlie Zhang)

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RESEARCH INTEREST

I'm passionate about training unified foundation models that accept multimodal inputs, including **touch, images, videos, language, and audio**. I'm enthusiastic about building efficient multimodal models by **efficiently fine-tuning** pre-trained unimodal models using a limited amount of downstream data and improving unimodal accuracy by **transferring representations** learned from other modalities.

EDUCATION

- **University of Michigan** April 2022 - Present
B.S., Computer Science Ann Arbor, MI, USA
 - **Organizations & Activities:** LSA Honors, Michigan Hackers, MHacks hackathon, V1, Power Hour, Undergraduate Research Opportunity Program (UROP)

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [S.1] Zichen Zhang, Minji Kim. (2024). **MIA-Sort: Multiplex Chromatin Interaction Analysis by Efficiently Sorting Chromatin Complexes.**

RESEARCH PROJECTS

- **Babysitting a Small Language Model through One-Step Tree-of-Thoughts Knowledge Distillation** December 2024
Keywords: SmolLM, semi-supervised learning, causal language modeling, Chain-of-Thought (CoT), Tree-of-Thoughts (ToT) [🌐]
 - Replicated CoT and ToT performances using GPT-4o on the Game of 24, achieving higher success rates than the GPT-4 in Yao et al. 2023
 - Proposed One-Step ToT, a simplified prompting framework that integrates ToT reasoning into a single structured prompt, and proved its effectiveness over naive CoT
 - Demonstrated that after distilling ToT-style knowledge into an SLM like SmolLM-360M, the SLM can achieve significant improvements on the Game of 24 and rival LLMs like GPT-4o
- **VTMo: Unified Visuo-Tactile Transformer Encoder with Mixture-of-Modality-Experts** October 2024
Keywords: multi-modality, transfer learning, InfoNCE loss, image-to-tactile retrieval [🌐]
 - Proposed the VTMo, a unified and modular vision-touch transformer encoder
 - Demonstrated that the proposed method can be trained more efficiently and achieve higher accuracy on the Image-to-Tactile retrieval task, beating the baseline CLIP-style dual encoder


OTHER PROJECTS

- **GenHint (🏆 MHacks 2024 Best Developer Tool Winner)** September 2024
Tools: Llama-3-70B, Node.js, VS Code API, Groq's AI Inference API, Warp Terminal, TypeScript [🌐]
 - Designed and developed an education-focused AI coding assistant integrating VS Code APIs, enabling real-time step-by-step guidance powered by Groq's fast inference engine
 - Processed user comments into actionable "TODO" steps, in contrast to traditional AI tools like GitHub Copilot
 - Created a VS Code extension deployed in the Visual Studio marketplace
- **Collage: An AI-Driven Education Technology Platform** August 2024
Tools: LlamaIndex, Scikit-learn, MySQL, React.js, Flask, Natural Language Toolkit, OpenAI API [🌐]
 - Developed an AI-driven platform to personalize class schedules and career exploration, enhancing user engagement and academic planning
 - Applied AI Agents and Retrieval-Augmented Generated (RAG) pipelines for personalized course recommendations, enabling features like AI academic advisor and course recommendations
 - Designed a user-friendly interface for students to explore career paths and make informed educational decisions
 - Streamlined CI/CD deployment using Heroku, ensuring continuous integration


RESEARCH EXPERIENCE

- **U-M Minji Lab** May 2024 - Present
Research Intern Ann Arbor, MI, USA
 - Developed MIA-Sort, an efficient sorting algorithm that reads a dataset of 4 billion chromosome genome-scale metabolic models (GEMs) fragments and ranks them in different schemes
- **U-M Direct Brain Interface Laboratory** September 2022 - April 2023
Research Intern Ann Arbor, MI, USA
 - Deployed the branch logics of the brain-computer interface survey instrument in Qualtrics hosted on JavaScript Form Engine
 - Implemented the automated user interaction functionalities in JavaScript and JavaScript APIs





INDUSTRY EXPERIENCE

- **Collage**  March 2024 - Present
Remote
Co-Founder & CTO
 - Led a cross-functional startup engineering team using Agile Scrum methodology to develop an AI-driven platform with React and Flask, improving user engagement and academic planning
 - Collaborated with the university administration, stakeholders and clients to gather technical requirements and ensure alignment of platform features with educational needs

CHALLENGE PRIZES

- **Honorable Mention Best Developer Tool** September 2024
MHacks, Major League Hacking 
 - One of the largest hackathons, attracting over 550 students from leading universities in North America

HONORS

- **University Honors** December 2022, April 2023, December 2023, May 2024
University of Michigan 
 - Awarded to students who earned a 3.5 GPA or higher during a term
- **James B. Angell Scholar** March 2024
University of Michigan 
 - Awarded to students who achieve an "A" record for two or more consecutive terms
- **William J. Branstrom Freshman Prize** March 2023
University of Michigan 
 - Award to first-term freshmen who rank in the upper 5%
- **Yale Young Global Scholars (YYGS)** July 2021
Yale University 
 - A competitive program for outstanding high school students from around the world focusing on discussing and tackling global challenges