Zerui "Jerry" Ma

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EDUCATION

Southern Methodist University August 2022 – May 2025
Bachelor of Science in Computer Science
Bachelor of Science in Data Science
Bachelor of Art in Mathematics
- GPA: 3.73/4.0

Master of Science in Computer Science August 2024 – May 2026
- GPA: 4.0/4.0

Research Interests: Machine Learning: Transformers, Stable Diffusion, visualization, Parallel Computing, Graph-RAG
ML for Health**:** LLM for Text Embedding, Knowledge Representation, Clinical Diagnostic Metric
Human-Compatible AI: Human Centered Computing, Recommender Systems, Human in the Loop

RESEARCH EXPERIENCE

Recommender Systems for University Advising June 2024 – Present
Independent Researcher
- Research funded by Robert Mayer Undergraduate Research Fellowship and Dedman College Math department.
- Developed agentic AI for student advising, integrating user-centric design such as Human-in-the-Loop (HITL).
- Built, designed a relational database with web-scraped University Catalog, improving retrieval accuracy by 50%.
- Developed solutions allowing users to retrieve customized recommendations based on their academic state and university undergraduate curriculum catalog.
- Proposed a novel, fully integrated advising system to greatly enhance efficiency for student curriculum planning.

Alzheimer's Disease Detection through Early Patients Language Complexity March 2025 – Present
Principal Investigator
- Led research in analyzing patient's future Alzheimer's risk based on NLP techniques on natural language data.
- Organized, managed, planned research directions and tasks for a team of 3, applied for funding and IRB approval.

Personality Disorder Detection NLP Research December 2023 – Present
Research Assistant
- Utilized PyTorch and Transformer architecture to finetune LLMs for personality disorders predictions.
- Preprocessed real-life interview data with Pandas and NLTK for BERT and LLaMA transformer finetuning.
- Finetuned LLM models using PyTorch, Transformers and LoRA libraries to predict Big-5 Personality Traits.
- Collaborated with a team of researchers in Psychology department for interdisciplinary research and publications.
- Automated batch jobs on HPC with CLI commands Ubuntu Linux; managed directory efficiently with Vim.
- Proposed novel and accurate personality disorder prediction methodologies for the fields of NLP and Psychology.

Protein Structure Prediction with ML Algorithms March 2025 – July 2025
Research Assistant
- Trained and finetuned NN for protein structure prediction. Designed, coded Stable Diffusion models in PyTorch.
- Planned, developed, built, tested and released a Python library for computational chemistry and Perl translation.

PUBLICATIONS

A Recommender System Architecture for University Curriculum Advising
1st Author | Published at 2025 AAAI Spring Symposium & NCUR 2025

AI Assistant for Socioeconomic Empowerment Using Federated Learning
2nd Author | Published at NLP4DH (Natural Language Processing for Digital Humanity) at NAACL 2025

Personality Prediction from Life Stories using Language Models
2nd Author | Published at Journal of Psychopathology and Clinical Science of the APA

***Study focusing on Machine Learning methods on interview transcripts has been submitted to* ACL** | *Primary Author*

CONFERENCES & PRESENTATIONS

EMNLP 2024 Miami, FL
Participant November 2024

- Gained insights into innovative research in NLP through workshops, keynote speeches, and poster sessions.
- Networked with academic researchers and industry professionals to explore novel ML methodologies for NLP.
- Enhanced understanding of emerging techniques and their applications for professional and research expertise.

AAAI 2025 Spring Symposium San Francisco, CA
Presenter March 2025

- Presented "A Recommender System Architecture for University Curriculum Advising" to fellow researchers in Human-Compatible AI Symposia.
- Discussed the common practices and advancement of ML technologies for UI/UX and HCI.

NCUR 2025 Pittsburgh, PA
Poster Presenter April 2025

- Presented independent study to a wide audience of undergraduate researchers with diverse backgrounds.

PROJECTS

Compass (a University Info App) Full Stack Dev, *CTO* for AI Startup, InfoSavvy Dec 2023 - Present

- Engineered a high-traffic AI-driven university information answering tool using LangChain and OpenAI API.
- Developed a scalable infrastructure, integrating NextJS UI with vector database retrieval for search accuracy.

SMU Hub Full Stack Development Dallas, TX
Full Stack Developer August 2024 – Present

- Designed a matchmaking algorithm interfacing with a larger software system to facilitate collaboration between students, professors, and industry professionals.
- Contributed to version control using Git commands, submitted pull requests, and resolved file conflicts.
- Implemented RESTful API calls to a backend database controller within ReactJS and TypeScript frameworks.
- Built software systems with scalable architectures and performed rigorous software testing life cycle (STLC).

University Schema Full Stack Development Dallas, TX
Database Designer April 2024 — May 2024

- Designed and implemented a relational database in MySQL for data management of complex university schema.
- Compiled a frontend using NPM and Node.JS while running database commands in a Spring Boot backend.
- Developed an intuitive UI using JavaScript, HTML, and CSS, supported by gem dependencies for reliability.
- Programmed functionalities with appropriate software design patterns.

Automated Debug Assistant Job System Dallas, TX
Programmer August 2023 – Dec 2023

- Utilized mutex locks to prevent race conditions and ensured deadlock-free multithreaded operations.
- Leveraged OpenAI APIs to design a RESTful interface querying a local LLM for iterative debugging.
- Created UML diagrams to design and visualize the architecture of a custom-made operating system.
- Performed parallel programming using Dask for accelerated calculations on a HPC cluster.
- Identified and resolved memory leaks in C++ programs using Valgrind for optimal system performance.

RAG Application Dallas, TX
Peer Programmer June 2024 – August 2024

- Developed a medical symptom diagnosis and transcript summarization tool using RAG with vector database.
- Built an automated text-generation agentic pipeline for medical screening and diagnosis for general patient cases.

Digital Logic Design, *Teaching Assistant*, SMU July 2025 – Present

- Engineered a Linear Feedback Shift Register that performs linear feedback in a chain of data flip flops.

- Implemented the circuit in Verilog and C, tested, debugged the digital logic on a Xilinx zync FPGA board.
- Learned basic components in circuitry and programming circuits by designing digital logic from scratch.

Assembly Game Design Dev, *Programmer*, SMU Dec 2023 - Present
- Developed an interactive reaction-based game on an ARM-based microcontroller, integrating C and ARM ASM.
- Implemented hardware interfacing by programming GPIO configurations, LED, push-button detection.
- Coded game logic successfully synchronizing hardware inputs with GUI for a seamless gaming experience.

WORK EXPERIENCE

Full Stack Developer, Social Panacea Dec 2024 – May 2025
- Developed an interactive web portal for university, aligning features with client needs with communication.
- Managed version control, pull requests, CI/CD pipelines, for improving workflow efficiency in a team of 6.
- Integrated Firebase JSON data into ReactJS components for user interface interaction and data visualization.
- Led iterative development cycles on Jira, ensuring timely feature deployment and product progress in each sprint.

Teaching Assistant for Advanced Python, Digital Logic Design, ML, University CS Department Jan 2025 - Present
- Assisted students in course concepts; debugged codes; optimized course tasks; graded exams in a timely manner.

Governor's Champion Summer Camp Dallas, TX
AI and Machine Learning Course Lecturer July 2024
- Designed and delivered an AI and Machine Learning course for high-achieving high school students.
- Covered foundational concepts such as intelligent agents, AI history, data preprocessing, and ML algorithms.
- Facilitated hands-on projects to connect theoretical knowledge with real-world applications.
- Developed curriculum design, enhanced public speaking abilities, and improved academic coordination.

Dedman Center for Lifetime Sports Dallas, TX
Gym Manager October 2022 – December 2023
- Directed a team of 4+ in facility operations with authentic leadership and professional communication.
- Handled complex multitasking customer demands during peak hours; maintained facility orders and operations.

AWARDS & SCHOLARSHIP

Accelerated Pathways Leadership and Service Scholarship May 2025
Robert Mayer Undergraduate Research Fellowship June 2024
Carrie and Edwin Mouzon Mathematics Scholarship August 2023
SMU Discovery Scholarship August 2022
SMU Distinguished Scholarship August 2022

ORGANIZATIONS & LEADERSHIP

Artificial Intelligence Club Dallas, TX
President August 2024 – May 2025
- Prepared and led talks in ML basics in both coding exercises and academic paper reviews, introducing problem-solving and technical understanding of ML algorithms to computer science students of diverse backgrounds.
- Collaborated with peers to understand and deconstruct complex neural networks such as Linear-Attention Transformers, Stable Diffusion, RoPE; effectively communicating insights and fostering group learning.

SKILLS

Program Languages:	Python, C++, Java (Spring Boot), Shell Script, SQL, ASM, JavaScript/HTML/CSS, MATLAB, R
AI/ML:	PyTorch, sklearn, Matplotlib, TensorFlow, Dask, HPC, batch job, LangChain, Yolo, DDP, regex
DevOps:	Git/GitHub, Docker, RESTful API, React, GNU, Valgrind, JupyterLab, IntelliJ, VSC, Vim, Jira
Operating Systems:	Linux (Arch, Ubuntu, Fedora, Kali), Windows, MacOS, Debug Assistant Job System, TempleOS
Professional:	Project Management, Interdisciplinary Collaboration, Problem Solving, Communication
Other:	Chinese (fluent); Latex, Web Scraping, Swift, Android Studio; Cisco Packet Tracer; Power BI