

Zicheng Ma

Objective: To apply for a Master in EECS/CSE/ECE/CS starting from 2024 fall

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EDUCATION

- **University of Illinois Urbana-Champaign** US
Bachelor of Science in Computer Engineering **GPA: 4.00/4.00** *July 2020 - Present*
- **Zhejiang University** China
Bachelor of Engineering in Electronic and Computer Engineering **GPA: 4.00/4.00** *July 2020 - Present*
Relevant Courses and Grades: Distributed Systems-A+, Computer Systems Engineering-A+, Computer Security-A+, Communication Network-A+, Data Structures-A+, Database System-A, Algorithm-A, Digital Signal Processing-A+,.....

RESEARCH INTERESTS

System Reliability, High-performance Computing, Machine Learning for System, Software Engineering

SKILLS

- **Programming:** Rust, Python, CUDA, Go, C, C++, SQL, MongoDB, Neo4j, x86 assembly
- **Frameworks:** Kubernetes, Pytorch, Huggingface, ONNX, OpenVINO, ReactJS, Hexo
- **Tools:** Git, MySQL, Azure, Google Cloud, LaTeX, Markdown
- **Languages:** English(Professional), Mandarin (Native)

RESEARCH EXPERIENCE

- **Microsoft Research Asia** Beijing, China
Research Intern in Data, Knowledge and Intelligence group supervised by Shilin He *August 2023 - Now*
 - **Accelerate big model inference speed:** Used ONNX, OpenVINO and tools related to accelerate the inference speed of CodeT5+ on CPU, resulting in a **6700% speed increase**. Sped up StableDiffusion + Controlnet pipeline inference by optimizing memory allocation and CPU multi-core usage, achieving a tenfold speedup.
 - **LLM automatic slot filtering:** Constructed a pipeline to utilize LLM to automatically tag user queries into different slots. Provided 50,000+ pieces of data for the Bing Real Estate team. Collaborated together to build an LLM parser, which is online now.
 - **Kusto Query Evaluation:** Applied self designed algorithm to evaluate different Kusto queries' similarities and retrieve similar Kusto queries based on user requests, aiding Microsoft engineers in tracking Azure service and identifying root causes of failures.
 - **LLM4Feedback Research:** A research project trying to leverage LLM on analyzing user feedback on software products. Applied few-shot demonstration and some data cleaning techniques and enabled LLM to perform better than machine learning methods on analyzing users' feedback. Built an AI agent based on Microsoft TaskWeaver.
- **Verifiable controller framework Anvil** Urbana-Champaign, US
Undergraduate Researcher supervised by Prof. Tianyin Xu from UIUC *March 2023 - Now*
 - **Building k8s controllers for different application:** Built controllers for mainstream applications running on a Kubernetes cluster using Rust and Verus (verified Rust), including ZooKeeper, RabbitMQ, and Cassandra. Designed how to scale down/up, upgrade, update and boot up for each application cluster.
 - **Design a new framework to verify controller:** Constructed a framework for building Kubernetes controllers that can verify liveness and safety, and propose a process for creating verifiable controllers.
 - **Import Kubernetes APIs to the new framework:** Wrote wrappers to describe the properties of different kubernetes APIs. These specifications were later used to write proofs.
- **Human Pose Estimation Research** Zhejiang, China
Undergraduate Researcher supervised by Prof. Gaoang Wang from ZJU *May 2022 - September 2022*
 - **Uniform dataset format:** Preprocessed different datasets according to the experimental requirements to realize the interoperability of data set formats
 - **Design a new unsupervised training process:** Designed and used projection loss as a loss function to fine-tune cross-dataset training.
 - **Use mmpose framework to train models:** Used mmpose framework from Open-mmlab to do the experiments. Injected new loss functions and new layers to train the models in an unsupervised way.

PAPERS

- **Anvil: Verifying Liveness of Cluster Management Controllers:** Xudong Sun, Wenjie Ma, Tyler Gu, **Zicheng Ma**, Tej Chajed, Jon Howell, Andrea Lattuada, Oded Padon, Lalith Suresh, Adriana Szekeres, Tianyin Xu. (In submission to OSDI 2024)

COURSE PROJECTS

- **Znix System (C, x86 assembly)** Urbana-Champaign, US
Unix-like operating system [demo] December 2022
 - **Basic functionalities:** Implemented an operating system supporting basic functionalities such as scheduling, interrupts, system calls, exceptions, and file systems.
 - **Self-designed features:** Used implicit free list and slab cache to implement a virtual memory allocation system. Also implemented advanced signals and speaker, hard-disk drivers.
- **Crime Map UIUC (MySQL, ReactJS, NodeJS)** Urbana-Champaign, US
Full-stack application visualizing criminal records around UIUC [code] December 2022
 - **Crime database and basic CRUD:** Implemented a database containing past crime logs around UIUC and allowed users do basic CRUD commands on the database through our web page.
 - **Advanced features:** Integrated Google Map API to show different crimes on a map to visualize them for users.
- **Database system for medical appointments (C++, B+ Tree)** Zhejiang, China
A simple database based on B+ Tree, CS225 coursework [code] May 2022
 - **B+ Tree data structure:** Used C++ to build B+ Tree as the base for our database system.
 - **User-friendly UI:** Instead of using terminal commands, a simple and useful UI is presented to the user.
 - **SQL style query language:** Implemented SQL style query language for the database, including a variety of collection operations and conditional judgment.

HONORS AND AWARDS

- **Mathematical Contest In Modeling Finalist Award** (Top 1% of the competitors worldwide – May 2022)
- **2021, 2022 and 2023 National Scholarship** (The highest honor awarded to 0.2% of all university students in China) - October 2021/2022/2023
- Zhejiang University Scholarship - First Prize (GPA rank 1 in the grade) - June 2021
- UIUC Dean's List SP23 - Spring 2023
- ZJU-UIUC Institute Dean's List 2021, 2022, 2023 - September 2021/2022/2023

LEADERSHIP EXPERIENCE

- **Course assistant for Computer System Engineering** Urbana-Champaign, US
ECE391 CA working for Dpt. of ECE at UIUC February 2023 - May 2023
 - **Guiding students on projects:** Guided students to finish high workload machine problems. Helped them to design their own simple OS.
 - **Exam review:** Provided review sections during office hours to help students do well in exams.
- **Minister of Student Union Outreach Department** Zhejiang, China
Working in Student Union of Zhejiang University International Campus September 2021 - August 2022
 - **Attracting sponsorship:** Cooperated and negotiated with commercial companies to secure sponsorship for campus events.
 - **Campus liaison work:** Liaised with other universities and student organizations to hold inter-university exchange activities
- **Minister of Coffee Club** Zhejiang, China
Founder of a new club in campus September 2021 - May 2022
 - **Holding events:** Built a new Coffee Club on campus and led more than 80 new members. Organized and designed coffee activities.