Xiangyu Zhou

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EDUCATION

University of Michigan, Ann Arbor, MI, Sep 2022 - May 2027 **Ph.D. in Computer Science**
- Ph.D. Advisor: Dr. Steve Oney

University of Washington, Seattle, WA, Sep 2018 - May 2022 **B.S. in Computer Engineering**
- GPA: 3.89

RESEARCH EXPERIENCE

Automated GUI Evaluation via High-Fidelity User Simulation   May 2025–Present
Ph.D. Research, University of Michigan
- Architected a **Model Predictive Control (MPC) powered generative user simulation model** that generates cursor-level interaction trajectories to automate the detection of **UI/UX design flaws**.
- **Reduced manual usability testing requirements** by synthesizing human-like interaction data that identifies edge-case design vulnerabilities inaccessible to traditional heuristic evaluations.
- Validated model accuracy by benchmarking simulated trajectories against real-world human data, demonstrating superior performance in revealing complex interface bottlenecks.

No-Code AI-powered Web Automation System from User Demonstrations   Aug 2022–Mar 2025
Ph.D. Research, University of Michigan
- Architected a **neuro-symbolic program synthesis** engine that integrates **Large Language Models (LLMs)** with symbolic control-flow structures (loops) to automate complex web tasks.
- Reduced operational overhead and search costs by optimizing the program synthesis process, ensuring high-quality code generation without excessive compute expenditure.
- Engineered a **Natural Language to Domain Specific Language (DSL) interpreter** achieving **91% task accuracy** and **80%+ success** in DOM node reasoning on industry-standard web automation benchmarks.
- Developed a Programming-by-Demonstration (PbD) tool that automates high-volume web workflows (data scraping, form filling) from minimal user interactions, significantly lowering the barrier for non-technical users.
- Outperformed **prior State-of-the-Art (SOTA)** on challenging benchmark with a **93.9% success rate**, demonstrating superior execution speed, scalability, and robustness as task complexity increased.

No-code Data Analysis Tool from User Demonstrations   Jul 2020–Nov 2021
Undergraduate Research, University of Washington
- Engineered a Programming-by-Demonstration (PbD) engine that automates complex data analysis by synthesizing nested SQL queries from intuitive user demonstrations.
- Accelerated query synthesis speed by **22.5x** compared to **prior SOTA** techniques, significantly reducing latency for end-user data workflows.
- Validated system robustness on 80 real-world data analysis tasks, including 20 challenging ones from the **TPC-DS database benchmark**, achieving a **95% success rate**.
- Improved user autonomy in data exploration by abstracting the complexity of manual SQL writing, allowing non-technical users to perform high-level data manipulations with increased confidence.

PUBLICATIONS

(* denotes equal contribution)
- Simulating Human Cursor Trajectories for Path-Sensitive GUI Evaluation
  Xiangyu Zhou, Steve Oney
  (Under Review)
- Efficient Bottom-Up Synthesis for Programs with Local Variables
  Xiang Li*, Xiangyu Zhou*, Rui Dong, Yihong Zhang, Xinyu Wang
  POPL 2024 (ACM SIGPLAN Symposium on Principles of Programming Languages)
- Synthesizing Analytical SQL Queries from Computation Demonstration
  Xiangyu Zhou, Rastislav Bodik, Alvin Cheung, Chenglong Wang
  Distinguished Paper Award
  PLDI 2022 (ACM SIGPLAN Conference on Programming Language Design and Implementation)

AWARDS & GRANTS

- OpenAI Researcher Access Program Grant, 2024
- SIGPLAN Professional Activities Committee Award, 2022, 2023
- Distinguished Paper Award at PLDI, 2022

TECHNICAL

- Programming Languages: Python, Rust, Java, SQL, C, C++, R, Ocaml
- Machine Learning & Artificial Intelligence: Large Language Models (LLMs), Reinforcement Learning (RL), Model Predictive Control (MPC), PyTorch
- Web & Automation: Selenium, Playwright
- Data & Research: Prolific, Git, Docker, Firebase, Experimental Design, Statistical Analysis