Rahul Dharmaji

rdharmaj@uci.edu – linkedin.com/in/rdharmaji

Education

M.S. Computer Engineering · (GPA: 3.95)

University of California, Irvine ····· 9/23 – 6/24

Algorithms, Data Structures, Computer Architecture, Operating Systems, Convex Optimization, Control & AI, Data Privacy, Deep Learning Compilers, Deep Learning Accelerators

B.S. Computer Engineering · (GPA: 3.90)

University of California, Santa Barbara ····· 9/19 – 6/23

Experience

Embedded & Cyber-Physical Systems Lab / Researcher · Irvine, CA ····· 6/23 – 6/24

- LLM4PLC: Harnessing Large Language Models for Verifiable Programming of PLCs in Industrial Control Systems ···· (ICSE'24 · 🌐)
  - Datasets & Tools · GPT-3.5, GPT-4, Code Llama, LoRAs, OSCAT BASIC
  - Languages · Python, Shell, C, C++, IEC 61131-3/SCL
  - Architected a state-of-the-art Large Language Model pipeline for Siemens Programmable Logic Controllers, with a measured increase in automated code generation ability by 25%
  - Automated a code analysis and formal verification framework for programmatically detecting and correcting errors in LLM-generated PLC code, resulting in an order-of-magnitude decrease in faulty code
  - Evaluated the LLM4PLC pipeline on real-world engineering test cases, resulting in 100-200% gains in a human assessment of code correctness, maintainability, and style
- Mic-E-Mouse: Covert Eavesdropping through Computer Mice ····· (in review @ NDSS'25)
  - Datasets & Tools · PyTorch, OpenAI Whisper, AudioMNIST, VCTK
  - Languages · Python, Shell, C, C++
  - Developed a Machine Learning pipeline to extract audio data from consumer mice using a novel side-channel attack, leading to an 80% speaker classification accuracy, compared to 92% with ground-truth data
  - Spearheaded the creation of a Convolutional Neural Network classifier to categorize speaker identities by reconstructing waveforms from noisy spectrogram images, resulting in a decrease in human-assessed error rate by 83%
  - Ethically engineered a proof-of-concept injectable exploit in real-world software to showcase the viability of the side-channel attack, including a compromised binary for distribution to targetted users.
- LLM4CVE: Enabling Iterative Automated Vulnerability Repair with Large Language Models ··· (in review @ ASE'24)
  - Datasets & Tools · GPT-3.5, GPT-4o, Llama 3, LoRAs, CVEFixes
  - Languages · Python, Shell, C, C++
  - Architected a state-of-the-art Large Language Model pipeline for programmatically repairing code vulnerabilities using publicly available CVE data, resulting in a 20% gain in code similarity compared to a ground-truth fix
  - Developed Low-Rank-Adaptions for common LLMs (including Llama 3 and Code Llama) with a custom dataset, leading to an increase in performance for open-source LLMs in our code-fixing benchmark
  - Performed a thorough evaluation of the LLM4CVE pipeline through both automated and human-centric means, including end-to-end tests with a real-world codebase, and human assessment resulting in an 85% confidence rating in our automated framework (compared to 100% for the ground-truth fix)

Vyu Labs, Inc. / Software Engineering Intern · Cupertino, CA ····· 6/21 – 9/21 · 6/22 – 9/22

Installed, tested, and certified development builds for mobile platforms. Ran debugging tools with breakpoints to rectify failing unit tests. Identified bugs and pushed builds onto CI/CD pipelines.

Valkyrie Robotics / Engineering Mentor · Santa Clara, CA ····· 3/18 – 8/23

Provided engineering mentorship to K-12 students towards building functional, adaptable robots.

Projects, Skills & Technologies

Interactive Music Visualizer · C++/GLSL ····· 6/20 – present

Built a cross-platform application to artistically visualize live and prerecorded musical input.

Skills & Technologies – C, C++, Python, Rust, LaTeX, Java, Shell, Linux/Unix, Git/GitHub, SQLite, DuckDB, GNU Make, Matlab, ANTLR, PyTorch, TensorFlow, OpenCV, and more