Guhan Balaji Samy

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Education

Arizona State University, Tempe **Aug. 2022 – May 2024**
Master of Computer Science *GPA: 3.7*

Indian Institute of Information Technology, Design and Manufacturing **Aug. 2017 – September 2021**
Bachelor of Technology in Electronics and Communication Engineering *CGPA: 8.04 / 10*

Technical Skills

Languages: C, C++, Rust, Go, Python, TypeScript, JavaScript, Bash
Web Front-End: HTML, CSS, SCSS, Bootstrap, React.js, Redux.js
Web Back-End and DBs: Node.js, Express.js, EJS, Deno, Firebase, MongoDB, PostgreSQL, Neo4J
Technologies/Frameworks/Libraries: Git, Github, gRPC, PwnTools, ROPgadget, Ropium, GCP, Heroku, Docker, Apache Hadoop, Apache Spark, DialogFlow, WebAssembly (WASM), Lingua Franca
Text Editors & OSs: VS Code, Neovim, Vim, Doom Emacs, Linux (Ubuntu, Arch), Windows 10/11

Experience

OneIntegral Technologies Pvt. Ltd. **May 2020 – October 2020**
Software Engineering Intern *Chennai, Tamil Nadu, India*

- Developed and deployed an AI-powered chatbot using *React-Redux, ExpressJS, and Dialogflow*, resulting in a significant increase in user engagement and satisfaction on OneIntegral's product website.
- Conducted extensive research on Graph Neural Networks (GNN) using Python programming to discover new and efficient ways to leverage OneIntegral's knowledge graph, resulting in a deeper understanding of its potential applications.

Projects

Understanding hardware security and vulnerabilities | *C, Python, Verilog* **Fall 2023**

- Developed covert channel programs to transmit data discreetly, leveraging memory bandwidth variations and cache timings for enhanced security measures.
- Implemented Arbiter and Ring Oscillator Physical Unclonable Functions (PUFs) using Verilog, establishing a hardware root of trust to bolster system security.
- Analyzed obfuscated Verilog code to detect trojans, contributing to a deeper understanding of software and hardware vulnerabilities. Additionally, designed and implemented a trojan for further exploration of security issues.

Interfacing and Navigating Pololu 3pi+ 2040 robot | *Lingua Franca, C, Picotools* **Fall 2023**

- Configured RP2040 embedded micro-controller chip for efficient utilization of multiple sensors in Pololu robot to enhance navigation capabilities.
- Designed a deterministic Finite State Machine model using Lingua Franca to orchestrate essential operations with the Pololu robot, showcasing proficiency in control system design.

Distributed Banking System | *Python, gRPC, Multiprocessing, Threading* **Fall 2023**

- Designed a distributed banking system incorporating Lamport's algorithm for clock coordination, facilitating seamless interaction among multiple bank branches and clients.
- Implemented an enhanced version of the distributed banking system, ensuring a read-your-writes client-consistency model for improved data coherence.
- Utilized gRPC with protocol buffers to establish efficient communication between distributed server and client processes through remote procedure calls, optimizing the system's overall performance and reliability.

Enhancing the Xv6 RISC-V Operating System | *C, GDB, QEMU* **Spring 2023**

- Designed a robust Bootloader to load Xv6 kernels on RISC-V machines emulated by QEMU, showcasing expertise in low-level system programming and hardware-software interfacing.
- Engineered on-demand paging strategies, including a heap page swapping mechanism, optimizing memory management for enhanced system efficiency and seamless swapping between RAM and disk.
- Developed a user-level threading library, demonstrating proficiency in multithreading and synchronization primitives, and implemented a trap-and-emulate approach to enable Xv6 RISC-V as a virtual machine on QEMU, enhancing system versatility for controlled execution and emulation within a virtualized environment.

Web App for Autonomous Drone Delivery System | *JavaScript, Node.js, Firebase* **Spring 2020**

- Developed a web application leveraging Express.js and Firebase for efficient management of medical supply deliveries on campus. Integrated user authentication, authorization via Firebase, and employed Firestore for streamlined data storage.