Hrishikesh Deshpande

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Education

University of Illinois Urbana-Champaign Urbana-Champaign, Illinois
B.S. Computer Engineering, Grainger College of Engineering *August 2023 - December 2026*
Relevant Coursework: Operating Systems Design, Signal Processing, Computer Architecture, Applied Parallel Programming, Machine Learning Applications, Algorithms & Models of Computation, Data Structures, Networks & Distributed Systems, Autonomous Systems

Technical Skills

Languages: Python, C, C++, Dart, Java, RISC-V Assembly, SQL, JavaScript, TypeScript
Tools & Frameworks: Git, GDB, Firebase, REST APIs, Flutter, React, Docker, CUDA, Xcode, Electron
Systems & Hardware: Verilog, SystemVerilog, Arduino, Intel Quartus, Vivado, Autodesk Fusion 360

Experience

Swaram – Founder & Software Developer Aug. 2024 – Present
Indian Classical Music Note-Taking App *Urbana, Illinois*

- Developed and launched a cross-platform mobile app using Flutter/Dart for iOS and Android, reaching 100+ downloads across North America, Europe, and Asia while maintaining a base of 50+ active users
- Designed and implemented custom keyboards with optimized layouts, increasing efficiency of complex music notation input by 40% compared to conventional methods, and collected feedback to guide feature improvements
- Integrated Firebase for real-time data synchronization and secure cloud storage, reducing inconsistencies by 30%, enabling near-instant updates across devices, and releasing regular updates to drive user engagement

Projects

16 Bit Microprocessor Architecture | *SystemVerilog, Vivado, Digital Design* Aug. 2025 – Present

- Architecting and implementing a custom 16-bit microprocessor in Vivado using SystemVerilog HDL, inspired by the Little Computer 3 (LC-3) architecture and optimized for FPGA deployment on Xilinx Spartan-7 board
- Designed datapath, control unit, ALU, register file, and memory interface with modular hardware design approach
- Developing a custom instruction set, assembler, and comprehensive testbench infrastructure to verify functionality and support simple programs in both simulation and physical FPGA hardware

RISC-V Operating System | *C, RISC-V Assembly, GDB* Jan. 2025 – May 2025

- Built a Unix-style kernel from scratch with ELF loading, dynamic user stack construction, Sv39 paging, efficient trap handling, exception management, and seamless supervisor–user mode transitions for reliable execution
- Developed a VirtIO block driver with descriptor queues, interrupt completions, reset logic, and locking; implemented a writable filesystem featuring block bitmaps, page-cache dirty tracking, and hierarchical directories
- Built a preemptive threading system with context switching, lazy stack allocation, and syscalls enabling concurrent processes, inter-process pipes, and a shell supporting argument parsing and file I/O

Air Trackpad: Gesture-Controlled Mouse | *Python, YOLOv8, Raspberry Pi* Mar. 2025 – Apr. 2025

- Designed a plug-and-play gesture-control device on a Raspberry Pi Zero 2 W in USB gadget mode, integrating PiCamera input, Coral Edge TPU acceleration, and custom circuitry for seamless host communication
- Optimized a YOLOv8-based hand detection pipeline for edge hardware with advanced data augmentations, achieving 15–30 FPS performance and low-latency gesture recognition on resource-constrained devices
- Implemented a lightweight serial protocol and embedded Python listener to translate encoded gestures into mouse events, delivering universal USB HID functionality without additional drivers

Stock Market Prediction Bot | *Python, ML, LSTM, Transformers (BERT)* Nov. 2024 – Feb. 2025

- Created a Python-based stock prediction bot leveraging LSTM models trained on over 5 years of market data from yFinance library, integrating sentiment features from real-time financial news scraping pipelines
- Integrated BERT-based sentiment classification with Hugging Face Transformers for context-aware analysis, improving accuracy over traditional NLP and enhancing predictive power of LSTM time-series models
- Achieved a 15% portfolio return over four months through sentiment-informed decision-making, validating feature-rich modeling with automated web scraping and real-time data ingestion systems