VARUN PAL

408-748-4386 | varunpal.info | vpal2@illinois.edu

EDUCATION

University of Illinois Urbana-Champaign Urbana-Champaign, IL
Bachelor of Science in Computer Engineering *Expected Graduation: Fall 2026*

- Technical GPA: **3.94**
- Relevant Coursework:

Operating Systems	Distributed Systems	Applied Parallel Programming
Deep Generative Models	Data Structures and Algs	Deep Learning For Computer Vision
Control Systems	Intro to Robotics	Machine Learning

WORK EXPERIENCE

RoboVision Lab May 2024 – Aug 2025
Summer Researcher *University of Illinois Urbana-Champaign, IL*

- Researched a generalizable robotic pick and place task diffusion policy under the guidance of **Prof Saurabh Gupta**
- Trained neural net policy utilizing **self and cross attention** on DROID data set in a **transformer architecture**
- Investigated a **data-distributed parallel** system, for improving GPU utilization across 4 RTX 3080 TIs
- Developed system for **filtering and processing large video datasets** (1.7 TB) for training robotic ML policies

ECE 391 (Operating Systems) Course Assistant Jan 2025 – Present
Course Assistant *University of Illinois Urbana-Champaign, IL*

- Develop core components of a Unix-like operating system, including **Shell** and **Pipes** for student projects
- Host **6 hours of weekly office hours**, providing conceptual guidance and debugging assistance to students

Abbott May – Sep 2023
Software Engineering Intern *Santa Clara, CA*

- Designed an efficient **data parsing algorithm** using **chunking techniques** to process **large text data** (> 4GB) from glucose monitoring devices, enabling faster analysis of product performance metrics
- Created a **data visualization dashboard** using **Power BI**, providing real-time insights into product testing results

PROJECT EXPERIENCE

OStrich | *Operating System, RISC-V* Fall 2024

- Placed **3rd out of 100** teams in the OS design competition, recognized for system features and performance
- Designed and implemented a Unix-based custom operating system with features including **paging virtual memory management**, **multi-thread processes**, and an **expandable file system** on RISC-V architecture.
- Capabilities: **POSIX like shell**, file reading/writing, and **UART and VGA driver** for snake game in the Qemu virt env

CUDA CNN Convolution Kernel Optimization | *CUDA C/C++* Spring 2025

- Optimized convolution kernel for LeNet-5 inference on Fashion MNIST dataset, implementing **matrix unrolling**, **tiled matrix multiplication**, and **kernel fusion** to achieve sub50ms run time on 10,000 images on A100 GPUs
- Profiled GPU performance using **Nsight Systems** (nsys) and **Nsight Compute** (ncu)
- Optimizations include **CUDA Streams**, **Tensor Cores** with Warp Matrix Functions, and FP16 arithmetic

Distributed Financial Transaction System | *Go, TCP Networking, Concurrency Control* Spring 2025

- Developed **Raft consensus protocol** for leader election and log replication, achieving sub-5 second leader recovery times and maintaining linearizability guarantees across distributed replicas with automated failover capabilities
- Designed **ACID-compliant** transaction manager using **timestamp ordering** concurrency control, supporting up to 5 concurrent clients with deadlock-free operation through message-passing architecture and **two-phase commit**

TECHNICAL SKILLS

Programming: C, C++, Python, GO, PyTorch, CUDA, ROS2, Java, System Verilog (Xilinx Vivado), Visual Basic
Tools: Linux, Git, FPGA, AXI, I2C, SPI, UART, Vivado, Vitis, Docker