Sahej Singh

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Education

University of Illinois at Urbana-Champaign   **Graduation: May 2026**

BS in Computer Engineering

Coursework: Computer Systems Engineering, Algorithms and Models of Computation, Digital Systems Laboratory, Artificial Intelligence, Principles of Safe Autonomy, Applied Parallel Programming, Data Structures, Discrete Structures, Linear Algebra with Computational Applications, Statistics and Probability I & II

Experience

Haylon Technologies   **Jun 2024 – Present**

Machine Learning and IoT Intern   *Edison, NJ*

- Developed embedded Machine Learning models using **SKLearn and TensorFlow** with online training for use on hardware. Allow for prediction of future current spikes with 90% accuracy.
- Implementing Machine Learning algorithms on microcontroller hardware using C.
- Working on development of **AWS Sagemaker** simulation software for clients.

Autonomous and Unmanned Vehicle Systems Laboratory (AUVSL)   **May 2023 – Present**

Research Intern   *Urbana, IL*

- Used Robotic Operating System (**ROS**) with **Python** on Ubuntu **Linux** to develop an obstacle avoidance system for a Jackal UGV robot using **PointCloud** computer vision data from a depth camera.
- Developed a **CANBus** hardware to **ROS2** Embedded Systems Topic node that allows researchers to subscribe for vehicle robotics data. Used by all researchers on test vehicle.
- Developed team **Github Actions** workflow for automatic documentation publication to Github Pages. Used on 100% of all repositories in organization.
- Working on development of adaptive control systems architecture using Lipschitz Neural Networks with ROS.

Quant Illinois   **Sept 2023 – Present**

Director of Trading   *Urbana, IL*

- Developed robust and extensible **backtesting** framework using **Yahoo Finance** for organizational use. Used by all researchers in organization.
- Developed and optimized **engine**, **order**, and **trade** classes.
- Planned and directed **EV** and **arbitrage** sports betting project.

Projects

Hardware-Accelerated Neural Network | *FPGA, SystemVerilog, Vivado Git*   **Apr 2023**

- Developed FPGA **neural network** hardware.
- Uses BRAM to store data, weights, biases.
- Allows for online training and classification of data on button press.

Parallelized CNN Model with CUDA | *CUDA Git*   **Jan – Apr 2023**

- Used NVIDIA's **CUDA** framework with GPU cluster access to implement **CNN** model from scratch.
- Leveraged parallel computing optimization paradigms and computer architecture considerations in **C** (streams, DRAM memory coalescing, caching, and unrolling) to achieve 1000x faster computation than CPU equivalent.

EyeOweYou | *MongoDB, Express.js, React.js, Node.js, Tailwind.css Git*   **Jun – Aug 2023**

- **Full stack** web app designed to keep track of money the user owes or has lent out.
- Backend is a **RESTful** API built using Node.js and Express.js for **CRUD** operations with a **MongoDB** database.
- Frontend designed in **React** and **Tailwind** styling elements with robust state management and routing.
- Allows users to create an always-accessible account to track and store their expenses.

ToxiShield | *Flask, PubChemPy, RDKit, HyperOptSklearn Git*   **July – Sept 2022**

- Web app that allows users to input a chemical and returns whether or not that chemical is safe to use as a pesticide.
- Designed using a **Flask** backend.
- Utilizes the PubChem and RDKit Python APIs to generate chemical descriptors from the chemical name.
- Descriptors are then input into model generated from this preprint's decision tree model, which was created using Hyper-Opt **SciKit Learn**.

Skills

Languages: Strong in C/C++ and Python, Proficient in SystemVerilog, comfortable in other Object Oriented Languages (Rust, Java, JavaScript), SQL, R, MATLAB

Software & Tools: FPGA development, CAN, SPI, ROS Linux, Xilinx Vivado, CUDA, Git Version Control, Docker, Kubernetes, Android Software Development Kit, React.js, Express.js, MongoDB, Node.js, Tailwind, Flask