

ASHWANI RATHEE

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Education

University of California, Santa Cruz 9/2024 - present

Master of Science in Computer Science(GPA: 3.85/4)

- Coursework: Computer Architecture, Neural Computation, Analysis of Algorithms, Computer Graphics

Panjab University 7/2019 - 5/2023

Bachelors of Engineering in Information Technology(GPA: 3.88/4)

Experience

FleetSafe 1/2023 - 6/2024

Software Engineer, *Previously Intern*

- Developed an **integrated radar-camera surveillance system** in **50+ locations** for custom Linux Arm64 board
- Iterated on **minimizing the size of data packet structure** and reduced **80% network usage** for data streaming
- Added support for **GPIO, UART, I2C and network layer** for data collection and analysis of sensor data
- Developed **serialization and de-serialization protocol of data packets** between **edge device** and **Node.js server**
- Utilized tools like **GDB and Valgrind** for debugging and shell/bash scripts for CI/CD

Projects

Semi-Automatic Brain Tumor Segmentation | Best Medical Hack @MHacks'21

- Developed a semi-automatic annotator tool for Brain Tumor analysis utilizing **PyTorch, Python and Plotly-Dash**
- Deployed the **PyTorch-based UNET** model with **Flask** server on Google Cloud with auto-scaling
- Implemented **REST API** with **Node.js** for vectorization algorithm of images deployed using Heroku

Dynamic Branch Predictor with Perceptron

- Implemented a perceptron-based branch predictor that achieved a **5.38%** average mispredict ratio, approaching the efficiency of **gshare (3.14%)** and **tage(1.41%)**
- Optimized perceptron predictor performance, achieving maximum **1.59391 IPC** average across SPEC2017 benchmarks
- Conducted experiments to optimize history length, number of perceptrons, and perceptron weight threshold

Alert System

- Developed a **real-time microcontroller-computer communication system** using **C, Julia**, and LibSerialPort.jl
- Built an **asynchronous Julia program** to process sensor data and trigger LED alerts for out-of-range conditions
- Designed a CLI with ArgParse.jl for **customizable sensor threshold settings** and system control

ExtraCurriculars

- Published "**Denosing of magnetic resonance images of brain tumor using BT-Autonet**" in BSPC Journal
- **Google Summer of Code 2022** Developer for JuliaLang: Improved e and GIF file format support
- **ISCAS Open Source Promotion Plan 2021** Developer for JuliaCN: Improved documentation of JuliaImages
- Helped conduct **Image Processing with Images.jl** Workshop at MIT during **JuliaCon'23**

Technical Skills

Languages: C++, Python, C, JavaScript, SQL
Libraries/Databases: Qt, Boost, Eigen, WebGL, PyTorch, MySQL, PostgreSQL, SQLite3
Tools: CMake, Google-Test, Bash, Git, Docker, AWS