AAYUSH PANDA

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TECHNICAL SKILLS

Programming Languages: C++, C, Python, Java, TypeScript, SQL, Haskell, Scheme, Bash
Frameworks: Flutter, Flask, Next.js, Firebase, Google Cloud, Android Development
Data Science/ML: Pandas, SKlearn, Torch, Tensorflow, Keras, MatPlotLib, NumPy, OpenCV

EDUCATION

University of Waterloo **GPA:** 3.92/4.00
Bachelor of Computer Science, Honours Co-op *Sep. 2024 – Apr. 2029*

EXPERIENCE

Undergraduate Research Assistant Apr. 2025 – Present
University of Waterloo
- Research on private record linkage protocols using locality sensitive hashing, supervised by Dr. Florian Kerschbaum
- Developing a differentially private method of estimating max LSH bin, to allow for private frequency smoothing without sharing bin size info between parties
- Implemented 2-d cuckoo hashing that allows for hashtable with size bounded by size of all data being hashed.

Laboratory Assistant Apr. 2025 – Present
University of Waterloo Multi-Sensory Brain and Cognition Lab (MBC)
- Developed CV pipelines and algorithms for baseball/eye tracking for an ongoing research project on how batsmen's eyes track baseballs through various jumps and saccades
- Developed correspondence algorithm to synchronise data from high speed head mounted camera and eye tracking data

Software Engineering Intern Mar. 2025 – Apr. 2025
Toma (YC W25)
- Used **BeautifulSoup** to scrape all ($\sim$ **20k**) US car dealerships, and wrote a service that periodically calls each with an AI voice to evaluate caller experience. This data was then used to find ideal clients, and demonstrate/evaluate Toma's impact.
- Developed a server log viewer with IDE-like features to improve debugging efficiency.
- Implemented debugging APIs to facilitate analysis of content in **AWS S3** buckets directly in Metabase dashboard

Founder and Co-President Dec. 2021 – Jul. 2024
hack::peel
- Founded and led, an annual Peel-region hackathon attracting **100+ high school participants** each year
- Secured over **$20,000+** in sponsorships annually, enabling high-value prizes and industry support
- Directed a team of 25 across 7 subteams to coordinate logistics, outreach, sponsorships, and event programming

PROJECTS

Semantify — *Python, React, FastAPI, Sentence Transformers, UMAP, Ollama*
- Built a system that semantically organises **1000+ files** into a directory structure in minutes using embedding models and custom hierarchical clustering and subtree merging algorithms
- Developed an interactive visualization of document embeddings to allow intuitive semantic exploration
- Implemented a RAG-powered chat interface to intelligently query uploaded documents with source citation

Phased Array SONAR — *C++, Python, Xtensa LX6 microprocessor, AVR RISC processors*
- Engineered a sub-degree precision beam-steering phased SONAR array with real-time radar-style display on oscilloscopes.
- Designed a waveguide to reduce inter-element pitch and suppress grating lobes, enhancing beam directivity.
- Built a phased array simulator suite to visualize beamforming, steering, and focus behaviors in 2D.

Woodlands App — *Flutter, Firebase, Google Cloud Storage*
- Developed a **Flutter** app to inform students about announcements, events, and cafeteria menu.
- Integrated **Firebase** and **Google Cloud Storage** for authentication and data storage.
- Achieved **400+** regular monthly users and rank **40** on the Apple App Store's top charts.

PATENTS

CA 3119717: Compliant mechanism for operating flight control surfaces of a remotely piloted aircraft.
CA 3222437 (pending): Device for redirection of optical beams using virtual gratings generated by stationary waves.

AWARDS

University of Waterloo President's Research Award
Jane Street Estimathon @ UWaterloo (2024): First place
Hack the North 2022: Winner (out of 829 participants)
PicoCTF 2022: 2nd place in Canada, 14th (top 0.001%) globally
FIRST Innovation Challenge 2021: Semifinalist