Vaibhav Gogia

Ontario, Canada vaibhavgogia01@gmail.com vaibhavgogia.com gogiavaibhav vaibhav-gogia

Education

Bachelor of Computer Engineering CO-OP, McMaster University — Sept 2019 – Apr 2024
Final Year Student – Dean's Honour List — Hamilton, Ontario

Technical Skills

Languages: Python, C/C++, Java, Verilog
Technologies: Machine Learning, AI, Neural Networks, Test Automation, APIs, Computer Vision, JSON, 3D-Printing, Data processing, GUI, Rest API
Tools: TensorFlow, PyTorch, GitHub, ML and AI Libraries: Scikit-Learn, Pandas, OpenCV, RaspberryPi, Oscilloscopes

Work Experience

Software and Tooling Engineer Co-op (LT), Advanced Micro Devices – **AMD** — May 2022 – Apr 2023
Markham, Ontario

- Product Security Office R&D (PHYSEC Canada Lab)
- Wrote Python and C Scripts to Automate the Lab's Database (+ Jira Rest API)
- Lead the Computer Vision work for the Lab's Automation routines
- Created a GUI to control the Lab's Machinery (XYZ Gantry)
- Software Tooling Creation for Electro-magnetic and Optical Fault Injection Attacks
- Signal, Imaging & Fault Injections – Security Analysis

ECE Department Representative, McMaster ECES - **McMaster University** — Aug 2020 – July 2022
Hamilton, Ontario

- Organizing and executing various Engineering events
- Interacting and working with current and potential students at McMaster University

Projects

Gesture-Based ML 3D Modelling System — Sept 2023 – Present

- Building and Training Machine Learning models using Python to interpret hand gestures for 3D modelling.
- Working as the lead on Machine Learning development, training and implementation.
- Designing a digital 3D modelling environment that will enable users to seamlessly interact and create 3D models using gestures.
- Hardware-Software Integration to ensure flawless communication standards. The various components include Time-of-Flight (ToF) sensors, cameras, and Raspberry Pi. With an aim to have an unobservable latency.
- Coordinating project schedules and tasks within the team to ensure milestones are met on time and resources are allocated efficiently.
  Skills used: Machine Learning, TensorFlow, Computer Vision, UI/UX Design, Object-Oriented Programming, Python, ML Libraries, Raspberry Pi

Raspberry Pi Software-Defined Radio — Jan 2022 – Apr 2022

- Software-Defined Radio implemented using C++.
- Real-time optimization on a Raspberry Pi 4 with the NESDR RF hardware kit.
- Fully functional Mono and Stereo audio capabilities for multiple sampling and audio frequencies.
- Audio processing involving the use of finite impulse response generation, signal convolution with built-in resampling for sample rate conversion, phase-locked loops, multithreading with sync queues.
- RDS processing added clock and data recovery via peak identification.
- The key design constraint was to ensure the system ran in real-time without stuttering or cutting out on a computing platform with limited resources.
  Skills used: C++, Python, Signal Processing, Software Development

Cardiac Pacemaker Sep 2021 – Nov 2021

- Developed a system that operates a Cardiac Pacemaker.
- Was responsible for developing and maintaining the Device Controller-Monitor (DCM) for a Pacemaker device.
- Used Java and Processing 3.5.4 with additional libraries like controlP5.*, processing.serial.* to develop the DCM interface.
- Worked with a group of 5 other team members to establish Serial-Communication and implement state flows using Simulink.
  Skills used: GUI Dev, Java, UI/UX development, Processing, Hardware-Software Integration

3D Spatial Mapping System Jan 2021 – Apr 2021

A microcontroller-based device that scans its surrounding.

- Developed a 3D visualization software using Python 3.8.8 scripting and various Python libraries such as Matplotlib and NumPy to gather data in real-time and plot data points as a 3D visualization.
- Implemented serial communication through I2C protocols and UART.
- Successfully utilized an MSP432E401Y microcontroller and VL53L1X Time-of-Flight sensor to scan the device's surroundings within the YZ plane.
  Skills used: Serial Communication, Visualization, Spatial mapping, Python

Hardware Image Decompression System Sep 2021 – Dec 2021

- Hardware image decompression system created using System Verilog in the Quartus Prime environment.
- Includes design and implementation of 6-tap finite impulse response filter for horizontal up-sampling, colour space conversion operations from the YUV plane to the RGB plane, matrix multiplication operations, and use of embedded and external RAM units.
- Key design constraints included a finite number of hardware multipliers and external RAM units, a minimum operating clock frequency, and a minimum multiplier usage percentage.
  Skills used: Verilog, Multithreading, Software Optimization, Embedded Systems

Relevant Courses

Embedded Systems	Jan 2024 — Present
Advanced Internet Communication	Jan 2024 — Present
Fundamentals of Machine Learning	Sep 2023 – Dec 2023
Space Systems Engineering	Sep 2023 – Dec 2023
Computer Architecture	Sep 2023 – Dec 2023
Communication Systems	Jan 2022 – Apr 2022
Operating Systems	Jan 2022 - Apr 2022
Digital Systems Design	Sep 2021 – Dec 2021
Software Development	Sep 2021 – Dec 2021
Circuits and Systems	Jan 2021 – Apr 2021
Microprocessor Systems	Jan 2021 – Apr 2021
Data Structures, Algorithms, and Discrete Maths	Jan 2021 – Apr 2021
Logic Design	Sep 2020 – Dec 2020
Principles of Programming	Sep 2020 – Dec 2020
Engineering Computation	Sep 2019 – Dec 2019