Rachad El Moutaouaffiq

(438) 878-0603 | French/English | rachadelmtq@gmail.com | *Portfolio* | *LinkedIn* | Vancouver, Canada

Education

The University of British Columbia Sep. 2022 – Jun. 2027
Bachelor of Applied Science - Computer Engineering | *Dean's Honour List 2023* *Vancouver, BC*

Technical Skills

Software: C/C++, Verilog, ARM assembly, Unix commands, Git, Multithreading, Python, Java
Hardware: Microcontrollers, Oscilloscopes, Switches, High Voltage, Soldering, FPGA (DE1-SoC), Capacitors

Personal Projects

BilliardBot VisionAI, *Demo* | *OpenCV, ESP-32 Server, Tkinter(GUI), Circuit, System Integration* Oct. 2023 – Present

- Built a **pool-playing robot** using OpenCV for ball detection and a high-voltage solenoid for cue striking.
- Designed and debugged robot circuitry, achieving ±0.2° / ±0.06mm accuracy with steppers & ESP-32 wireless control.
- Developed OpenCV algorithms for accurate spatial measurement and object detection.
- Developed a Tkinter UI and a physics simulation for real-time control, testing, and fine-tuning of OpenCV parameters
- **Robot scores bank shots more accurately than the average human player.**
- Exploring YoloV8 for better ball classification and optimizing shot sequences using and statistical analysis.

Airbus A320 side sitck *Demo* | *(Personal project) Microcontroller, FPGA, DAC/ADC, USB interface* June. 2024

- Reverse-engineered the internal circuit of an actual Airbus A320 sidestick to make it computer-compatible.
- Modified the microcontroller firmware to function as an HID device for use in a flight simulator.
- Exploring using an FPGA with custom DACs and ADCs instead of a microcontroller to expand my hardware skills.

384V Multistage Coil Gun, *Demo* | *Thyristors, Optocoupleur, Capacitors, Oscilloscope, Interrupts* Jan. 2023

- Constructed a 384V coil gun with high-voltage capacitors and switches like optocouplers and SCR-thyristors
- Built an IR speedometer using interrupt functions for accurate projectile exit velocity measurements, tweaking variables like winding turns and distances, resulting in 17m/s and 3 Joules of energy

Technical Experience

Firmware & Power Electronics Engineer Co-op Sep. 2024 – Present
Analytic Systems *Vancouver, BC*

- TBD, I just started

AOCS Hardware & Firmware Developer Sep. 2024 – Present
UBC Orbit | *Satellite Design Team* *Vancouver, BC*

- Hardware and firmware developer for the Attitude and Orbit Control System (AOCS) subteam
- TBD, I just started

Software Subteam Member Sep. 2022 – May. 2023
Thunderbots | *Autonomous soccer playing robot design team* *Vancouver, BC*

- Collaborated on Pybind tickets to integrate C++ and Python, enabling variable access across files for our UI
- Improved goalie decision-making in proximity to other robots, reducing goals allowed

IT Consultant Aug. 2021 – Aug. 2022
Bank of Montreal (BMO) / CGI | *(During Gap Year)* *Vancouver, BC*

- Resolved bank employees' issues with group policy permissions, software, and VDI technical challenges