Rachad El Moutaouaffiq

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EDUCATION

The University of British Columbia   Sep. 2022 – Jun. 2027

Bachelor of Applied Science - Computer Engineering | Dean's Honour List 2022/23   *Vancouver, BC*

TECHNICAL SKILLS

Software: Googling, Git, Unix commands, Multithreading, Python, Java, C/C++, Verilog, ARM assembly.

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

- Building a pool-playing robot, using OpenCV for ball detection and a high-voltage powered solenoid for cue striking.
- Designed and debugged robot circuitry and seamlessly integrating firmware with ESP-32 wireless connections for precise control. Achieved ±0.2° degree or ±0.06mm margin of error.
- Developed OpenCV algorithms for spatial measurement and object detection via HSV thresholds; currently exploring YoloV8 for enhanced ball classification.
- Designed a Tkinter UI for robot control, enabling real-time troubleshooting and fine-tuning of OpenCV sensitivity parameters. Ensured seamless integration between the UI, computer vision, and firmware.
- Exploring graph theory and statistical analysis with my team to optimize shot sequences for optimal follow-up shots.

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.
- Selected high-current/voltage components through datasheet analysis and diagnosed errors with an oscilloscope.
- 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.

Automatic Xylophone, *Demo* ⎋ | *Homemade Solenoids, Transistors, MIDI*   Aug. 2022

- Built an automated electromagnetic Xylophone with 24 transistors, DIY solenoids, and nails for key strikes, controlled through MIDI and serial communication. My project was featured on the *Arduino-website* ⎋.

TECHNICAL EXPERIENCE

Software Subteam Member   Sep. 2022 – May. 2023

Thunderbots | *Autonomous soccer playing robot design team*   *Vancouver, BC*

- Enhanced software development skills through code reviews, Git& version control, and managing merge conflicts.
- Collaborated on Pybind tickets to integrate C++ and Python, enabling variable access across files for our UI.
- Contributed to improving the goalie's decision-making and enhancing the overall game strategy.

IT Consultant   Aug. 2021 – Aug. 2022

Bank of Montreal (BMO) / CGI | *(During Gap Year)*   *Vancouver, BC*

- Assisted bank employees with group policy permissions, software and VDI technical issues.
- Documented my work and routed tickets to other departments when necessary.

Technical Support Agent   Mar. 2021 – Aug. 2021

Advanced Skyline Technology | *(During Gap Year)*   *Markham, ON*

- Supported end-users with OS related issues such as boot sequence and drivers, and handled warranty claims.
- Although it wasn't required, I took the initiative to develop Python scripts for our email system with Win32com.client to automate sending personalized emails with parcel and customer details, improving my efficiency by 10%. My manager appreciated this effort, and the solution was adopted by 2 colleagues. *More info* ⎋.