

# RACHAD EL MOUTAOUAFFIQ

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## EDUCATION

### University of British Columbia

Bachelor of Applied Science - Computer Engineering,

Sep. 2022 – Jun. 2027

Vancouver, BC

## PROJECTS

### BilliardBot VisionAI, [link](#) | OpenCV, ESP-32 Server, Tkinter, High-Voltage Solenoid/Capacitors Oct 2023 – present

- Leading a 5-member, multidisciplinary pool-playing robot project using OpenCV for ball detection/classification and high-voltage circuits for cue striking. I focused on electrical and software tasks while ensuring system integration.
- Implemented wireless control with ESP-32 libraries and optimized stepper motor performance using non-blocking functions, achieving precise robot movement.
- Developed a Tkinter UI for robot control, facilitating real-time troubleshooting and AI sensitivity tuning.
- Exploring YoloV8 for better ball detection/classification and enhancing shot strategy algorithms using physics, concentrating on post-strike cue ball placement for better follow-up shots.

### Multistage Coil Gun, [link](#) | Thyristors, Optocoupleur, Capacitors, Interrupt functions, Oscilloscope Jan. 2023

- Constructed a 384V coil gun with high-voltage capacitors and switches like optocouplers and SCR-thyristors.
- Analyzed datasheets to ensure the selection of components that were compatible with high currents.
- Diagnosed errors by isolating specific components and assessing their behavior with a DMM and oscilloscope.

### Automatic Xylophone, [link](#) | Homemade Solenoids, Transistors, MIDI Aug. 2022

- Constructed an automated electromagnetic Xylophone equipped with 24 transistors and DIY solenoids, which produce sound by striking the xylophone keys with nails.
- Enabled software-based control for the xylophone using the MIDI library and serial port communications.
- This project was featured on the [Arduino-website](#).

## ENGINEERING DESIGN TEAM

### Software Subteam Member

Sep 2022 – May 2023

**UBC-Thunderbots** | Autonomous soccer playing robot design team

- Enhanced software development skills by conducting code reviews via GitHub, utilizing Git and version control in a Linux environment, and managing pull requests and merge conflicts.
- Collaborated on Pybind tickets to integrate C++ and Python, ensuring seamless variable retrieval across different files and languages for our user interface.
- Contributed to improving the goalie's decision-making and enhancing the overall AI strategy.

## WORK EXPERIENCE

### IT Consultant

Aug 2021 – Aug 2022

CGI / Bank of Montreal (BMO)

(Remote)

- Assisted bank employees with group policy permissions, software and VDI technical issues.

### Technical Support Agent

Mar. 2021 – Aug. 2021

Advanced Skyline Technology

Markham, ON

- Provided phone and TeamViewer technical support to end-users.
- Created a Python application and scripts to automate recurring tasks like parcel tracking, customized client emails, and auto-filling database forms, employing Win32.com.client and pathlib. See [this link](#) for more details.

## TECHNICAL SKILLS

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

**Hardware:** Microcontrollers, Oscilloscopes, Switches, High Voltage, Soldering, FPGA(DE1-SoC), Capacitors.