UBC Science Co-op
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Ehsan Al Twal

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SKILLS

Electrical
PCB Design in Altium, Building, Debugging, Soldering

Programming
NN, CNN, SIFT, ROS, CV, Java, C, C#, OOP, HTML, Python, GUI, Game development

Mechanical
Designing, Prototyping, Testing, 3D printing, CAD (Onshape, Solidworks)

Microprocessors
STM32F103C8T6, Arduino

EDUCATION

3rd Year UBC Engineering Physics Undergrad, *University of British Columbia*
Sep 2021 – Jun 2026
Vancouver, Canada

- Engineering Physics is the pursuit of taking new ideas from concept to practical use, that also combines physics, mathematics and engineering.
- Key Courses include: software construction; mechanics; electronics; and design

PROFESSIONAL EXPERIENCE

Mechanical/Materials Engineer, *Terrella Energy Systems - Matthews International*
Jan 2023 – Apr 2023
Vancouver, Canada

- Led a project to optimize the behavior of a material by measuring/testing its mechanical properties and studying its behavior under different environments.
- Developed new mechanical testing methods and techniques, identified equipment needed for the test, and conducted the experiments which resulted in useful findings
- Fixed a vacuum chamber using improvised materials.

Mechanical Engineering Trainee, *Fine Hygienic Holding*
Jul 2022 – Aug 2022

- Demonstrated high safety awareness while successfully measuring vibration values for predictive maintenance testing of heavy machinery.
- Trained in a Paper Mill factory for maintenance with exposure to digital control systems, production lines, and manufacturing process reports.

Maintenance/ Waiter/ Life guard, *Mariam Hotel*
2017 – 2022

- Experienced in general maintenance, food service, lifeguarding, and social media account management.
- Strong customer service skills and attention to detail.

STUDENT DESIGN TEAMS

UBC Formula Electric

- Designed the module PCB for balancing and monitoring the temperature and state of charge of the battery.
- Leveraged Altium Designer to develop schematics for our vehicle's control circuits.
- Repaired a broken connection in the CAN module wiring, enhancing vehicle communication reliability.

UBC Open Robotics

- Mechanical Team Lead for the Gripper Project.
- Effectively delegated responsibilities and managed project workflow.
- Spearheaded the design and prototype development of the claw's motion system.
- Demonstrated expertise in CAD design, utilizing OnShape for project assignments.

PROJECTS

Robot Race Car Competition

- Built the CAD and fabricated a sturdy chassis using sheet metal techniques.
- Pioneered an Ackermann Steering System for enhanced track performance and agility.
- Engineered an advanced H Bridge circuit for precise motor control and maneuvering; extensively tested, soldered, and noise issues expertly resolved.
- Integrated essential electronic circuits, including a rotary encoder, servo motor, and regulators, ensuring seamless robot operation.
- Fused sensor arrays (magnetometer, IMU, accelerometer, gyroscope) for 3D orientation determination.
- Utilized laser distance and ultrasound sensors to pinpoint track positions, enabling accurate localization.
- Devised a strategic track mapping approach via Desmos, programming the robot for autonomous route navigation.

Autonomous ROS Robot with CNN-Based Text Recognition

- Programmed a vehicle to navigate autonomously while obeying traffic laws in a ROS environment.
- Implemented OpenCV for real-time detection of pedestrians, cars, road elements, and roadside posters featuring embedded clues.
- Developed a convolution neural network to read and interpret text from images, essential for clue analysis.

Robot Tank (Personal)

- Built and wired robotic tank involving various components such as servo motor, Ultrasonic sensor, Bluetooth module, LED lights, and more.
- Developed code in C targeting the Arduino platform to control Motion, Tracking, and Lighting aspects
- Overcame faults in the product by carving wheels.

Robot Claw

- Designed, Modeled, Prototyped (C-sketch & Physical), and Built two robot claws using cardboard, tape, servo motor, Arduino, IR sensor, and a Joystick
- Coded in C language targeting Arduino platform to control Motion, Measure Distance, and Gripping aspects
- Scored the highest in class competition.

Mobile Game

- Self-taught game development, programming, and graphics production through online videos and courses.
- Conceived and developed a mobile game idea independently.
- Demonstrated proficiency in game development, using Unity for game engine, C# for programming, and Blender for graphics and assets.

AWARDS

Dean's Honour List, *University of British Columbia*

Trek Excellence Scholarship, *University of British Columbia*

100% High School Average

graduated high school with an average of 100%