

Brandon Jahoor



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Candidate for BAsC in Mechatronics Engineering Honours, Minor in Computer Engineering, University of Waterloo

Developing intelligent robotics systems driven by perception and AI!

Skills

- **Robotics & Perception:** ROS2/ROS, Gazebo, Foxglove, OpenCV, kinematics (FK/IK), RealSense, Pure Pursuit
- **Embedded Systems:** Raspberry PI, Nvidia Jetson, STM32(C), ESP32, PLC ladder logic, FPGA/VHDL
- **Software & Tools:** C++, Python, C, Docker, AI, GitHub, Linux/Ubuntu, Ollama, YOLO, Isaac Sim & Lab, REST, HTTP, DSA
- **Design & Prototyping:** SolidWorks(CAD), 3D-printing, electrical/mechanical assembly, testing, validation

Experiences

Robotics Research Assistant – University of Waterloo RoboHub *(Sept 2025 - Dec 2025)*

- Syncing Xsens Awinda IMUs with **7-axis robotic arm** (Emika Panda's) in to **mirror human arm motion**.
- Done in a ROS2 environment on Linux/Ubuntu, using Docker for replicability.

Robotics Engineering – University of Waterloo Robotics Team (Co-op) *(June 2025 - Aug 2025)*

- Developed **ROS2 Realsense** RGB & depth stream with compression and dynamic resolution selection; added **OpenCV** processing.
- Modelled/solved 6-wheel rocker-bogie drivetrain **forward & inverse kinematics** for mars rover running on **Nvidia Jetson**.

Robotics Engineering – BHF Robotics (Co-op) *(May 2025 - June 2025)*

- Implemented **ROS2 autodrive** routine; trained **deep learning AI** model for autonomous farming robot's weed/crop detection.
- Diagnosed electrical issues and **restored robotic controls**; contributed to part design & simulation for prototyping/manufacturing.

Projects

AI Roommate – Nvidia Jetson, Ollama (Qwen2.5-0.5B) LLM, Ultralytics YOLOv8s Detection, REST API (FastAPI)

- Developed scene-aware "AI Roommate" delivering real-time detection, assistance, & interaction from a functional dashboard.

Robot Arm Simulation – Nvidia Isaac Sim & Isaac Lab, AI Policy Training, Reinforcement Learning

- Setup Isaac Sim & trained RL policies for Franka & SO101 arms in (CUDA enabled) Isaac Lab; validated sim-to-real transfer readiness.

Hexapod Robot – Nvidia Jetson (Jetpack), Robotic Arm, RealSense, AI Object Detection (OWL-ViT)

- Co-developed a 3D-printed 18-DOF hexapod with SO101 arm, onboard camera system, and teleop control.
- Led integration of Jetson-based OWL-ViT zero-shot AI for real-time object detection and autonomous following.

Autonomous Rover Simulation – Gazebo, ROS2, Python, Navigation, AI

- Developed a Gazebo rover simulation with ROS2 navigation stack with obstacle avoidance for autonomous goal-seeking movement.
- Added AI-based plant detection node using onboard camera feed and image classification model.

AI Object Detection – AI, ROS2, Python, RealSense, OpenCV

- Developed ROS2 RealSense camera package with compression for efficient RGB-D streaming and local AI inference.
- Integrated Hugging Face Transformers (OWL-ViT) for zero-shot, text-prompt object recognition with real-time OpenCV visualization.

WATonomous – Docker, Foxglove, C++, LiDAR, A*

- Implementing ROS2 navigation stack with A* global path planning & Pure-Pursuit control within Docker for autonomous navigation.
- Using Foxglove to visualize LiDAR-based cost maps, path planning, and odometry in real-time.

SWARM Robots – Linux/Ubuntu, Docker, Gazebo, ROS2 Assembly, ESP32

- Assembled and programmed a fleet of HeRo 2.0 swarm robots from scratch, including SMD soldering & ESP32 WiFi communication.
- Deployed ROS2 and Gazebo containers in Docker to simulate swarm coordination.

3-DOF Robotic Arm – ROS2, OpenCV, SolidWorks, PWM, 3D Printing, Raspberry PI

- Designed & 3D-printed robotic arm using SolidWorks; implemented PWM motor control on Raspberry Pi using ROS2.
- Programmed colour-based token sorting using OpenCV vision and HSV filtering for real-time classification.

For more information, please visit my website portfolio: bjahoor.github.io