

Ibrahim Helal

Sr. Software Engineer - Robotics

A highly motivated engineering professional with an initiative and startup spirit, driven to build innovative solutions in the autonomous systems field.



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WORK EXPERIENCE

Sr. Software Engineer - Robotics Miso Robotics

09/2021 - Present

Pasadena, CA

- Developed autonomy software for Flippy 3, leading to **5M+ baskets cooked** and **99% uptime**.
- Led system redesign, **reducing cabling by 84% and electronic box size by 60%**.
- Integrated advanced sensor arrays for real-time cooking automation.
- Designed multi-station control logic for high-volume kitchens.
- Designed, simulated, developed and tested robots from idea to mass production
- Built test benches **reducing validation time from 3 hours to 3 minutes and production traceability**.

Founder ANTS Robotics

09/2019 - 08/2021

Vancouver, Canada

- Led a team of engineers building custom simulation and autonomy stacks.
- Developed full robot inverse kinematics and mission-level autonomy software.
- Designed and integrated proprietary hardware for advanced robotic systems.
- Secured project funding and delivered first customer field testing.
- Built scalable simulation platforms for autonomous multi-agent robots.

Robotics Entrepreneur Gripix

11/2019 - 09/2021

Vancouver, Canada

- A record of **2600 robotic platforms deployed** to educational facilities in Canada and China
- Hardware interfacing software library engineering
- Building Docker containers for production-ready software

Robotics Engineer OTTO Motors, a division of Clearpath Robotics

01/2019 - 04/2019

Waterloo, Canada

- Automated HIL tests across a fleet of OTTO robots using REST API integration.
- Enabled real-time test result reporting via Slack and Elastic for QA efficiency.
- Developed wire harnesses for OTTO 100 robot, deployed in 3 continents

Robotics Software Engineer (Localization) Advanced Intelligent Systems Inc.

09/2018 - 12/2018

Burnaby, Canada

- Developing Visual Odometry Algorithms
- UWB localization system calibration
- Improving Robot Localization and Navigation performance

TECHNICAL SKILLS

Robotics

Experience with robotics system design, robotic manipulation, and knowledge of kinematics and dynamics, simulation.

Embedded

Experience with microcontroller programming (STM32, ESP32, PLC) EthernetIP, Modbus, RS485, I2C, SPI

Simulation

Gazebo, RViz, Isaac Sim, Isaac Lab

Instrumentation

Experience with sensors and actuators, data acquisition, measurement systems, Logic analyzer, and Oscilloscope.

Electrical

Wire Harness Design, PCB Assembly, Electrical Schematics, Troubleshooting electrical systems.

Mechanical

Rapid prototyping, 3D Printing, Mechanical Subsystems analysis.

SOFTWARE SKILLS

C++

CMake

Docker

Gazebo

Git

HITL

I2C

JIRA

Linux

Python

AWS

ROS

RViz

Solidworks

UML

Unit Testing

URDF

OOP Design

Foxglove

Graphana

EDUCATION

MS Computer Science (Computational Perception and Robotics)

Georgia Institute of Technology

01/2024 - Present

BASc Mechatronic Systems Engineering Simon Fraser University

09/2016 - 08/2021

PATENTS

PATENT

AUTOMATED FOOD FRYING SYSTEM

Filed Oct 5, 2024

63/703,953

PATENT

Hierarchical Robotic Control Architecture Utilizing Large Language Models, Vision-Language Models, and Modular Skill Agents

Filed Jul 30, 2025

63/854,447

SIGNIFICANT PROJECTS

Flippy 3 Advanced - (IO-Link, EthernetIP, Modbus, RS-485)

- Converted Flippy 3 into a Fieldbus based architecture reducing number of cables by **85%**
- Reducing the size of the Flippy 3 electronic box by **50%**
- Developing and owning the architecture development and communication protocols for the new Flippy 3 Advanced
- Cutting costs by **\$20,000** reducing the cost of the robot by **53%**
- Integrating an IO-Link based architecture for all the sensors and actuators on-board to utilize a production design to be able to scale the fleet

Production Test Benches - (PyTest, RosTest, AWS)

- Engineered and architected a suite of advanced production test benches for Flippy units.
- Designed an electronic box test system that **slashed testing time from 3 hours to 3 minutes**.
- Developed automated subsystem validation using custom PCB and GUI software.
- Implemented full traceability with integrated barcode labeling for serialized inventory tracking.

Flippy 3 - (C++, Python, ROS, URDF, Rviz, Gazebo, Grafana)

- Architected 30% of core software stack across 3 subsystems with OOP and fail-safe patterns.
- Engineered autonomous Elevator subsystem achieving **99% uptime** through **data-driven fault analysis**.
- Implemented self-healing architecture with automated fault detection, **reducing failures by 98%**.
- Designed single-motor actuation system with precision control for autonomous operations.
- Integrated Grafana monitoring for performance tracking and optimization.
- Delivered modular codebase with hardware-agnostic design for cross-platform compatibility.
- Developed mission software to orchestrate the robot subsystems to season and mix cooked food using state machines and behavior trees.

Miso Custom Dispenser - (I2C, RS-232, C, ESP32, Modbus)

- Took leadership on the system design and architecture
- Developed the electrical, firmware and software of the product in an astonishing duration of 3 months
- Took the project from idea to prototype, to production.
- Designed a modern dispenser electronic architecture to fit in any ROS robot while maintaining cost targets
- Developed it in a state machine
- Developed software to orchestrate 5 motors and 25 sensors with a software manager.

Flippy Lite

- Championed the deployment and development of Flippy Lite the robot into the first Chipotle restaurant
- With a Go To Market mindset and a timeline of less than 1 year, the system was developed and deployed to site.
- Owning 20% of the system architecture design and software packages

Omni-directional Autonomous Mobile Robot

- Simulator (XML, C++, ROS) [↗](#)
- Inverse Kinematic Model (C++, ROS) [↗](#)
- Robot State Updater (C++, ROS) [↗](#)

Multi Agent Robotic Simulation (Gazebo, ROS, C++) [↗](#)

Full Stack Robot Programming Library (Sample Code) [↗](#)

CERTIFICATES & ONLINE COURSES

Fundamentals of Deep Learning for Computer Vision (06/2019)

NVIDIA

Robotics Operating System (ROS) (08/2017)

FH Aachen University of Applied Sciences (Germany)

Siemens Mechatronic Systems Certification (08/2018)

Siemens

Certified SOLIDWORKS Mechanical Designer (12/2018 - Present)

Credential ID: C-ML7V7TA224

HONOR AWARDS

Robotics World Champion

Stephen Harper (Former Prime Minister Of Canada)

- Have been recognized for outstanding achievements received in the VEX Robotics Competitions.

Robotics Startup Entrepreneurs' Choice Award

Venture Connections

- As a robotics entrepreneur , with the help of my team, we successfully got picked to win the Entrepreneurs' Choice Award during our incubation period at Venture Connections

BCIT - Excellence Award

Awarded the highest British Columbia Regional competition award

- Top 10 Robot Skills Ranking
- Top 10 Robot Software Programming Ranking
- Top 10 Tournament Ranking

REFERENCES

Brian McLean - Director of Hardware Engineering at Clearpath Inc.

"Ibrahim has always worked with dedication and application. He readily throws himself at any problem. He applies himself diligently to learn whatever skills or knowledge he needs to complete the task. Ibrahim consistently delivered above and beyond what was expected of him and worked to improve himself. I recommend Ibrahim wholeheartedly for future employment in robotics and technical fields."

Contact : <https://www.linkedin.com/in/brian-mclean-7b0792/>

David Harper - Staff Electrical Design Engineer at Clearpath Inc.

"Ibrahim proved to be a quick study and a diligent worker. He was introduced to and trained in wire harness design and hardware testing. His skills in hardware and ROS became apparent as Ibrahim volunteered for project after project with his infectious enthusiasm for robotics. Ibrahim became a valuable member of our team in short order and has been sorely missed after his 8 months at OTTO Motors ended. Its hard to find dedication like this."

Contact : <https://www.linkedin.com/in/david-harper-9a02231/>

Mike Piehler - Sr Robotics Engineer at Fresh Consulting

"Ibrahim is an excellent engineer with a solid work ethic. He has a strong intuition for electrical and mechanical systems and an excellent understanding of robotics. And if that's not enough, he's a delight to work with."

Contact : <https://www.linkedin.com/in/mike-piehler-a220442/>