

Sebastian Barrio Bejarano

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Profile

AI engineer with a foundation in Mechatronics and a proven record of applying cutting-edge AI and building production-grade ML, computer vision, and robotics systems. Experienced in developing novel algorithms, custom computer vision models with outstanding accuracy, LLM-based workflows, 3D/VR interfaces, and advanced methods for robot navigation and Reinforcement Learning. Comfortable across Python, C#, C++, React, Node.js, and hardware-software integration, with a strong bias toward solving hard problems independently and delivering reliable systems for industry leaders like Siemens

Work History

AI Research Scientist Intern, Siemens, Munich, Germany Mar 2025 to Aug 2025

- Engineered an end-to-end robotics planning pipeline for AI-driven assembly-by-disassembly in Python and C#, combining automated sequence generation and pruning, path-finding methods (ML-RRT, D*, RL), and VR export of interactive AI-generated instructions in Siemens NX.
- Trained and deployed a custom-architecture YOLO-based model and computer vision system for automated digitization of single-line diagrams, achieving over 98% accuracy.
- Developed LLM- and embedding-based workflows for semantic data harmonization and clustering, and delivered an interactive React tool for data curation, cleansing, review, and visualization for stakeholders.
- Designed a graph algorithm for automated 3D placement of CAD components under connection and collision constraints
- Developed a novel method for constrained component placement using Fourier transforms to estimate the solution density within the discrete inverse-kinematics configuration space, greatly reducing computation time.
- Contributed to middle-ware development for managing multi-disciplinary plant data and generating interactive data visualizations.

Front-End Developer Intern, La Brújula, Mexico City Feb 2024 to Jun 2024

- Integrated third-party APIs to deliver translation functionality in a production website.
- Implemented a reusable design system to improve consistency and speed up frontend development across the product.
- Implemented CI/CD pipelines to automate testing and deployment, improving delivery reliability and release velocity.

Freelance Full-Stack Web Developer, Mexico City Jan 2019 to Dec 2020

- Designed, developed, and maintained production-grade full-stack web applications for small clients using modern technologies such as React, Node.js, and Firebase, Deployed on cloud infrastructure, managing databases and CI/CD orchestration to ensure high system reliability and performance at scale.

Education

Tecnológico de Monterrey, Mexico

B.S. Mechatronics Engineering

Entrepreneurial and Academic Scholarship holder. National CENEVAL Award winner.

Subjects: Robotics | Control Systems Design | Industrial Process Automation | Dynamic & Electrical Systems Modeling | Mechanical Design, Material science, & Manufacturing

Technische Universität Dresden, Germany

Exchange semester

DAAD-KOSPIE scholarship holder.

Subjects: Advanced Robot Control | Laser robotics | Neural Networks and Memristive Hardware Accelerators | Property and behavior analysis | Plasma Technology

Projects

- Industrial maintenance robot RoboMop, ITESM + dasVent** Nov 2025
- Engineered the software stack for a fully autonomous mobile robot (AMR) in C++ and Python, focusing on concurrent real-time systems, 2D Occupancy Grid SLAM, and sensor fusion with strict attention to time synchronization and timing constraints.
 - Implemented path-planning and coverage algorithms for autonomous navigation and obstacle avoidance in industrial environments.
 - Built a real-time React/Node.js telemetry interface using WebSockets for live mapping and teleoperation, enabling monitoring and remote control of the AMR.
- Automation of a manufacturing cell, Rockwell Automation** Mar 2024
- Engineered a fully automated manufacturing cell by integrating robotic arms, CNC code, PLCs, and IoT sensors, reducing manual intervention and improving production efficiency.
 - Implemented a VR-based digital twin for virtual operations training and process validation.
- Robot Arm with Computer Vision, ITESM** May 2024
- Implemented a real-time OpenCV pipeline for object detection and fiducial-based precise positioning.
 - Designed and validated geometric inverse kinematics for a 4-DoF arm and wrist to enable reliable pick-and-place motion
 - Built ESP32 firmware in C++ exposing a Wi-Fi socket server to parse commands and drive 5 servo motors with state acknowledgments and OTA updates.
 - Integrated an end-to-end Python control loop for camera capture, path planning, TCP communication, and task execution.

Awards and Certificates

- National CENEVAL Award EGEL+ IMECATRO, Mexico** Dec 2025
- DAAD KOSPIE Scholarship Recipient, Germany** Apr 2024
- CS50AI: Artificial Intelligence with Python, HarvardX** Oct 2020
- AI Professional Certificate, Google** Mar 2026
- RoboCup 2017 Rescue Robotics CoSpace Best Presentation Award, Japan** Jul 2017
- JavaScript Algorithms and Data Structures, FreeCodeCamp** Sept 2022
- ITESM Entrepreneurial Talent Scholarship Finalist, Mexico** Dec 2021
- ITESM International Science Contest Finalist, Mexico** Apr 2021
- TMR 2017 Rescue Robotics CoSpace First Place Award, Mexico** Apr 2017

Skills

- Programming:** Python, C++, C#, Javascript/Typescript, React, ROS2, Node.js, SQL, Git, Firebase, Tailwind, PostgreSQL, CI/CD, MLOps, HTML, CSS, Azure, Docker, AWS, MongoDB
- Robotics & hardware:** Advanced Robot Control, SLAM, LIDAR, Inverse Kinematics, Path planning, Sensor fusion, Vision models, Fusion 360, Solidworks, CATIA, Matlab, Simulink, Electronics & PCB design, Embedded Systems
- AI / ML:** LLM workflows, Embeddings, Clustering, Agentic systems, ML pipelines, Pytorch, Tensorflow, OpenCV, YOLO
- Languages:** Spanish — Native | English — C2 (Proficient) | German — B2 (Upper-intermediate)