Diego Andres Carvajal Solano

Robotics and Automation Engineer

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DiegoCarvajal98 | Portfolio

PROFILE

Mechatronics Engineer with hands-on experience designing and integrating robotic systems, specializing in both mobile wheeled robots and robotic arms, leveraging strong expertise in ROS with Python and C++. My passion lies in solving complex challenges through programming, systems design, and integration, creating robust solutions that enhance efficiency and effectiveness.

I have a proven track record of working in a fast-paced environment, integrating hardware and software, and developing software for robotic platforms. I have solid experience with industrial components, such as PLCs and HMIs, which ensures a comprehensive approach to system development.

I am a collaborative team player with a passion for continuous learning and problem-solving. I am eager to apply my skills to innovative and challenging projects in robotics and automation.

SKILLS

Automation
PLC programming, HMI Siemens PLC, Delta, Instrumentation, Control, Networking, EthernetIP, CANOpen

CAD and Simulation
Gazebo, Solidworks, Simulink, Autodesk Inventor, Proteus, Comsol Multiphysics

Programming
Linux, Python, C++, Git, Docker, Matlab, OpenCV, YOLO, Qt, pyQt

Other Skills
Web Development, Wordpress, Prototyping, Research, Continuous improvement, Communication, Problem solving

Robotics
ROS 1/2, MoveIt, Nav2, Robotics teleoperation, Robotics integration, Kinematics, Dynamics, Arduino

RELEVANT EXPERIENCE

Controls Engineer — 12/2025 – Present
Rocatek — Medellin, Colombia

- Architected comprehensive automation logic for Allen-Bradley PLCs using Studio 5000, ensuring robust and scalable control systems for complex industrial processes.
- Developed high-fidelity HMI and SCADA interfaces via FactoryTalk View, optimizing operator visualization and real-time data acquisition (SCADA).
- Engineered industrial control panels using EPLAN Electric P8, performing hardware selection, thermal calculations, and schematic design in compliance with international electrical standards.
- Developed and deployed custom client websites utilizing WordPress and Breakdance, incorporating dynamic filtering systems and optimized assets for enhanced UI/UX.

Innovation and Development Engineer — 08/2023 – 10/2025
Automate Col — Medellin, Colombia

During my time at AutomateCol, I was involved in key robotics and automation projects that enhanced my technical and problem-solving skills.

- Led the development of a wheeled mobile robot, implementing autonomous navigation and mapping via ROS 2. Integrated autonomous charging functionality using Behavior Trees, significantly boosting operational reliability and efficiency.
- Developed an automated flower-bucket packaging system. Programmed Delta AS332P-A PLCs and DOP-110IS HMIs, and integrated a UR20 robotic arm to streamline throughput and optimize the packaging process.
- Enhanced a multi-size box-packing Cartesian system utilizing Delta ASDA-A3 servomotors and drives. Improved system architecture by migrating from hardwired modules to Ethernet and CANopen communication protocols, ensuring seamless integration with Delta PLC and HMI hardware.

These and other projects helped solidify my expertise in robotics software, PLC programming, and system integration while allowing me to work across both hardware and software domains.

Research Intern 07/2022 – 11/2022
Grupo de Investigación en Control y Mecatrónica Bucaramanga, Colombia
Developed a system for pick and place applications using a UR3 robot controlled by EEG data with ROS and Matlab, enhancing automation capabilities

EDUCATION

Bachelor of Engineering, Mechatronics Engineering 01/2018 – 04/2023
Universidad Autónoma de Bucaramanga Bucaramanga, Colombia

PROJECTS

Teleoperation System for a Robot Manipulator with Gripper Haptic Feedback 01/2022 – 11/2022
During this project, I developed a teleoperation system or a UR3 robot manipulator using my programming skills with python and C++ to estimate the pose of the user's hand and control the robot and its gripper with ROS, my hardware design skills for the design of the electronics and mechanical components needed in the haptic tool and gripper force sensing systems.

Control of a Robot Manipulator with EEG Data for Object Manipulation Tasks 07/2022 – 11/2022
Throughout the development of this project, I used my programming skills with python and C++ as well as Matlab to program a UR3 robot manipulator to pick one of five possible objects according to the result from a machine learning model and Brain-Computer Interface data and place it at a determined location using ROS for the robot control and object detection.

PUBLICATIONS

A Camera-Based Teleoperation System for a Robot Manipulator With Gripper Haptic Feedback 02/23/2026
ASME 2025 International Mechanical Engineering Congress and Exposition
The design and manufacturing of mechatronic systems are integral to advancing both educational tools and research capabilities, particularly in robotics. At the Autonomous University of Bucaramanga (UNAB), a lack of adequate infrastructure for remote laboratories limits the ability of students to perform lab activities off-site. This underscores the growing need for accessible, low-cost technological solutions. To address this gap, this article presents the design, development, and validation of a low-cost mechatronic system for teleoperation, aimed at enhancing remote laboratory experiences.

Revisión del uso de interfaces cerebro-computador con el paradigma de Potenciales Evocados Visuales en Estado Estable en el control de robots manipuladores 10/30/2023
Editorial Unimar
Article presented at the CIIMA 2022 comference.

LANGUAGES

Spanish
Native

English
C1 (IELTS 7.5)

Korean
Competent in basic Korean

AWARDS

UNRobot 2021 Challenge Winner 11/22/2021
Ceintum-RAS Group
Winner of the UNRobot Challenge in the Intermediate Simulation category, this challenge consisted of developing and implementing an obstacle avoidance strategy for a differential robot through Matlab simulation.

COURSES

Learn to Code in Python3: Programming beginner to advanced
Udemy

ROS for Beginners: Basics Motion and OpenCV
Udemy

ROS for Beginners II: Localization, Navigation and SLAM
Udemy