RHANDY CARDENAS

Industrial PhD Researcher · AI Decision-Making & Autonomous Driving

CONTACT

Peruvian

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Videos: Renault | Heudiasyc

TECHNICAL SKILLS

- **RL & Decision-Making**

Deep RL (DQN, Policy Gradients, Actor-Critic), MDP/POMDP, Monte Carlo Tree Search (POMCP), Dynamic Programming

- **Machine Learning & Deep Learning**

Neural Networks, Supervised & Unsupervised Learning

- **Robotics & Simulation**

ROS 2, IPG CarMaker, CARLA, Gazebo, MATLAB/Simulink

- **Programming & Frameworks**

Python, C++, PyTorch, Keras, scikit-learn

- **Tools & OS**

Git, Linux, Visual Studio, LabVIEW

- **Engineering**

Design (Catia V5, SolidWorks), Embedded Systems (STM32, Arduino)

LANGUAGES

Spanish	Native speaker
English	C1 level
French	C1 level
Italian	A2 level
German	A2 level

INTERESTS

Basket Robotics Travel Reading

ABOUT ME

Industrial PhD researcher in Control and Robotics at Renault Group and UTC/Heudiasyc, specializing in AI for autonomous-driving decision-making, planning under uncertainty, and safe autonomous systems under ODD constraints. Experienced in developing, integrating and validating algorithms using Python, C++, and ROS 2, from simulation to SIL/VIL and prototype-vehicle testing. Skilled in Machine Learning, Deep Learning, and Reinforcement Learning. PhD defense scheduled for December 2026.

EDUCATION

Industrial PhD – Control & Robotics 2023 - 2026
Université de Technologie de Compiègne & Renault Group, France

Mechanical Engineering – Specialization in Mechatronics 2019 - 2023
Université de Technologie de Compiègne, France

Electrical Engineering & Industrial Computing 2017 - 2019
IUT Nice Côte d'Azur, France

Mechatronics Engineering 2015 - 2017
National University of Engineering, Peru

PROFESSIONAL EXPERIENCE

Industrial PhD Research Engineer – ADAS/AD **Jul. 2023 – Jul. 2026**
Renault Group / Heudiasyc UTC, Aubevoye / Compiègne

- Conducted a comparative analysis of tactical decision-making approaches to guide the design of the behavior planning architecture.
- Designed and implemented a behavior planning framework for autonomous driving, enabling fail-operational behavior by dynamically mapping vehicle capabilities to ensure graceful degradation under ODD transitions.
- Formalized sequential decision-making with MDP and POMDP models, using Value Iteration and Monte-Carlo planning (POMCP) to reason under uncertainty.
- Built the planning system in C++ and Python on ROS2, achieving modular, real-time integration within an industrial software architecture.
- Validated the framework across a three-stage testing pipeline: Software-in-the-Loop (SIL), Vehicle-in-the-Loop (VIL), and real-world experiments on internal vehicle platforms at controlled track environments.
- Benchmarked against baseline planning models, demonstrating robust tactical decision-making, safety, and operational continuity via degraded modes triggered by capability limitations and ODD changes.

R&AE Intern – HMI Decision System **Feb. 2022 - Aug. 2022**
Renault Group, Aubevoye

- Developed a ROS-based interactive decision-making system enabling users to select tactical maneuvers for highway driving scenarios.
- Designed maneuver feasibility and safety validation logic to ensure that only safe and feasible valid maneuvers could be executed.
- Studied user interaction with maneuver-based autonomous driving systems within simulated environment.

Teaching Assistant – Python Programming **Sep. 2026 - Present**
Université de Technologie de Compiègne (UTC), Compiègne

- Supervise and assess Python programming laboratory sessions for engineering students, covering core programming concepts, object-oriented programming, scientific computing, and databases.

Teaching Assistant – Control Systems **Oct. 2023 – Feb. 2024**
Université de Technologie de Compiègne (UTC), Compiègne

- Supervised laboratory sessions in control systems, system modeling, and feedback control for master students.
- Guided hands-on experiments using MATLAB/Simulink for system analysis and implementation.

PROFESSIONAL EXPERIENCE

Fablab Monitor **Oct. 2019 - Jan. 2020**

UTC Innovation Center, Compiègne

- Supported engineering students in rapid prototyping workflows involving CAD modeling and digital fabrication tools.
- Assisted in the operation of 3D printers, laser cutting systems, and digital manufacturing equipment.

R&D Intern - Graduate Technical Internship **Apr. 2019 - June 2019**

I21 Innovation, Cagnes-sur-Mer

- Developed energy management and energy harvesting solutions for connected embedded systems with focus on low-power operation and communication efficiency.
- Programmed ATmega328P and STM32 microcontrollers for embedded sensing (C++), data transmission, and system optimization tasks;

AI COURSES & CERTIFICATIONS

- **Deep Reinforcement Learning Nanodegree** *— Udacity (2026)*
  Deep Q-Networks (DQN), Policy Gradient Methods, Actor-Critic Algorithms, Continuous Control and Multi-Agent Reinforcement Learning.
- **Self-Driving Car Engineer Nanodegree** *— Udacity (2026)*
  Deep Learning, Computer Vision, Object Detection, Sensor Fusion, Localization, Motion Planning and Vehicle Control.
- **Machine Learning Specialization** *— DeepLearning.AI & Stanford Online (2023)*
  Supervised and Unsupervised Learning, Neural Networks, Regression, Classification, Decision Trees and Model Evaluation.

PUBLICATIONS

- R. P. Cardenas, L. Adouane, C. Zinoune and M. A. Benloucif, "Context-aware and Reliable Long-term Decision-Making for Safe Intelligent Vehicles: A survey," in IEEE Transactions on Intelligent Vehicles, doi: 10.1109/TIV.2024.3524881. *Link*
- R. P. Cardenas Curo, L. Adouane, C. Zinoune and M. A. Benloucif, "ODD-based long-term decision-making for intelligent vehicles," Proc. IEEE Intell. Vehicles Symp. (IV), Cluj-Napoca, Romania, 22–25 June 2025. *Link*
- R. P. Cardenas Curo, L. Adouane, C. Zinoune and M. A. Benloucif, "Assessing the decisional capability for an ODD-compliant automatic lane change system via Sense–Think–Act paradigm," Proc. 12th IFAC Symp. Intell. Autonomous Vehicles (IAV), Phoenix, AZ, USA, 7–9 May 2025. *Link*

PROJECTS & LEADERSHIP

Quadruped Robot for Underground Mine Exploration - Technical Supervisor **Feb. 2025 – Dec. 2025**

National University of Engineering, Peru

- Developed and supervised ROS2 and Gazebo based simulation workflows for a quadruped robot designed for autonomous underground mine exploration.
- Mentored student teams on ROS2 integration, route planning algorithms, and decision-making strategies.

IEEE VAMS 2025 - Organizing Committee **Aug. 2025**

CNAM, Paris, France

- Organizing Committee Member of the "2nd IEEE International Symposium on Verification of Autonomous Mobile Systems" (VAMS 2025). *Link*
- Developed the conference registration website and coordinated speaker and attendee activities during autonomous shuttle demonstrations in Paris.

UTAC Challenge 2024 – Team Mentor & Technical Supervisor **Feb. 2024 - May 2024**

UTC - UTAC, Compiègne - Linas-Montlhéry

- Mentored the UTC student team in Europe's first real-world autonomous and connected mobility competition.
- Supervised simulation workflows in CARLA and MATLAB for fleet AD system.
- Achieved 2nd Place (Open Category) and Best School Award. *Link*

National IUT Robotics Competition **Oct. 2018 - Apr. 2019**

IUT Nice Côte d'Azur, Nice

- Designed and developed an autonomous robotic platform capable of simulating a tennis match.
- Contributed to mechanical design, embedded electronics, and software development for autonomous robot operation.