



Pedro Masi Burgos

Mechatronics Engineer

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Skills

Programming

Python
C/C++
Matlab/Simulink
HTML
SQL

Software & Tools

AI & Machine Learning

Scikit-Learn
TensorFlow
PyTorch
OpenCV

Simulation & CAD

Ansys Workbench
CAESAR II
Catia V5

Embedded & GUI

STM32CubeIDE
FreeRTOS
Raspberry Pi

Other Skills

Git/GitHub
Scrum (Agile)

Languages

Spanish	Native
English	Professional
French	Professional
Italian	Elementary
Portuguese	Elementary

Profile

Mechatronics Engineer with international academic background (Argentina & France). Experience in R&D simulation and industrial automation, with a technical focus on **Python development, Embedded Systems, and Control Theory**. Proven ability in hardware-software integration, developing intelligent systems and advanced automation solutions.

Experience

Structural & Automation Engineer

Apr 2025 - Present

Dinvent SAS

- **Automation:** Led the end-to-end automation of a hydraulic test bench. Developed complex control logic using State Machines on a Raspberry Pi Zero 2.
- **Stress Analysis:** Performed static and dynamic stress analysis for international nuclear projects (RA10, Pallas) using Ansys Mechanical and CAESAR II.

R&D Engineer Intern

July 2024 - Jan 2025

ANSYS, Inc

- Developed a **Python ACT extension** to integrate specialized Response Spectrum Analyses into Ansys Mechanical.
- Optimized simulation workflows by automating data extraction and processing from MAPDL solvers via internal APIs.

Education

BSc + MSc in Mechatronics Engineering

2019 - Present

Universidad Nacional de Cuyo, Argentina

Multidisciplinary focus on electronic systems, software, and automatic control. Expertise in autonomous robotics, real-time embedded systems, and applied AI, with a strong foundation in digital signal processing and systems modeling.

MSc in General Engineering

2023 - 2025

École Nationale d'Ingénieurs de Brest, France

Specialized in Digital Systems, focusing on Advanced Control, AI, and Embedded Software. Expertise in mobile application development, vibratory mechanics, and computer vision projects using PyTorch. **Attestation de Réussite obtained** (Master's equivalent / Bac+5).

Projects

Vector Control Design for PMSM Motor

Control Theory · MATLAB/Simulink · State Estimation

Developed a high-fidelity multi-physics simulation for a 1-DOF robotic joint. Implemented a Field-Oriented Control (FOC) strategy with cascaded PID loops using Park Transformations. Designed a reduced-order integral observer for state estimation and applied Tustin discretization for digital controller readiness.

Real-Time Wi-Fi Controlled Mobile Robot

STM32 · C · ESP32

Modular mobile robot with a **multinode architecture** using an **STM32 Nucleo-F446RE** for real-time motor control and an **ESP32-S3** as a wireless bridge. Implemented preemptive task scheduling via **FreeRTOS** and engineered a custom **PyQt5** HMI using **UDP sockets** for high-frequency telemetry and low-latency control.

Autonomous Smart Agent Simulation

Computer Vision · Python · A* Pathfinding

Engineered a full-stack robotic software pipeline in Python consisting of three autonomous stages:

- **Perception:** Integrated **Knn** and **K-means** algorithms for real-time recognition of industrial components.
- **Reasoning:** Implemented **STRIPS-based automated planning** to optimize box reordering logic.
- **Navigation:** Developed an autonomous agent that navigates random complex mazes using the **A* algorithm**.