Alonso Cano

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Education

Sorbonne University — Paris, France
Master's in Intelligent Systems, Image and Sound Processing — *Aug 2017 – Nov 2019*
Bachelor's in Electronics, Electrical Energy and Control Systems — *Aug 2014 – Jun 2017*

Experience

Carnegie Mellon University — Pittsburgh, USA
Research Associate, Full-stack ML/Robotics Engineer — *July 2024 – Present*

Project: Large-scale Dataset and Foundation Models for Trajectory Prediction in Aviation

- Contributed to developing and open-sourcing a large-scale trajectory prediction benchmark for aviation on **GitHub** (github.com/orgs/AmeliaCMU/) and **HuggingFace** (huggingface.co/AmeliaCMU).
- Developed parallelized Python processing pipeline for a large-scale trajectory dataset (∼20 TB), reducing processing time by **over 60%** (from 40 to 15 hours) for scalable analysis and processing.
- Assisted in training experiment sweeps of transformer-based models, achieving state-of-the-art performance on benchmark trajectory prediction datasets using **Pytorch-Lightning.**
- Developed data-splitting algorithms to avoid data leakage and ensure deterministic splitting for fair reproducibility.
- Co-authored and submitted a research paper to **NeurIPS 2025 Datasets and Benchmarks Track**, detailing the dataset, experiments, and model design.

Project: Generative Robot Manipulation

- Engineered workflow automation tools for a robotic painting system that uses learned stroke-generation models to reproduce input images.
- Designed and 3D-printed a calibrated workspace platform in Fusion 360, automating calibration and reducing setup time by **over 70%** (2 hours to 30 minutes).
- Built a full-stack GUI with **Django**, **React**, and **Docker** for seamless user–robot arm interaction.
- Trained parameter-to-visual-output mapping models to improve stroke accuracy, motion expressiveness, and closed-loop feedback control.

Project: Contact-rich Human-Robot Interactions using Propioception and Soft Actuation

- Designed and built a social robot prototype with an inflatable, soft outer layer enabling safe, contact-rich navigation and interaction with humans.
- Integrated a **ROS**-based navigation stack using the **CMU Autonomous Exploration** tool, enabling autonomous navigation and mapping on a custom-built mobile robot.
- Engineered and deployed a proprioception algorithm based on a 3D deformation classification algorithm using **Open3D** and **PyTorch**, allowing the robot to detect touch types and trigger context-specific responses.
- Presented a demo of the prototype at the **IEEE International Conference on Robotics and Automation** (**ICRA**).

Ixaya / PyLC — León, Mexico
Machine Learning Engineer — *May 2020 – July 2024*

- Engineered and deployed a **RAG**-powered virtual assistant on **AWS Bedrock**, **ECS**, and **ECR**, and **SerpAPI**, enabling instant access to contextual portfolio data.
- Designed and iteratively refined prompt-engineering workflows to optimize LLM outputs for risk scenario analysis, improving output accuracy and consistency by over 95% (5 hours to 10 minutes) and enhancing decision making.
- Automated backend workflows and optimized data extraction from documents and web sources, with **AWS EC2** and **Azure AI**, cutting forms completions by **over 95 %** (15 minutes to 25 seconds).
- Developed scalable APIs with **Flask**, **AWS ECR**, and **ECS** for dynamic production workload handling.
- Implemented deep learning models for document classification, image segmentation, and text extraction.

Technical Skills

Languages: Python, C++, Java, SQL

Libraries: NumPy, Pandas, Scikit-learn, OpenCV, Torch, TensorFlow, Matplotlib

Frameworks: Flask, ROS, AWS, Google Cloud, Jenkins, n8n, LangChain

Tools: GitHub, Subversion, AzureDevOps, Fusion 360, Spyder, Anaconda, MATLAB, Automation Anywhere

Languages

Spanish: Native **English:** Fluent **French:** Fluent