Alejandro Leonardo García Navarro

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Personal page GitHub Google Scholar

Education

MSc in Machine Learning for Health Aug 2025 - Present
Universidad Carlos III de Madrid
- Relevant coursework: Biosignals & Bioimages, Machine Learning, Deep Learning, Biomedical Image Processing

BEng in Data Science and Engineering Sep 2021 - Jul 2025
Universidad Carlos III de Madrid
- Bachelor Thesis: "Generative Agent-Based Models for Simulated Interactions: A Framework for Experiment Design" (Grade 10/10, nominated for honors)
- Year abroad at Concordia University, Montreal — Santander Estudios Scholar (1 of 22 top-tier grants among 110 awarded)
- Awarded 4 national government scholarships (full-tuition coverage + additional merit-based stipends)

Research Experience

Applied Research Intern Feb 2025 - Aug 2025
Repsol
- Conducted research on large language models, including prompt-engineering strategies and context window optimization
- Developed 25+ LLM-based agents for workflow automation, integrating reasoning chains and external tool use

Research Assistant Sep 2023 - Aug 2025
Universidad Carlos III de Madrid
- Developed and trained deep learning models (GAN, CTGAN) to generate synthetic network traffic datasets, achieving 80%+ similarity to real data
- Benchmarked prompt strategies across 5 LLMs, increasing problem-solving accuracy by up to 30%
- Designed a reinforcement learning algorithm for network routing, keeping latency spikes below 14.8%

Selected Publications

CTGANs for Generating Synthetic Traffic Matrices in Wide Area Networks, **ONDM 2025 International Conference on Optical Network Design and Modeling** Jun 2025

Introducing Large Language Models as the Next Challenging Internet Traffic Source, **arXiv Preprint** Apr 2025

Designing Reliable Experiments with Generative Agent-Based Modeling: A Comprehensive Guide Using Concordia by Google DeepMind, **arXiv Preprint (BSc Thesis Work)** Nov 2024

Reinforcement-Learning based routing for packet-optical networks with hybrid telemetry, **ONDM 2024 International Conference on Optical Network Design and Modeling** Jun 2024

Skills

Machine Learning & AI: ML (scikit-learn), DL (PyTorch), Reinforcement Learning, Generative Models (GAN, CTGAN), LLMs, Prompt Engineering
NLP & Agents: spaCy, NLTK, Gensim, LangChain, LangGraph
Programming & Data: Python, R; SQL/NoSQL (PostgreSQL, MongoDB)
Other Tools: OpenCV for image analysis; Git/GitHub for version control
Languages: Spanish (Native), English (C1), French (C1), Catalan (B1)