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Nicolás Fierro

Portfolio: nfierroflo.github.io
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As a recent graduate with a Master's in Engineering Sciences from the University of Chile and an Engineering degree from both CentraleSupélec and the University of Chile, my academic journey has focused on Robotics and Artificial Intelligence (AI). My Master's thesis centered on Multiple Extended Object Tracking (MEOT) using Stereo Images. I am deeply interested in AI and its applications in robotics, and I aspire to pursue a Ph.D. program to further develop my expertise in these areas.

Education

Master of Science in Engineering, Electrical Mention (7.0/7.0), *University of Chile* 2023 — 2024

- Completed my thesis on Multi-Target Tracking (MTT) algorithms for extended objects using Random Finite Sets (RFSs) and Bayesian filters. The research involves the use of neural networks and stereo cameras for segmentation and depth estimation of objects of interest.
- This thesis is part of a dual-degree program, allowing me to obtain both the Engineer and Master's degrees.

Electrical Civil Engineering (7.0/7.0), *University of Chile* 2017 — 2022

- Featured Courses: Computational Intelligence and Robotics Laboratory, Deep Learning, Evolutionary Computation, Introduction to Digital Image Processing, Neural Networks and Information Theory for Learning, Computational Intelligence, Introduction to Data Mining.

Double Degree, *CentraleSupélec* 2019 — 2021

- Generalist engineering education with electives in electronics, artificial intelligence, and programming.
- Featured Courses: Projet de Programmation (Programming Project), Systèmes d'Information et Programmation (Information Systems and Programming), Algorithmique et complexité (Algorithms and Complexity), Réseaux et sécurité (Networks and Security), Traitement de signal (Signal Processing), Statistique et Apprentissage (Statistics and Learning).

Publications

Extended Target Tracking with 3D-INSEG and its benefits in dense scenarios
- Fierro Flores, N. I., Adams , M. y Cament, L. (2024). FUSION 2024 (Venice).
- Publication.

3D-INSEG: A 3D Instance Segmentation Algorithm for Extended Object Tracking
- Fierro Flores, N. I., Adams , M. y Cament, L. (2023). ICCAIS 2023 (Hanoi).
- Publication.

Structured grammatical evolution for modeling the multi-band light curves of supernova
- Fierro Flores, N. I. y Pilataxi, J. (2023). Structured Grammatical Evolution for Modeling the Multi-band Light Curves of Supernova. Trilogía (Santiago), 38(49), 24-31. Santiago de Chile: Ediciones UTEM.
- Publication.

Technical Skills

Python	Advanced programming and knowledge of libraries for data mining, machine learning, and signal processing such as: Tensorflow, scikit-learn, Pandas, Pytorch, PyTorch Lightning, scipy, openCV, etc.
Other Languages	C++, JavaScript, Java, Matlab.
Frameworks	ROS, AndroidStudio, QTcreator.
Others	Git (Advanced, Gitflow workflow), Docker (Advanced), Anaconda (Advanced), SQL (basic).
Languages	Spanish (Native), French (C2 TFI certification), English (C1 IELTS certification).

Projects

Transient Examples Generation using GANs August 2023 — Present

- Building a GAN model to generate images of transient objects (Supernovae), including these new examples in the classification model's training set, and validating if the inclusion of this data helps improve binary classification performance.

Dense Object Detection in Retail March 2023 — July 2023

- Developed a model capable of detecting objects on supermarket shelves, which, through mosaic-type data augmentation techniques, surpassed state-of-the-art models.

Smart Garage Door 2021

- Using an ESP32 and proximity sensors, created an Android application that allows monitoring the opening/closing of a garage.

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Face Recognition Application Project 2019

- Collaborated with the French company Prisma Media to develop a program capable of providing information about celebrities through facial recognition.

Data Mining: Quora Insincere Questions 2019

- Created a program capable of detecting malicious questions on the Quora question forum using data mining techniques.

Professional Experience

Data Scientist **June 2023 — Present**
Accenture *Santiago, Chile*

- Developed and deployed end-to-end predictive solutions for one of the largest pulp companies worldwide, ranked in Forbes Global 2000's 2023 list (under NDA due to confidentiality agreements). The solutions focused on optimizing industrial processes using AI and Machine Learning.
- Worked extensively with Python, PyTorch, TensorFlow for model development, and integrated solutions using Google Cloud Platform (GCP) services such as Google Cloud Storage (GCS), BigQuery, Vertex AI, Cloud Scheduler, Cloud Functions, and APIs.
- Leveraged Infrastructure as Code (IaC) principles using Terraform to manage GCP resources, ensuring efficient and scalable deployments of data pipelines and machine learning models.
- Collaborated with cross-functional teams to design, develop, and implement predictive models aimed at optimizing chemical processes and production efficiency.

Data Scientist **July 2023 — Present**
ISAtech *Santiago, Chile*

- Developed neural network-based models to support remote ECG diagnostics, addressing critical healthcare shortages in specific regions.
- Contributed to the development of a model for acceptance/rejection of ECG readings and anomaly detection to prioritize high-risk cases.
- Implemented an algorithm using computer vision techniques on ECG spectrograms to detect acute myocardial infarction (AMI), with an accuracy of 94
- Demonstrated the technology at national health conferences, including Congreso Futuro.
- Technical Stack: Python 3, PyTorch 2, PyTorch Lightning, Tensorboard, GIT, local server computation.
- Contact: Paul Lieutier, Lead AI paul.lieutier@free.fr

Freelance Data Analyst **August 2022 — June 2023**
FoxIntelligence *Paris, France (Remote)*

- Conducted 7 data analysis missions for various e-commerce categories, identifying classification issues and proposing solutions based on text pattern detection using REGEX.
- Improved product classification accuracy to 100% for major retailers such as Amazon, eBay, and Zalando in categories including Alcoholic Beverages, Homecare, Cosmetics, and Nutrition.
- Technical Stack: Tableau, REGEX.
- Contact: Alexandre Sena, Senior Data Analyst alexandre.sena@foxintelligence.fr

Robotics Engineer Internship **July 2021 — January 2022**
Solystic *Paris, France*

- Developed an autonomous human-following robot using LIDAR and computer vision for detecting color-coded safety vests worn by operators.
- Integrated LIDAR sensors for distance measurement and cameras for visual tracking, achieving a robust multi-sensor fusion system for precise human tracking.
- The tracking algorithm was validated and tested in real-world scenarios, receiving approval from the executive board.
- Technical Stack: Python 3, C, QtCreator, motion planning, tracking algorithms.
- Contact: Hicham El Bernoussi, Lead Computer Vision AI hicham.el-bernoussi@solystic.com

Distinctions

National Master's Scholarship, National Agency for Research and Development (ANID) 2023
Best EVIC Poster Award 2022
Outstanding Student 2018 — 2024
Andrés Bello Scholarship 2017