VICENTE CASTRO SOLAR

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EDUCATION

Politecnico di Milano (PoliMi) Sept 2021 - **Dec 2024**
MSc. Computer Science — GPA: 27.15/30 Milan, Italy
↦ Expected graduation grade: 107/110

Pontificia Universidad Católica de Chile (PUC) Jan 2017 - Jun 2021
BSc. Computer Science — GPA: 6.4 (Top 1%) Santiago, Chile

RESEARCH EXPERIENCE

Politecnico di Milano Oct 2023 - **Now**
Master's Thesis Advisor: *Manuel Roveri*

Neural Architecture Search (NAS) for growing networks in Continual Learning. Studying **plasticity** and **stability** through the loss function landscape (i.e: flatness) and its effects on sequential task learning. These notions are used to guide an architecture search strategy and allow us to learn, at design time, **a scaling operator for a class-incremental learning problem**

iHealth Institute, Chile Oct 2023 - **Now**
Research Assistant Supervised by *Francisco Sahli* and *Claudia Prieto*

Meta-learning for cine-MRI reconstruction. Using **Implicit Neural Representations** to learn the cardiac cine from the inverse problem, we aim to improve the quality and training time towards a real-time solution. In this work, we study **meta-learned initialisations (i.e: MAML, Reptile)**, achieving state-of-the-art performance comparable to traditional methods like GRASP.

PUC and University of Notre Dame Jan 2021 - Jan 2024
Research Assistant Supervised by *Francisco Sahli* and *Maria Holland*

Unfolding the cortex via Graph Convolution Neural Networks (GCNs). The **mechanical folding of the brain** changes the cortical thickness naturally, but the observed measurements need to explained by an additional biological factor. We learn to **regress the biological component using GCNs** on mesh representation of fetal brains. *Related presentation available*

NearLab, Politecnico di Milano Sept 2021 - May 2022
Technical Assistant Supervised by *Alessandra Trapani* and *Alessandra Pedrocchi*

Pre-processing of mice neural recordings. The project aim was to understand the role of the **cerebellum in task-planning and task-learning**. Analysed **one-photon neural recording** captured from in-vivo subjects to understand how the activation time of neurons changes with learning. Develop an **algorithm to track neurons intra and inter-session movements** through the experiments.

XCV Lab, PUC Jan 2020 - June 2020
Undergraduate Research Assistant Supervised by *Domingo Mery*

Studied **performance biases** on state-of-the-art DL models for Face Recognition (e.g: ArcFace), involving gender, ethnicity and age imbalance. Particularly, the case of Chile's indigenous groups.

INDUSTRY EXPERIENCE

Watermind Apr 2024 - **Now**
ML Engineer Remote

Early engineer of climate tech startup working on harmful algae bloom (HAB) detection using satellite images. Developed ML models to solve bloom prediction, species identification and image-denoising from multi-band data sources.

Generali Real Estate Aug 2022 - Jun 2023
Data Science, Intern Milan, Italy

Took a 1-year break from my master's studies to work in the industry. Developed regression/forecasting models for the RE price in different city zones. Explored image-based models for energy consumption estimation from satellite imagery.

TEACHING EXPERIENCE

Teaching Assistant March 2019 - June 2021
Computer Science Department (PUC) Santiago, Chile

During my BSc. I was a TA for different maths and computer science courses. I prepared and gave tutorials, guided course projects and solved problems in preparation for the exams.

- **CS Courses:** Artificial Intelligence, Pattern Recognition, Data Mining
- **Maths Courses:** Ordinary Differential Equations, Calculus II, Dynamics

Pre-University School Professor March 2018 - June 2019
University of Chile Santiago, Chile

Volunteer as a maths and physics teacher for a non-profit initiative to prepare students from endangered backgrounds for the university test. One of the best experiences I have ever had.

AWARDS AND SCHOLARSHIPS

(2021) #1 place at ImageCLEF-medical Challenge
Captioning task. Presented the results and a working-note paper at the CEUR Workshop 2021.

(2017) Honor Enrollment.
Full scholarship for university studies

(2016) Two National Scores at the University Selection Test (PSU)
In Maths and Physics. From 250k students only four had these results

SCIENTIFIC OUTPUTS

Castro-Solar V, Catalán T, Sahli F, & Prieto C. (2024). "Towards real-time cine-MRI reconstruction using meta-learning". *SMRA Conference 2024.* (Note: a full paper is in preparation.)

Castro V, Pino P, Parra D, & Lobel H. (2021). "PUC Chile team at Caption Prediction: ResNet visual encoding and caption classification with Parametric ReLU". *CLEF (Working Notes).*