SANTIAGO SUÁREZ

Electrical Engineer from Universidad de la República & Machine Learning Engineer at Tryolabs

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EDUCATION

Engineering Degree in Electrical Engineering, **Top 2** of generation (**Top 1%**)

Universidad de la República, Uruguay

2017 – 2022

Specialised on Signal Processing, Machine Learning and Embedded Systems.

Strong theoretical background on Mathematics, Physics and Computer Science.

WORK EXPERIENCE

Machine Learning Engineer

TryoLabs; AI-specialised consulting & dev. company

March 2022 – Ongoing Montevideo, Uruguay

- Developer in a wide variety of Data-and-AI-based technology consultancy projects, mainly for clients in the United States.
- Involved in the requirements analysis, design and implementation of results-oriented software solutions.
- Direct contact with business stakeholders is the norm, demanding excellent communication skills.
- Involved in internal developement activities such as research, knowledge sharing meetings, onboardings and hirings.

Secondary School Teacher

Instituto Preuniversitario Juan XXIII; secondary school

April 2019 – Ongoing Montevideo, Uruguay

- Teacher of mathematics courses for students aged 16 to 18. Involved in test preparation, grading, and lecture delivery.

University Research & Teaching Asisstant

Unversidad de la República; applied electronics department

March 2021 – March 2022 Montevideo, Uruguay

- Contributed at department's R&D projects developed for clients.
- Teacher of 'Digital Electronics' and 'Microcontrollers' courses. Involved in test preparation, grading, and lecture delivery.

KEY SKILLS

Hard-working | Independent | Eye for detail | Enthusiast | Responsible | Adaptable | Team-worker

Python | C/C++ | Bash | Git | Linux | Cuda | Machine Learning | Assembly | Embedded C | SQL

PROFILE SUMMARY

Science-oriented electrical engineer; eager to apply my practical and theoretical knowledge to push the frontier of science and technology. Adventure seeker, looking to travel the world in search for wisdoms from different peoples and cultures.

PUBLICATIONS

Conference Proceedings

- Suárez, S., Pereyra, D., de Souza, J. P., Musé, P., Oliver, J. P., & Monzón, P. (2024). **PicassoBotZ, a Robotic Artist with Human-Like Drawing Execution**. In *2024 ieee 15th latin america symposium on circuits and systems (lascas)* (pp. 1–5). doi:10.1109/LASCAS60203.2024.10506153
- Stolovas, I., Suárez, S., Pereyra, D., De Izaguirre, F., & Cabrera, V. (2021). **Human activity recognition using machine learning techniques in a low-resource embedded system**. In *2021 ieee urucon* (pp. 263–267). doi:10.1109/URUCON53396.2021.9647236

Thesis

- de Souza, J. P., Pereyra, D., & Suárez, S. (2022, May). *Picassobotz : Un brazo robótico que realiza retratos*. Retrieved from https://iie.fing.edu.uy//publicaciones/2022/DPS22

LANGUAGES

Spanish (native) ●●●●●

English ●●●●●

Japanese ●○○○○

CERTIFICATIONS

C2 Certificate of Proficiency in English (CPE)

Cambridge University, England

2017

Japanese Language Proficiency Test (JLPT) N5

Japan Foundation, Japan

2022

PROJECT EXPERIENCE

Engine degradation prediction with ML model

Tryolabs

May 2024 - July 2024

Developed an end-to-end machine learning pipeline to predict engine degradation in vehicles over time. The model is able to detect engine's failure state 4 hour in advance on lab data. Analysed more than 1000 CAN signals available from the vehicle's electronic system, did an evaluation of their importance on the prediction, and trained an XGBoost model with the most relevant ones. Regular interaction with SMEs was key to interpret the importances correctly. The end goal is to deploy this model on an edge device in a working vehicle, some optimisations were done for this purpose.

Benchmark of DSP-based embedded devices for ML applications.

Tryolabs

February 2023 - April 2023

Benchmarked DSP-based dual core microcontrollers for machine-learning-specific tasks. Two double core devices were benchmarked, for both of their cores, giving estimates of execution time and memory print for a number of simple transcendental operations, and for complete ML models. The benchmarking was done using C++ libraries specific for machine learning tasks on resource constrained devices. NatureDSP and NNLib for basic operations, and TensorFlow-lite for microcontrollers for full inference of Neural Networks. Compilation and linking options were deeply studied and tested, to ensure correctness and repeatability of results.

PicassobotZ, a human-like robotic artist

Degree´s final project

April 2021 - may 2022

Assembled and programmed a robotic, servo-based arm that can draw a picture taken of a human face. The arm could draw faces satisfactory, with a human-like execution of the drawing. Assembled the embedded system and electronics needed to program and control the servos in real time. Developed and implemented an algorithm to plan and control the arm movement using modern mathematical tools, achieving the sensation of human-like execution in the drawing process. Implemented the image processing needed to obtain meaningful curves from a given image of a human face. The code needed was implemented in Python and C++.

Marketing personalisation

Tryolabs

April 2023 - August 2022

Contributed in the digital journey of big retail company from the US. Explored massive data sets (∼1B rows) for insights on the effects of email sending frequency on the client's engagement. Also used these insights to develop a look-alike ML model, tool to detect behavioural patterns on clients. Most of the work was done using SQL and Python on VertexAI and BigQuery.

Large-scale MLOps platform development, consulting and promoting

Tryolabs - LATAM Airlines

August 2024 – Ongoing

Enhanced LATAM Airlines' Data and AI Operations team as part of Tryolabs. Was part of multiple initiatives, due to the highly-variable needs of such a big company. Some of the initiatives were:

- Contributed in the development and promotion of usage of internal large-scale MLOps and Data Analytics tool. This tool is a framework for easy and standard development, deployment and monitoring of products in google cloud's environments. It leverages technologies gallore, from standard development (python, makefiles, SQL, ci/cd) to infrastructure management (terraform, kubernetes, kubeflow). Most components of the tool look to abstract certain functionalities from multiple GCP's services (BigQuery, CloudRun, CloudBuild, and others), and service them with ease to data engineers and data scientists.
- Regularly communicated and coordinated with multiple stakeholders inside the company. Involved in narrowing the distance between the platform team, and the digital business areas. Assessed the pains and needs of the bigger Data and Analytics Sector, in search for optimisations to be done that impact directly on LATAM's revenue.
- Technical lead for an initiative to parse invoices through the use of a multimodal LLM. Reconcile the needs from different areas (business and platform) to offer an impactful solution.

Infrastructure development for deploying custom-optimised LLMs

Tryolabs

May 2023 - May 2024

Contributed as part of an international team to develop a production-ready system for inference-optimised Transformers-based AI models. Adapted and integrated a wide variety of SOTA technologies for such a system's build, test, and deployment processes. Regularly met with the team to discuss appropriate paths for system integration and technology leverage.

Computer-vision-based squat counter

Tryolabs

January 2023 - February 2023

Worked on the development of a computer-vision-based squat counter, to run on a raspberry pi and camera system. Improved maximum fps reached by the system by leveraging the architecture-specific tensorflow-lite backend XNNPack. Final system got presented at KHIPU, Latin American meeting in artificial intelligence.

PROJECT EXPERIENCE (CONT.)

Appliance identification from electrical consumption measurements

Universidad de la República, course final project

August 2019 - December 2019

Built a device to measure voltage and current consumption of household appliances. Trained and evaluated machine learning algorithms (random forest, knn, multilayer perceptron) to recognise the appliances based on the collected data.

Personal projects and studies

Personal

Ongoing

- Studied and Implemented Physically-informed-nerual-networks. Build nets from scratch, and visualised their fitting to a solution of a differential equation.
- Investigated and implemented multiple binding methods between Python and C. The main objective was to understand how to accelerate python code by delegating some processing to a high-performance C kernel. Implemented and tested around 5 binding methods, with a general enough template to accelerate any operatio needed.
- Studied advanced linear algebra, particularly, tensor algebra. Interested in it for their wide usage in Physics and Machine Learning.
- Learned basic CUDA. Cuda Fundamentals certification unfinished.
- Tested multiple connecting devices in my home network, under the rounter. Could connect with a terminal in my phone, through the internet, to a server in my home.

Human activity recognition using machine learning techniques in a low-resource embedded system

Universidad de la República, R&D Project

May 2021 - July 2021

Developed a wearable device based on an MSP430 microcontroller capable of detecting the activity being done by its user (running, walking or staying still). Programmed the device's firmware to retrieve data from an extrenal accelerometer, and predict the state with such data. Prediction was made in real time with a data-based dimensionality reduction and classifier. Both algorithms were previously trained with collected data from the same device.

Guitar chord detection using computer vision

Universidad de la República, course final project

October 2020 - December 2020

Developed a computer vision software that retrieves the chord being played by a guitarist. Full Python implementation, heavily leveraging OpenCV, using edge detection, line detection, and colour segmentation algorithms.

Air quality measurement devices for classrooms

Universidad de la República, Applied Electronics Department

July 2021 – March 2022

Built a Micro:Bit based network to measure CO2 in various classrooms of a public school. Thoroughly searched the CO2 measuring sensor´s world market. Assembled the electronics to communicate the sensor with the board. Evaluated and implemented a network communication protocol in the devices using the Zephyr RTOS implementation of BLE.

ACHIEVEMENTS

Jury at the National Mathematics Olympiad
In the years 2018 and 2017

2^{nd} place at the National Mathematics Olympiad
In the years 2016, 2015 and 2013

3^{rd} place at the National Mathematics Olympiad
In the year 2014

Participation in the "Olimpiada matemática Rioplatense" Latin American mathematics Olympiad
In the years 2013-2016, hosted in Argentina

CONFERENCES

KHIPU 2025 Tryolabs' representative
Latin American Meeting In Artificial Intelligence. Pitched Tryolabs to the attendees. Worked on networking.

IEEE LASCAS 2024 speaker
Latin American symposium on circuits and systems. Presented paper based on undergrad's thesis.

KHIPU 2023 Tryolabs' booth representative
Latin American Meeting In Artificial Intelligence. Presented a computer-vision-based squat counter working on a raspberry pi. Worked on networking.

SCIENCE COMMUNICATION

Interviewed in "Sobre ciencia"
Uruguayan science communication TV program, interviewed about undergrad thesis.

Speaker at "Sumo Robotico"
Yearly championship of robotics, focused on the communication and education of robotics, electronics and programming.

Presenter at "Ingeniería de Muestra"
Yearly university fair, in which projects from all the university are presented to the general public. Presented undergrad's thesis (2022) and electrical engineering workshop's final project (2017)

COMMUNITY SERVICE

Oratorio Cordón
Educator at Salesian centre for disadvantaged kids and teenagers. Years 2016-2021

OTHER ACTIVITIES

Drama club
In Juan XXIII alumni centre, with nationally famous drama teacher. Years 2018-2021

Camp and festival organizer
Organised and executed festivals, camps, and field trips for 100+ teenagers from Juan XXIII high school. Years 2017-2019

Rugby player
Played in school's rubgy team through all my primary and secondary education. Years 2004-2016

REFEREES

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