



Daniel Alcides Saromo Mori

Date of birth: 23 Oct 1997 | **Nationality:** Peruvian | **Gender:** Male | **Email address:**
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EDUCATION AND TRAINING

18 SEP 2024 – CURRENT Prague, Czechia

CYBERNETICS AND ROBOTICS, M.SC. Czech Technical University in Prague

Website <https://international.cvut.cz/> | **Field of study** Engineering, manufacturing and construction | **Level in EQF** EQF level 7

12 SEP 2022 – 16 FEB 2024 Milan, Italy

AUTOMATION AND CONTROL ENGINEERING, M.SC. Politecnico Di Milano

(Number of semesters attended: 3. Degree not obtained)

Website www.polimi.it | **Field of study** Engineering, manufacturing and construction | **Level in EQF** EQF level 7

20 JAN 2021 Lima, Peru

MECHATRONICS ENGINEERING, PROFESSIONAL DEGREE Pontifical Catholic University of Peru

Website www.pucp.edu.pe | **Level in EQF** EQF level 6

15 MAR 2014 – 17 JUL 2019 Lima, Peru

MECHATRONICS ENGINEERING, B.SC. Pontifical Catholic University of Peru

Website www.pucp.edu.pe | **Field of study** Engineering, manufacturing and construction | **Final grade** 15.70/20 |

Level in EQF EQF level 6 |

Thesis Thesis (in Spanish): Intelligent spider robot for detecting anti-personnel metallic landmines in uneven terrain.

WORK EXPERIENCE

JUN 2018 – AUG 2018 Lima, Peru

PROJECT ASSISTANT - PRE-PROFESSIONAL RESEARCH INTERNSHIP PUCP POLYMERS AND COMPOSITES RESEARCH GROUP (POLYCOM)

I supported the execution and documentation of experiments related to these and other research projects: analysis of the mechanical properties of Peruvian spiders' silk, and extraction of starch nanoparticles from Peruvian potatoes. Research advisor: Omar Troncoso, Ph.D.

FEB 2019 – CURRENT Lima, Peru

RESEARCH ASSISTANT PUCP ARTIFICIAL INTELLIGENCE RESEARCH GROUP (IA-PUCP)

- Auto-Rotating Perceptrons: I invented this neural unit to mitigate the vanishing gradient problem at deep neural networks. The results show that if we change classic perceptrons to ARP, we can improve the learning performance of neural networks. Paper presented at the NeurIPS LXAI 2019 workshop as an oral exposition and at the poster session. Research advisors: Elizabeth Villota, Ph.D. and Edwin Villanueva, Ph.D.

- Auto-Rotating Neural Networks: I extended the concept of the ARP and created a new neural model family named Auto-Rotating Neural Networks. I have implemented dense, recurrent, LSTM, GRU, and convolutional layers with the Auto-Rotating operation; and obtained promising results. We are finishing the journal paper for this project. Research advisors: Edwin Villanueva, Ph.D. and Matias Valdenegro-Toro, Ph.D.

FEB 2020 – DEC 2020 Lima, Peru

RESEARCH ASSISTANT PUCP APPLIED ROBOTICS AND BIOMECHANICS RESEARCH GROUP (GIRAB)

- Smart Sensor Calibration with Auto-Rotating Perceptrons: This paper dealt with adjusting the signal from a wearable force sensor against a reference scale. By using a few samples and data augmentation, we trained a neural-based regression model to correct the wearable output. For this task, we tested the novel Auto-Rotating Perceptrons (ARP). We found that a neural ARP model with sigmoid activations can outperform an identical neural network based on classic perceptrons with the ReLU activation, reducing the test loss by a factor of 15. Paper presented at the ICML LXAI 2020 workshop as an oral presentation and at the poster session. Research advisor: Elizabeth Villota, Ph.D.

JUL 2020 – 31 DEC 2020 Bremen, Germany

GUEST RESEARCHER - REMOTE MODE GERMAN RESEARCH CENTER FOR ARTIFICIAL INTELLIGENCE (DFKI)

We are testing the implementation of Auto-Rotating Neural Networks to validate and compare their performance against equivalent models without the auto-rotating operation. Experiments ran in the research center's GPU clusters. Research advisor: Matias Valdenegro-Toro, Ph.D.

● LANGUAGE SKILLS

Mother tongue(s): **SPANISH**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	B2	C1
ITALIAN	C1	C1	C2	C2	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● PUBLICATIONS My research papers have currently **more than 100 citations** reported in Google Scholar

2022

[A Deeper Look into Aleatoric and Epistemic Uncertainty Disentanglement](#)

Matias Valdenegro-Toro, and Daniel Saromo

2022

[Smart Insole Sensor for vGRF Measurement](#)

Leonardo Bravo, Daniel Saromo, and Elizabeth Villota

2020

[Smart Sensor Calibration with Auto-Rotating Perceptrons](#)

Saromo, D., Bravo, L., Villota, E.

Link <https://slideslive.com/38930524/>

2019

[Auto-Rotating Perceptrons](#)

Saromo, D., Villota, E., Villanueva, E.

Link <https://slideslive.com/38922594/>

2020

[Intelligent spider robot for detecting anti-personnel metallic landmines in uneven terrain](#)

Saromo, D.

● HONOURS AND AWARDS

JUL 2018

Automatic system for pre-fried potatoes production: Best team project of the PUCP Mechatronics Project Fair 2018 – Pontifical Catholic University of Peru

Link <https://www.facebook.com/MecatronicaPUCP/photos/a.1909223672432556/1909225162432407>

SEP 2017

11th place at the X National Mechatronics Olympics FESTO 2017 – Festo Peru

At the FESTO Callao headquarters, my team partner (Leonardo Bravo) and I received pneumatics, electro-pneumatics, and PLC programming training. We got the eleventh position in this national-level contest.

NOV 2020

Extraordinary Support Funding for Undergraduate Research Thesis – Pontifical Catholic University of Peru

Monetary award given for my professional degree thesis, which also was honored with the qualification of outstanding.

NOV 2019

Innovation Recognition Award – ASME Global - Old Guard Committee

My undergraduate thesis project, titled "Intelligent spider robot for detecting anti-personnel metallic landmines in uneven terrain," received the Innovation Recognition Award at ASME Old Guard 63rd Annual Oral Competition Finals at ASME IMECE 2019, located in Utah, US.

Link https://community.asme.org/old_guard/b/weblog/archive/2019/11/24/old-guard-oral-competition-finals-winner-list.aspx

24 NOV 2020

MEXT Japanese Government Scholarship (Research Student) - Passing of Primary Screening – Embassy of Japan in Peru

OCT 2019

LXAI Travel Grant – LatinX in AI (LXAI) Organization

I was selected to be an oral presenter in the LXAI Workshop at NeurIPS 2019, and LXAI financially supported me to travel to Vancouver and present my research paper.

AUG 2019

1st place and Technical Award – ASME South America - Old Guard Committee

I presented my undergraduate thesis project and won the 1st place and Technical Award at ASME Old Guard Oral Presentation Competition (ASME E-FEST South America). Also, I received the ASME Travel Award, a financial support that allowed me to represent PUCP and South America in the ASME IMECE 2019 Finals Competition.

Link <https://www.asme.org/topics-resources/society-news/asma-news/asma-engineering-festivals-season-concludes-with-successful-event-in-south-america>

● PROJECTS

DEC 2024

Denavit-Hartenberg online 3D simulator

On my own initiative, I developed an online 3D simulator of an articulated robot to verify some manual exercises from the course Advanced Robot Kinematics that I took at Czech Technical University (CTU).

This simulator receives the DH parameters of an articulated robot, and allows the user to visualize and interact with the corresponding kinematic diagram of the robotic frames related to that robot.

Furthermore, I got perfect score on that master-level course.

Link https://www.danielsaromo.xyz/DH_simulator.html

JUN 2021 – JUL 2021

SCARA 2D robot simulator

Goal: Create a versatile open-source environment of an articulated robot for teaching students how to control the position of the end effector by applying machine learning (ML) techniques.

Results of the work:

- The mathematical modeling of a SCARA 2D robot was developed and implemented in Python. It also has a graphical tool to verify the actual position of the robot's articulations.
- The code allows the user to create a generic SCARA robotic arm, which any number of links desired.
- The simulator has been used in two editions of the course I gave, titled: "Machine Learning for Industry."
- The simulator was presented at the international conference IEEE Open Fest LATAM Week 2021, where I gave a workshop titled: "Introduction to Artificial Intelligence and Robotics."

Link https://github.com/DanielSaromo/Robot_Simulator_2D

APR 2021 – JUN 2021

My own website!

Goal: Have an online portfolio to showcase my projects for a graduate program application.

Results of the work:

- I learned to program in HTML, CSS, and Jekyll.
- I learned how to buy a web domain.

Link <https://www.danielsaromo.xyz/>

OCT 2020 – MAR 2021

Auto-Rotating Perceptrons Library

Goal: Make an open-source library for the ARP units.

Results of the work:

- I managed to make a Keras implementation of the ARP units.
- The library is available on the Python Package Index (with the command: ``pip install arpkeras``).
- I presented this library in a tutorial for the research group Papers We Love Guatemala: <https://www.youtube.com/watch?v=zM3NMyGqHow>

Project created in collaboration with Matias Valdenegro-Toro, PhD.

Link <https://github.com/DanielSaromo/ARP>

MAR 2020 – JUN 2020

PyDuino Bridge: Library for bi-directional communication between Python and Arduino

Goal: Connect Python and Arduino to easily send a list of variables from one platform and transparently receiving it on the other one.

Results of the work:

- Two libraries have been created: one for Arduino and the other for Python.
- I learned how to upload Python packages to PyPI and the Arduino Library Manager.
- Both libraries are entirely open-source and are easily accessible for installation (on the official Arduino Library Manager and the Python Package Index).
- I sharpened my OOP (object-oriented programming) skills in C++ and Python.
- I learned how to use Travis CI for testing and deploying library codes.
- I tested the library and its example codes on Arduino Nano and UNO boards with Python running on Windows, Ubuntu, Raspberry Pi, and Jetson Nano.

Link <https://github.com/DanielSaromo/PyDuinoBridge>

APR 2020 – MAY 2020

My laser pointer robot

Goal: Have a physical robot to control it using machine learning.

Results of the work:

- I built an arm-type robot that learns to control a laser pointer using Deep Reinforcement Learning, Neuroevolution, and Computer Vision.
- The 2 DOF robot learned to point a laser beam to reach a target located at the center of two marks. The algorithms used were DDQN and NEAT.
- A Linux computer executed these algorithms. Then, it sent the commands to an Arduino board using the PyDuino Bridge Library I authored.
- I understood firsthand how vital the reset mechanism of a robot is, if we want to control it using machine learning. This project made me have a particular interest in the reality gap problem that exists in robotic simulators.

Link <https://www.danielsaromo.xyz/projects/#PointerBot>

JUL 2018 – NOV 2018

My spider robot: making it learn to walk

Goal: To have a physical environment in which I could test the AI algorithm I proposed in my bachelor's thesis

Results of the work:

- I managed to design and build a spider-shaped robot guided by AI.
- I used several prototyping iterations, following Kamrani's rapid design methodology.

Link <https://www.danielsaromo.xyz/projects/#SpiderBot>

JUN 2018 – NOV 2018

Kalman filtering with Arduino and MATLAB

Goal: Learn and deploy a Kalman filter in the physical world.

Results of the work:

- This is an extracurricular project that I wanted to do to learn about Kalman Filters.
- I read papers about the Kalman filter to understand the working principles behind this theory.
- I implemented two Kalman filters using MATLAB. The first Kalman filter combined a noisy measurement and a model-based prediction to find the optimal estimate of the signal. The second Kalman filter blended three noisy synthetic signals, working as a sensor fusion Kalman filter.
- However, as a mechatronics engineer student, I wanted the program to interact with electronic sensors. Hence, I used four accelerometer signals to feed a Kalman-based real-time sensor fusion algorithm implemented in Arduino.
- One of the Kalman filter's requisites is to have the standard deviation of the signals, which are part of the covariance matrices. For the calibration of the algorithm, I collected the sensor data with Arduino and calculated the covariance matrices in MATLAB. Then, I passed the required calibration coefficients to the Arduino code.

Link <https://www.danielsaromo.xyz/projects/#KalmanFilters>

MAR 2018 – JUL 2018

Automatic system for pre-fried potatoes production

Goal: Design and build a machine that receives washed potatoes for later processing.

Results of the work:

- The device received the washed potatoes and then automatically peeled, cut, and pre-fried the potatoes.
- This team project was developed in the undergraduate course: Mechatronics Design Project.
- I was one of the machine's oral presenters at the Mechatronics Engineering Project Fair 2018-1.
- The machine was awarded as the best project of the fair.

Link <https://www.facebook.com/MecatronicaPUCP/videos/1898946413460282>

JAN 2017 – FEB 2017

NASA Human Exploration Rover Challenge 2017

I was selected to be part of the telemetry group on the PUCP's team that competed on the NASA Human Exploration Rover Challenge 2017. The contest, convened by NASA, was about building a human-powered driving vehicle contest. We managed to elaborate a paper titled: "Design of a real-time low-cost telemetry system in an all-terrain Human-powered vehicle."

Link <https://www.danielsaromo.xyz/projects/#BB8>

DEC 2015 – MAR 2016

My BB8-shaped robot

Goal: Build my BB8 robot using recycled materials.

Results of the work:

- I built a robot whose shape was inspired by the BB8 robot of a Star Wars movie (Episode VII).
- I used an old plastic globe world map for the robot chassis.
- I went through the process required to have a laser-cut MDF piece: from the CAD drawings to the laser cut.
- I did this extracurricular project to sharpen my skills in electronics, Arduino, and C++ programming.

Link <https://www.danielsaromo.xyz/projects/#BB8>

● CONFERENCES AND SEMINARS

OCT 2024 Prague, Czechia

Dny AI: AI-focused series of events taking place across Czechia

Presenting the [pitch](#) "Auto-Rotating Neural Networks" in the [DNY AI Workshop](#) as an oral exposition and poster presentation.

OCT 2021 Lima, Peru

Speaker at IEEE Open Fest LATAM Week

I was invited to be a speaker at the international event: IEEE Open Fest LATAM Week 2021. I gave a workshop titled: Introduction to Artificial Intelligence and Robotics.

Link <https://www.facebook.com/watch/?v=302588664569427>

OCT 2021 Lima, Peru

Speaker at the VII Research Meeting of the PUCP Engineering Department

I talked about the research project I worked on at the GIRAB Laboratory.

Link <https://www.facebook.com/departamentodeingenieriapucp/photos/a.864673250234811/4345883158780452/>

FEB 2020 Lima, Peru

Speaker at CEFACI PUCP's Fair of Engineer Careers 2020

The PUCP Federated Center of Science and Engineering Faculty (CEFACI PUCP) invited me to give the talk titled: "Myths and Truths: Science and Engineering - Mechatronics Engineering Edition." I talked about the course program, my projects, and my path to research. The presentation was well received by the undergraduate students. I finished giving some tips to the attendees and then answered their doubts.

Link <https://www.facebook.com/TercioEstudiantilEEGGCC/posts/2685568678207088>

MAR 2021 Guatemala, Guatemala (Teleconference)

Invited Speaker for the research group Papers We Love Guatemala

I gave a [tutorial](#) about the Auto-Rotating Perceptrons for the group [Papers We Love Guatemala](#). In this talk, I taught how to use the ARP by presenting the [Keras ARP Library](#) and a example notebook.

Link <https://www.youtube.com/watch?v=zM3NMyGqHow>

JUN 2021 Lima, Peru

Invited Speaker for IEEE chapter group EMBS PUCP

I was invited by the IEEE Engineering in Medicine & Biology Society PUCP (EMBS PUCP) to give the [tutorial](#) titled: "Introduction to Python and MicroPython". GitHub repository available [here](#).

Link <https://www.facebook.com/ieeeembspucp/posts/4052136081560082>

JUL 2020 Lima, Peru

Speaker at the fair: Getting to know your carrer: Mechatronics Engineering

I was invited by the PUCP Association of Mechatronics Engineering Students (ASIME PUCP) to give the [talk](#) titled: "Getting to know your career: Mechatronics Engineering". Timestamp: 2:27:42.

Link <https://www.facebook.com/cfeeggcc/videos/980634912381404/>

JUN 2018 Lima, Peru

Oral presenter at the PUCP Mechatronics Project Fair 2018

Oral presenter of the project: **Automatic system for pre-fried potatoes production**. My team and I managed to design and implement a device that received washed potatoes for later processing. The machine then peeled, cut, and pre-fried the potatoes. It was awarded as the [best project](#) of the PUCP Mechatronics Project Fair 2018.

Link <https://es-la.facebook.com/MecatronicaPUCP/videos/1898946413460282/>

DEC 2019 Vancouver, Canada

Oral presenter at LXAI NeurIPS 2019

Presenting the **paper** "Auto-Rotating Perceptrons" in the [LXAI workshop](#) as an [oral exposition](#) and poster presentation.

Link <https://slideslive.com/38922594/>

JUL 2020 Vienna, Austria (Teleconference)

Oral presenter at LXAI ICML 2020

Presenting the **paper** "Smart Sensor Calibration with Auto-Rotating Perceptrons" in the [LXAI workshop](#) as an oral exposition and poster presentation.

Link <https://slideslive.com/38930524/>

NOV 2021 Singapore, Singapore (Teleconference)

Poster presentation at Online Asian Machine Learning School at ACML

Presenting the **poster** "[Auto-Rotating Neural Networks](#)" in the [Online Asian Machine Learning School](#) at [ACML](#).

JUL 2021 Lima, Peru

Invited speaker for GEMRA PUCP group

I was invited by the PUCP Student Group of Environment and Water Resources (GEMRA PUCP) to give an [introductory workshop to MATLAB](#). GitHub repository available [here](#).

Link <https://fb.watch/7qjYecdeG/>

JUN 2022 New Orleans, USA

Oral presenter at LXCV CVPR 2022

Presenting the **paper** "A Deeper Look into Aleatoric and Epistemic Uncertainty Disentanglement" in the [LXCV Workshop](#) as an oral exposition and poster presentation.

● VOLUNTEERING

NOV 2017 – JAN 2018 Lima, Peru

Teacher - Fast Trainer community

I actively gave academic advising for the Fast Trainer community, which seeks that PUCP students find a private teacher who prepares them for their evaluations without leaving the campus.

MAR 2017 – JUL 2017 Lima, Peru

Coach - MakerLab Peru

I was part of the MakerLab developer community as a coach in electronics, Arduino, MATLAB, and programming.

Lima, Peru

Volunteer Staff - PUCP's University Pastoral Counseling Center (CAPU)

Support in a Christmas event for children.

OCT 2021 – DEC 2021 Lima, Peru

Mentor - PUCP's Women In Engineering (WIE) affinity group

I was assigned to a freshman mechatronics engineering student to guide her in the transition to her career's studies. I gave her academic advice and study tips, and orientation to help her reach her professional goals.

● RECOMMENDATIONS

Matias VALDENEGRO-TORO, Ph.D. Assistant Professor at University of Groningen

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Email m.a.valdenegro.toro@rug.nl

Elizabeth Roxana VILLOTA CERNA, Ph.D. Chair of PUCP Mechatronics Engineering Program

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Email evillota@pucp.edu.pe

Edwin Rafael VILLANUEVA TALAVERA, Ph.D. Researcher at AI PUCP Research Group

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Email ervillanueva@pucp.edu.pe