



Daniel Saromo Mori

MECHATRONICS ENGINEER · INVENTOR OF THE AUTO-ROTATING NEURAL NETWORKS (ARNN) · AI RESEARCHER AND LECTURER

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About me

I'm Daniel, a mechatronics engineer passionate about AI-powered robot control. My main research interest is *robotics × machine learning: robot learning*. As a result of my research in AI, I have invented the ARP and the ARNN —algorithms that I have presented in six countries. Besides that, I have **5+ years of experience** in research and teaching AI, ML, and Data Science. Also, I have **practical experience in Robot Learning**, like my [spider robot guided by AI](#), work recognized with the [Innovation Award at IMECE 2019](#) in the United States.

Education

M.Sc. in Cybernetics and Robotics, with an Specialization in AI · Currently enrolled

CZECH TECHNICAL UNIVERSITY IN PRAGUE ([1ST IN CZECHIA: QS ENGINEERING RANKING 2023](#))

Prague, Czechia

Since Sep. 2024

M.Sc. in Automation and Control Engineering · Average mark after 3 semesters: 27.0/30

POLITECNICO DI MILANO ([13TH IN THE WORLD: QS ENGINEERING RANKING 2022](#))

Milan, Italy

Sep. 2022 - Feb. 2024

B.Sc. in Mechatronics Engineering & Mechatronics Engineering Professional Degree

PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ ([1ST IN PERU: QS RANKING 2022](#))

Lima, Peru

03/2014 - 07/2019, 08/2019 - 11/2020

- **Bachelor's average course grade:** 15.70 (Scale: minimum: 0, required to pass: 11, maximum: 20).
- **Academic ranking:** Top fifth of class (6th of 32 mechatronics graduates) · Top 6.66% of the students of the Faculty of Science and Engineering.
- **Theses title:** [Intelligent spider robot for detecting anti-personnel metallic landmines in uneven terrain](#).
- **Professional Degree Thesis Awards:** - Extraordinary Support Funding for Undergraduate [Research Thesis](#).
- **Ranking:** Degree thesis unanimously awarded by the tribunal with the [qualification of outstanding](#).
- **B.Sc. Thesis Awards:** - [Best bachelor's thesis](#) and poster presentation at the PUCP Mechatronics Workshop of the semester 2019-1.
- Innovation Recognition Award at the International Mechanical Engineering Congress & Exposition (**IMECE**) 2019.
- **Theses advisors:** Dr. Elizabeth Villota and Dr. Edwin Villanueva.

Scientific Publications

- [C4] Bravo, L., **Saromo, D.**, and Villota, E. "Smart Insole Sensor for vGRF Measurement", *9th International Symposium on Sensor Science*. Warsaw, Poland. 2022.
- [C3] Valdenegro-Toro, M. and **Saromo, D.** "A Deeper Look into Aleatoric and Epistemic Uncertainty Disentanglement", *LXCV Workshop at CVPR 2022*. Louisiana, U.S.A. 2022 · Paper presented in the poster session and was one of the few selected for an oral presentation. This **paper currently has more than 85 citations** reported in [Google Scholar](#).
- [C2] **Saromo, D.**, Bravo, L., and Villota, E. "Smart Sensor Calibration with Auto-Rotating Perceptrons", *LXAI Workshop at ICML 2020*. Vienna, Austria. 2020 · Paper presented in the poster session and was one of the few selected for an oral presentation.
- [C1] **Saromo, D.**, Villota, E., and Villanueva, E. "Auto-Rotating Perceptrons", *LXAI Workshop at NeurIPS 2019*. Vancouver, Canada. 2019 · Paper presented in the poster session and was one of the few selected for an oral presentation.
- [T1] **Saromo, D.** "Intelligent spider robot for detecting anti-personnel metallic landmines in uneven terrain", *Pontificia Universidad Católica del Perú*. Lima, Peru. 2020 · Thesis published in Spanish. English abstract available: [link](#).

Teaching Experience

- PUCP's Continuing Education Department · Teacher at Specialization Diplomas

LECTURER - Diploma in Development of AI Applications (**Course:** AI for Games): 2019-2, 2020-1, 2020-2, 2021-1, 2021-2, 2022-1, 2022-2, 2023-1, 2023-2, 2024-1, 2024-2. Lima, Peru
Since Sep. 2019

LECTURER - Diploma in Data Analytics (**Course:** Data Analysis Methods for Time Series): 2022-1. Jun. 2022 - Oct. 2022

- PUCP's Center for Advanced Manufacturing Technologies (CETAM)

LECTURER **Courses:** - ML for Industry (2020-2, 2021-1, 2021-2, 2022-1, 2022-2, 2023-1, 2023-2); Lima, Peru
Sep. 2020 - Sep. 2023

LECTURER - [Python for Data Science](#) (2021-1, 2021-2, 2022-1, 2022-2, 2023-1). Jun. 2021 - Sep. 2023

- National Meteorological and Hydrological Services (SENAMHI) · Peruvian Government Entity

LECTURER **Course:** Introduc. to AI and ML for National Meteorological and Hydrological Services. Lima, Peru
May. 2022 - Jun. 2022

- PUCP Undergraduate School · Faculty of Science and Engineering

TEACHING ASSISTANT **Undergrad. courses:** AI (2019-1), ML (2019-2), Computer Science Applications (2019-2). Lima, Peru
Mar. 2019 - Dec. 2019

Honors & Awards

- 2023 **1st place**, at the [Pitch Competition 2023](#) organized by [Entrepreneurship Club POLIMI](#) Milan, Italy
- 2022 **CVPR Registration and Travel Grant**, for attending [CVPR 2022](#) to be an oral and poster presenter · 900 USD New Orleans, U.S.A.
- 2022 **LXCV Travel Grant**, for attending [CVPR 2022](#) to be an oral and poster presenter · 2567 USD New Orleans, U.S.A.

2019	LXAI Travel Grant , for attending NeurIPS 2019 to be an oral and poster presenter · 1860 USD	Vancouver, Canada
2019	Innovation Recognition Award , Old Guard 63 rd Annual Oral Competition (World Finals at IMECE) · 250 USD	Utah, U.S.A.
2019	ASME Travel Award , to represent PUCP and South America at ASME IMECE Finals Competition · 1500 USD	Utah, U.S.A.
2019	1st place + Technical Award , Old Guard Oral Presentation Competition (ASME E-FEST South America) · 850 USD	Lima, Peru

Research Experience

German Research Center for Artificial Intelligence (DFKI)

Bremen, Germany

GUEST RESEARCHER · REMOTE MODE

Aug. 2020 - Jul. 2022

- **Auto-Rotating Neural Networks (ARNN):** I extended the ARP concept and created a new neural model family named Auto-Rotating Neural Networks. I've implemented dense, recurrent, LSTM, GRU, and convolutional layers with the Auto-Rotating operation; and obtained promising results. *Research advisor:* Dr. Matias Valdenegro-Toro.
- We are testing the implementation of the ARNN, to validate and compare their performance against equivalent models without the Auto-Rotation. Experiments ran in the research center's GPU clusters. Results presented at the [Online Asian Machine Learning School \(OAMLS\)](#).

PUCP Applied Robotics and Biomechanics Research Group (GIRAB)

Lima, Peru

RESEARCH ASSISTANT

Mar. 2020 - Dec. 2020

- **Smart Sensor Calibration with Auto-Rotating Perceptrons:** In this paper, we applied the ARP to calibrate a wearable force sensor. By changing classic neurons to ARP, we obtained 15x better neural network performance. *Research advisor:* Dr. Elizabeth Villota.

Talks & Presentations

INTERNATIONAL 🌐

Oct. 2024	Pitch: Auto-Rotating Neural Networks , Dny AI: AI-focused series of events taking place across Czechia	Prague, Czechia
June 2022	Paper exposition: A Deeper Look into Aleat. and Epist. Uncert. Disentang. , Speaker at LXCX CVPR	New Orleans, U.S.A.
Nov. 2021	Poster presentation: Auto-Rotating Neural Networks , Online Asian Machine Learning School at ACML	Singapore, Singapore
Mar. 2021	Tutorial: Auto-Rotating Perceptrons , Invited speaker for the group Papers We Love Guatemala	Guatemala, Guatemala
Jul. 2020	Paper exposition: Smart Sensor Calibration with Auto-Rotating Perceptrons , Speaker at LXAI ICML	Vienna, Austria
Dec. 2019	Paper exposition: Auto-Rotating Perceptrons (ARP) , Speaker at LXAI NeurIPS	Vancouver, Canada

DOMESTIC 🏠

Jun. 2023	Webinar: Auto-Rotating Perceptrons , Conference speaker: Systems engineering & Research at UNAM	Moquegua, Peru
Oct. 2021	Workshop: Introduction to AI and Robotics , Conference speaker at IEEE Open Fest LATAM Week	Lima, Peru
Oct. 2021	Conference: VII Research Meeting of the PUCP Engineering Department , Conference speaker	Lima, Peru
Jul. 2020	Fair: Getting to know your carrer: Mechatronics Engineering · Timestamp: 2:27:42 , Speaker	Lima, Peru

Continuing Education

Aug. 2024	Robot Operating System (ROS) (Grade: 20/20) , PUCP Center for Engineering Vinculation (FABRICUM)	FABRICUM PUCP
Nov. 2023	Disaster Risk Monitoring Using Satellite Imagery , NVIDIA Deep Learning Institute	NVIDIA DLI
Aug. 2022	Oxford Machine Learning Summer School , Oxford University & AI for Global Goals	Oxford University
Nov. 2021	Online Asian Machine Learning School , Asian Conference on Machine Learning (ACML)	ACML 2021
Jul. 2021	Robot Operating System (ROS) , Center for Advanced Manufacturing Technologies (CETAM)	CETAM PUCP
Nov. 2020	Scrum Master Certification Training , IEEE Ricardo Palma University Student Branch	IEEE Peru Section
Jul. 2019	Getting started with AI on Jetson Nano , NVIDIA Deep Learning Institute	NVIDIA DLI
Nov. 2018	PyTorch Scholarship Challenge , Udacity / Facebook	Udacity / Facebook
Apr. 2018	Machine Learning for Data Science and Analytics , Columbia University	edX
Feb. 2017	PCB design with international standards oriented to manufacturing , AIDelta Technologies	AIDeltaTec.com
May 2016	Embedded Systems – Shape the World , University of Texas at Austin	edX
May 2015	Introduction to Robotics , Queensland University of Technology	QUT MOOC

Robot Learning Projects

Robot learning using DDQN and Neuroevolution for my 2 DOF laser pointer robot

Lima, Peru

GOAL: TO HAVE A PHYSICAL ROBOT TO BE CONTROLLED USING MACHINE LEARNING

Apr. 2020 - May 2020

- 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.
- These algorithms were executed on Linux. Then, the commands were sent to an Arduino board using the [PyDuino Bridge Library](#) I authored.

My 8 DOF spider robot: making it learn to walk · Honored with IMECE's Innovation Award

Lima, Peru

GOAL: TO HAVE A PHYSICAL ROBOT TO TEST THE AI-BASED ALGORITHM I PROPOSED FOR MY THESES

Aug. 2018 - Jul. 2019

- I designed and implemented a spider robot following Kamrani's rapid prototyping methodology.
- Development of a novel algorithm that uses supervised ML, genetic algorithms and Arduino/Python interaction let the robot learn to walk.