Arturo Moises Flores Alvarez

Lima, Peru

afloresa@ucla.edu

https://thenewrobot.github.io/arturofloresa/ (Portfolio)

● Education ● Research experience ● Publications ● Honors ● Technical skills ● Specializations ● Conferences ● Extracurricular ●

EDUCATION

University of California, Los Angeles (UCLA) – California, United States *Anticipated Sep,2022*

Candidate in MS Mechanical Engineering (Systems & Control)

Universidad Nacional de Ingeniería (UNI) – Lima, Peru *Mar, 2014 – Sep, 2020*

Bachelor of Science in Mechatronics Engineering, Engineer Title (Academic Qualification – Dissertation: 19/20)
PPA: 13.714/20 (commendation of 'Very Good', literal scale 'A': References on my Transcript)
Professional School of Mechatronics

RESEARCH EXPERIENCE

Undergraduate Research Experience – Research Intern *Dec, 2021– Mar, 2022*

Laboratory: Alvarez Laboratory (University of Rhode Island, USA) – AI researcher

References: PhD. Marco Alvarez

- Carried a study of MLP-Mixer's representations using Centered Kernel Alignment as similarity measure.
- Worked under the framework of TensorFlow with GPU acceleration, CKA Google library, Scipy, and Matplotlib.
- Composed an article for a congress and delivered a presentation.

Professional Experience - Robotics and Artificial Intelligence Research Intern *May, 2021 – Nov, 2021*

Companies: ZIGNAR Technologies (Canada) & IRIS (Peru) – Field Robotics

References: Eng. Gianfranco Campos, Eng. Julio Canahuire,

- Implemented the project *Interplanetary Precision Agriculture* (IPA) in the greenhouse of the basecamp of an analog mission in the Mojave Desert to simulate a space-scenario. IPA is an integral, end-to-end solution that seeks to automate the monitoring, production, and commercialization of agriculture processes on Earth and in outer space. (Demo)
- Developed the computer vision of a 17x17x16 inch holonomic robot using a Mask R-CNN algorithm for the recognition and counting of grapes and tomatoes (crop monitoring); and a Yolo V3 algorithm to follow people for the support of greenhouse activities of analog astronauts.
- Worked with an Intel RealSense D435i depth camera and a Jetson TX2 module.
- Developed a robotics application and deep learning algorithms using ROS Melodic in Ubuntu 18.0, and the framework of Pytorch and TensorFlow.
- Oversaw as the "Chief Engineer" (role in the Analog mission) the systems for power generation and water intake, and maintaining the structural integrity of the basecamp daily.

Professional Experience – Research Intern *Jul, 2021 – Dec,2021*

Company: AvatarMEDIC Inc (USA) – Robotic Manipulators applied to Medicine
References: MD. Susan Ip-Jewell

- Controlled an Industrial Robotics Arm (Dexter, Haddington Dynamics - MIT) for medical assistance with tool handling during tele-anesthesia protocols in outer space. Experiments conducted during an analog mission.
- Implemented the XBOX360 manual controller of Dexter using the official documentation of the project, Dexter Development Environment and Java.

Professional Experience – R&D Intern *Oct, 2020 – Jun, 2021*

Company: AGP eGlass Group – Glazing Technology for Luxury Automotive Industry
References: Eng. Ian Riofrio

- Designed several prototypes for a glass connector with embedded photovoltaics technology and its manufacturing process for an awarded program with the Swedish car manufacturer Volvo.
- Validated experimental solutions for the technologic line of Lux Fractal – ambient car lightning systems –using glass-embedded electronic light sources and microcontrollers for ambient lighting of Tesla cars.
- Managed and monitored the whole construction of a 16 ft x 13 ft electronics laboratory intended for the exclusive construction of automotive connectors. Designed in Autodesk Inventor all the furniture for this lab.
- Controlled R&D prototypes to showcase AGP's technologies during its worldwide exhibitions.

Undergraduate Research Experience – Research Intern *Aug, 2019– Dec, 2019*

Laboratory: Computational Mechanics (UNICAMP, Brasil) – Control Scientist

References: PhD. Grace S. Deaecto, PhD. Lucas N. Egidio

- Designed a switched cooperative control technique for networked systems using a time-varying convex Lyapunov function and linear matrix inequalities, which are easier to solve than available methodologies in the state-of-art.
- Implemented this technique in real-time in an Inverted Pendulum and an Active Suspension of Quanser, using MATLAB and Simulink.
- Composed an undergraduate thesis and a scientific article.

Undergraduate Research Experience – Research Lead *Dec, 2019– Oct, 2020*

Group: PumiiPeru & UNIDA Paraguay University – Space Robotics undergraduate project

References: *Eng. Manuel Luque Casanave*

- Designed an autonomous Rover integrated with a drilling system, an algorithm for 3D reconstruction of the environment, and a core sample extraction tool presented at the European Rover Challenge 2020 (Finalist).
- Designed and implemented the autonomous application for the Rover using ROS Melodic, Gazebo, Rviz, Matlab ROS toolbox, OpenCV, and rtab-map.
- Deployed solution using a ZED2, an Intel RealSense D435i camera, and the computing device Jetson TX2.
- Controlled remotely a Leo Rover in a Poland Mars Yard using Freedom Robotics.
- Developed lectures for beginners in ROS (Project ROSvers: GitHub)
- Co-authored 3 articles related to the solutions presented for this contest.

PUBLICATIONS

Journal Publications

Flores, A. M., Egidio, L.N., Deaecto, G.S., "Cooperative Networked Control Based on a Time-Varying Lyapunov Function", Journal of Control Automation and Electrical Systems 32, *Springer*, 533–542, 2021 (link)

Pisfil Puicón, P. A., **Flores Alvarez, A. M.**, "Controlador difuso de velocidad para un motor DC con escobillas", *Revista UNIDA científica*, vol. 5, 1rst edn., pp. 1-8, July, 2021 (link)

Mendoza Vargas, G. A., **Flores Alvarez, A. M.**, "Diseño y simulación de un manipulador robótico de 5 GDL para rovers y otros vehículos menores según lineamientos del concurso European Rover Challenge", *Revista UNIDA científica*, vol. 5, 2nd edn., July, 2021(link)

Aparicio Palomino, H. D., **Flores Alvarez, A. M.**, "Uso del material UTP y estimación de cargas para el diseño de una rueda UPTIS", *Revista UNIDA científica*, vol. 4, 2nd edn., January, 2021 (link)

Conference Publications

Flores, A. M., Morales, A., Campos, G., Gelso, J., "Energy Efficiency Using IOTA Tangle for Greenhouse Agriculture ". Information Management and Big Data. SIMBig 2021, *Communications in Computer and Information Science*, vol 1577. Springer, April, 2022 **(**link)

Cevallos, B., Jamanca, G., Napan, J., **Flores, A. M.**, Vásquez, Y., "FISHER-X: A Bioinspired Robotic Alternative for the Exploration of the Oceanic Environment on a Jupiter's Moon". *International Astronautical Congress*, September, 2022 (accepted for oral presentation)

Research Works

Flores, A. M., "Cooperative Control of Dynamical Systems Based on a Time-Varying Lyapunov Function: Experimental Implementation in an Inverted Pendulum and an Active Suspension", Undergraduate Thesis, *School of Mechanical Engineering – UNICAMP*, 2019 (link)

HONORS, SCHOLARSHIPS, AWARDS

Distinguished dissertation for the Engineer Title *Aug, 2022*

Excellence (final grade 19/20) during the presentation of the undergraduate thesis: "Design of a teaching module of co-operative control in a network of dynamic systems based on Lyapunov functions for the improvement of teaching in control and automation laboratories" (Mechatronic Engineer Title)

Postgraduate School Offers for MS in United States *Mar, 2022*

Universities: University of California Los Angeles, Colorado School of Mines, University of California Santa Barbara, Oregon State University, University of Rhode Island.

Research Intern in Research Experience for Peruvian Undergraduates (REPU) – Computer Science *Dec, 2021*
Research program that complements the education of talented Peruvian undergraduate students by organizing scientific research internships in the best institutions of the world. Extremely competitive selection process. Host Institution: *The University of Rhode Island - US*, Advisor: *Professor Marco Alvarez*, Topic: *Optimization of Neural Networks.*

AGP Kaizen Ideas Winner: 3D-printed tool for fast alignment of automotive connectors *Mar, 2021*
Recognition for innovative ideas that can improve production processes of AGP eGlass products.

European Rover Challenge 2020 finalist – ESA *Aug, 2020*
Finalist in the Poland space robotics competition sponsored by ESA. Final results: 18TH place from 40 competitors around the world.

MIT COVID-19 LATAM Challenge winner *Jun, 2020*
Winner in the track 'G' Education for the proposal 'Teachers4Teachers'

Financial grant for research internship in Brasil *Aug, 2019*
Full financial support granted by Universidad Nacional de Ingenieria due to outstanding academic performance. Scholarship: 2212 USD

Telemetry Award-NASA *Apr, 2019*
Best Telemetry proposal in the Human Exploration Rover Challenge -NASA 2019 organized in Huntsville, Alabama.

Financial grant for an international competition *Apr, 2019*
Partial financial grant of Engie Energia Company for travel expenses at the Human Exploration Rover Challenge 2019. Scholarship: 1000 USD

TECHNICAL SKILLS

Equipment | Inverted Pendulum (Quanser), Active Suspension (Quanser), Dexter (Haddington Dynamics), ProMetric I Colorimeter (Radiant Vision Systems)
DevOps| VS Code, Sublime, Docker, Google Cloud Console, AWS S3, AWS Kinetic, Git, GitHub
Artificial Intelligence| TensorFlow**,** Pytorch, Keras, OpenCV, MaskRCNN, YoloV3, fbprophet, pmdarima, scikit-learn
Robotics | Jetson TX2, Intel RealSense D435i, ZED camera, see3CAM_CU20, RP Lidar A3, Raspberry, ROS Melodic and Kinetic, RViz, Gazebo, rtabmap_ros, Freedom Robotics, Dexter Development Environment
Software & CAD| C, C++, Python, Java, Latex, MATLAB, Simulink, LabView, COMSOL, PLC-SIM, AutoCAD, SolidWorks, Inventor, Protheus,
Microcontrollers| Arduino boards and sensors, Adafruit boards and sensors**,** PIC 16F877A**,** Teensy 4.0, STM 32
Language | Spanish (Native Proficiency), English (Full working Proficiency), Portuguese (Working Proficiency)
Editing Programs | Photoshop, Camtasia Studio 9

SPECIALIZATIONS & COURSES

Deep Learning with Keras *Jul, 2021*
Information and Communications Technology Center (CTIC) - UNI
Specialization in Artificial Intelligence in the design and optimization techniques of Deep Neural Networks, Convolutional Neural Networks, and Recurrent Neural Networks

- Worked with the framework of Google Cloud Console, Keras, TensorFlow, and Visual Studio

MMAARS Virtual Training Level I *Mar, 2021*
Mars-Moon Astronautics Academy & Research Science (MMAARS)
Interactive course that prepares the participant for a selection into a MMAARS Low Fidelity Analog Astronaut mission - best student of the Class. Crew Commander at the *'Gale Crater'*

'***How to write in English a scientific article' – Ph.D. Erick Garcia Garcia*** *Jan, 2021*
Casa de Lletres

Robot Operating System (ROS) for Beginners I, II module *May, 2020*
Udemy

CONFERENCES

Nov, 2021	***Agri-D Convention (IOTA Foundation)*** *– Keynote Speaker/ Insights Stage*
Oct, 2021	***Intel Innovation (Intel)*** – Attendant
Sep, 2021	***Sagan Summer Workshop (Caltech)*** *– Delegate*
Aug, 2021	***Spot in Nuclear Environments (Boston Dynamics)*** – Attendant
Apr, 2021	***Pipeline to Grad School: Bootcamp (UC Berkeley)*** *- Delegate*

Oct, 2020	***ROS World (ROS org)*** - Attendant
Oct, 2020	***Mars Society Convention (Mars Society)*** - Attendant
Jul, 2020	***SpaceGen United (Space Generation Advisory Council) -*** Delegate of NASA Exploration Workshop
Jun, 2020	***Mars 2020: The Legacy continues for NASA Space Robotics*** - Attendant
May, 2020	***International Conference on Robotics and Automation –*** Participant

EXTRA-CURRICULAR ACTIVITIES

Space Generation Advisory Council *2021 – 2022*

Project Coordinator in the DREAM Team

Increase the quality of analog missions while creating a professional network that supports diverse gender, geography, and generation space enthusiasts to be involved.

Speaker in Competitive Debate Formats *2016 – 2019*

Founder/Captain of the UNI Debate Club

Interdisciplinary group that fosters the teaching of critical thinking and oratory among my university community. Active participant in national and international Debate competitions.

Student Branch of American Society of Mechanical Engineers (ASME) *2016 – 2020*

Secretary

Student branch that organizes talks, technical visits to power plants, and multidisciplinary projects in the School of Mechanical Engineering of the Universidad Nacional de Ingenieria. Plus, it encourages active participation in engineering projects for students of our university.

Hablemos de Cambio Member *2017 – 2020*

Active Member

Interuniversity organization that generates spaces for interuniversity dialogue where undergraduate students are motivated to propose innovative social solutions to mitigate the main social, political, and education issues of Peruvian society.

Positions in the organization: Active member in User Experience, in Alliances & Fundraising, and in Human Resources.

STEM careers promoter ***2019 – Today***

Interview by the Official newspaper from the Peru State "El Peruano" (link) *Aug,2022*

Astronauta Análogo Peruano (Scientific meeting UNAC, Peru) *Nov,2021*

Keynote speaker (link)

El multiverso de las oportunidades (Microsoft Learn Student Ambassadors - Americas) *Oct, 2021*

Keynote speaker (link min 6:25)

¡Houston! El cielo ya no es el límite (Inspirate UNI) *Dec, 2020*

Keynote Speaker (link)