Diego Alonso V. Palma Rodríguez

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Education

BSc. Mechatronics Engineering - *Universidad de Ingeniería y Tecnología (UTEC)* Lima, Peru

- **Minor in Robotics**. Rank: 1st highest (2023 graduation).

Exchange Program in Computer Science - *Tecnológico de Monterrey* Monterrey, Mexico

- **Coursework:** Advanced Algorithm Design, Data Structures, Databases and Artificial Intelligence (Winter 2022).

Exchange Program in Computer Engineering - *Universidad Adolfo Ibáñez* Santiago, Chile

- **Coursework:** Data Mining (Machine Learning), and Applied Electronics (Fall 2021).

Professional Experience

Ekumen Inc., *Robotics Software Engineer* Jul. 2024 - Present

- Development of software components for robotic applications, including documentation of code, procedures and architecture design.
  Tech Stack: C/C++, Python, ROS 2, Gazebo and Docker.

ACME & CIA SAC

Sales Engineer Sep. 2023 - Jul. 2024

- Implementation of live demonstrations using image processing and deep learning models with ifm's 3D cameras for potential clients.
- Provided technical advice to customers on automation, control and instrumentation projects.

  Tech Stack: Docker, Pytorch and ifm software.

Research and Development Intern Oct. - Dec. 2022

- Implementation of dashboards to monitor IoT product data as well as perform data processing. I also worked on the implementation of image processing algorithms and transfer learning for IFM's O3R camera to perform image classification.

  Tech Stack: Docker, Node-RED, JavaScript, Python, Tensorflow, Command Shell and Bash, MySQL and MariaDB.

Geophysical Institute of Peru, *Research and Development Intern* Ene. - Mar. 2022

- Implementation of frequency domain back projection algorithm for SAR imaging from synthetic data of a ground-based synthetic aperture radar in squint mode.
  Tech Stack: Python and Scientific libraries (Scipy, Numpy and Matplotlib).

Research Experience

Network Systems Lab - TU Delft, *Research Intern* Ene.- Apr. 2024

- Working on the implementation of robotics tasks using visible light for robot-to-robot communication.
- Developing experiments using mobile robots to evaluate the reliability of the link generated for the visible light.
  Tech Stack: C/C++, Python.

Vision and Learning Lab - University of Alberta, *Research Intern* Ene. - May. 2023

- Implementation of Spiking Neural Networks for object recognitions using event-based data. Best Poster Presentation among international students in FURCA 2023.
- Development of a graphical interface and a program to manage 3 Azure Kinect depth cameras and store synchronously and asynchronously the capture of images from each of the cameras.
  Tech Stack: C/C++, Python, PyTorch, SpikingJelly, PyQt5, Remote servers.

KON Team, *Research and Development* Jul. 2022 - Ago. 2023

- Implementation of lane detection pipelines using computer vision techniques, and longitudinal and lateral control for the KON autonomous vehicle level II (Thesis project under supervision of Óscar Ramos, Ph.D.)
- Implementation of longitudinal control (PID control) and Simulation of lateral control (Stanley control) to control the speed and steering of the vehicle (KON MK IV), respectively.
- Implementation of an Extended Kalman Filter to estimate the position of the vehicle (KON MK IV) in the environment.
  Tech Stack: C/C++, Python, OpenCV, PyTorch and Node-RED.

VantTec, *Software Engineer* Mar. - Jun. 2022

- Implementation of lane detection pipelines using computer vision techniques and image processing for an autonomous vehicle dedicated to Tec de Monterrey's campus tour.
  Tech Stack: Python, OpenCV and ROS.

Mechatronics and Robotics Lab - UTEC, *Research Student* Sep. 2019 - Dec. 2021

- I was part of the team who built two mobile robots, ARCA and JONAS, for an Open Day (event to show incoming students what we developed as a Mechatronic student) at UTEC.
- Developed algorithms that allow ARCA to navigate autonomously using vision and other types of sensing in Gazebo, as well as the implementation of YOLO algorithm for object detection.
- Performed simulation of the dynamic and kinematic control of the Solo 12 robot, as well as statistical analysis of the contact forces during its gait in different environments.
- A list of some of my projects are shown here.
  Tech Stack: C/C++, Python, MATLAB, Pybullet, ROS, Gazebo.

Publications

Miguel A. Chávez Tapia, **Diego Palma Rodríguez**, and Marco Zúñiga Zamalloa. 2024. Edge-Light: Exploiting Luminescent Solar Concentrators for Ambient Light Communication. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 8, 3, Article 94 (August 2024), 23 pages. https://doi.org/10.1145/3678574.

Arroyo, N., Flores, D.P., **Palma, D.**, Solórzano, R., Alegria, E.J. (2022). Synthesis and Sensitivity Analysis of a Prosthetic Finger. In: Pucheta, M., Cardona, A., Preidikman, S., Hecker, R. (eds) Multibody Mechatronic Systems. MuSMe 2021. Mechanisms and Machine Science, vol 110. Springer, Cham. https://doi.org/10.1007/978-3-030-88751-3_2.

Centeno, E., Flores, D.P., **Palma, D.**, Solórzano, R., Murray, V. (2022). Visual Angular Haze Detection Using Focus Metrics. In: Iano, Y., Saotome, O., Kemper Vásquez, G.L., Cotrim Pezzuto, C., Arthur, R., Gomes de Oliveira, G. (eds) Proceedings of the 7th Brazilian Technology Symposium (BTSym'21). BTSym 2021. Smart Innovation, Systems and Technologies, vol 295. Springer, Cham. https://doi.org/10.1007/978-3-031-08545-1_55.

Teaching Experience

UTEC, *Teaching assistant* Apr. 2021 - Dec. 2022

- Developed laboratory guides and entry tests for the course of Analysis of Signals and Systems as well as helping students using MATLAB to resolve practical problems.

RUN, *Teaching assistant* Feb. 2019 - Feb. 2020

- Promoted computational thinking, created academic content, and taught Python programming to high school students.

Extracurricular and Volunteering Activities

GIIT Robotics, *Vicepresident* Mar. 2020 - Dec. 2021

- Organized workshops for the design and construction of a micromouse robot. Also belong to the Computer Vision team where we learned about algorithms for autonomous navigation.

Edukay, *Project Leader* Feb - Aug. 2021

- Promoted STEAM careers to students in rural areas of Peru by organizing, developing and delivering seven virtual workshops in their schools. Besides,we were recognized as first place in the "Integrity and Competitiveness" category of the volunteer programs developed in Peru's bicentennial.

UTEC Student Representation, *Student Representative* Ene. - Dic. 2021

- I had the opportunity to be elected as a member of the Student Representation at UTEC during 2021. We received suggestions and comments from the entire UTEC community to channel it with academic management authorities and achieve common goals.

Science Clubs International, *Member* Ene. - Feb. 2021

- Selected to belong to the Artificial Intelligence Club conformed by students from different LATAM countries. I learned about Machine Learning techniques (KNN, Decision Trees and SVM) applied to data analysis.

SpinOut & UTEC Admissions, *Consultant and Community Builder* Feb. 2020 - Feb. 2021

- Applied I&E methodologies to find solutions for the benefit of UTEC's incoming students community (+300). Organized and moderated webinars for the entirecommunity.

Engineering Without Borders, *Volunteer* Aug. - Sep. 2019

- Organizer of a blood donation volunteer program at UTEC for the benefit of the children from National Children's Institute (Breña-Peru). We reached a total of 75 blood donors among students and university administrators.

Science Clubs Peru, *Member* Jul. - Aug. 2019

- I was selected to belong to the Club of Radar Systems (CdeC35). We tested a radar prototype and used MATLAB to process data for object detection.

Certifications

- **UTEC Global Academy:** Introduction to intelligent control systems.
- **Yamagata University:** Drone Technology, Image Collection, Processing and Analysis.
- **Platzi certifications:** Machine Learning Path.
- **Coursera:** Neural Networks and Deep Learning, and Introduction to Self-Driving Cars.

Engineering and Technical Skills

- **Programming Languages:** Python, MATLAB, C/C++, JavaScript, Linux Shell Scripting.
- **Databases:** SQL Server, MySQL and MariaDB.
- **Frameworks and Tools:** OpenCV, scikit-learn, PyTorch, TensorFlow, Scientific Python libraries, Image Processing Toolbox, Git and Github.
- **Robotics tools:** ROS, Gazebo, PyBullet, Rviz.
- **Languages:** English (C1), Spanish (Native).

Achievements, Awards and Honors

(2024) Selected by REPU to work on computer science research internship at TU Delft.
(2023) Best poster presentation among international students - FURCA 2023 (UAlberta).
(2023) Being awarded with a full scholarship for research program: Emerging Leaders in the Americas Program (ELAP).
(2022) Being awarded with a scholarship for exchange program: UTEC GO International Grant.
(2021) Being awarded with a full scholarship for exchange program: UAI Imagine Global Classroom LATAM 2021.
(2020-2021) Being awarded for academic excellence by UTEC.
(2019) First place in the science and technology fair organized by UTEC
(2019) Second place in poster presentation about engineering projects organized by UTEC.
(2018) Full scholarship for undergraduate studies - UTEC.
(2017) Poster presentation at XXVI Peruvian Physics Symposium.
(2017) Bronze medal - XXII Iberoamerican Physics Olympiad (Colombia).
(2017) Gold medal - Online Physics Olympiad (+10 LATAM teams).
(2016) Oral presentation at XXV Peruvian Physics Symposium.
(2016) Bronze medal - VIII Latin American Astronomy and Astronautics Olympiad.

References

Ruth Canahuire, Ph.D
Academic Advisor

- Head of Engineering department at UTEC.
- Contact: rcanahuire@utec.edu.pe.

Óscar Ramos, Ph.D.
Academic Advisor

- Head of Mechatronics and Electrical Engineering departments at UTEC.
- Contact: oramos@utec.edu.pe.