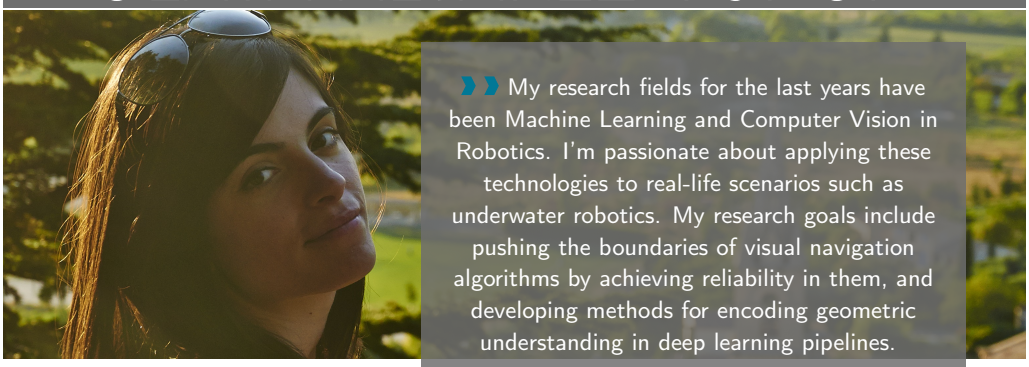
OLAYA ÁLVAREZ TUÑÓN



My research fields for the last years have been Machine Learning and Computer Vision in Robotics. I'm passionate about applying these technologies to real-life scenarios such as underwater robotics. My research goals include pushing the boundaries of visual navigation algorithms by achieving reliability in them, and developing methods for encoding geometric understanding in deep learning pipelines.

EXPERIENCE

PhD Student — Aarhus University, 06/2021 - now

- Marie Curie Scholarship at the ETN project ReMaRo
  - Development of an SLAM algorithm for underwater vehicles using camera-based deep learning algorithms to aid navigation.

Research Technician — University Carlos III Madrid, 10/2015 - 03/2020

- Teacher Assistant
  - Teacher Assistant at the RoboticsLab in the Systems Engineering and Automation department.
- Researcher in the EU Project INDIRES (Information Driven Incident Response).
  - Software development for hexapod robot navigation.
- Researcher in the EU Project STAMS (Long Term Stability Assessment and Monitoring of Flooded Shafts).
  - Development of software tools for real-time control and data acquisition of the flooded mine shaft inspection devices. Deliverable writing, field tests conducting.

Research Fellow — Arcelor-Mittal, 2013,2014/08-10

- Scholar at R&D Arcelor-Mittal center in Avilés.
  - Research in the automatic detection of defects and dust in the rolled steel with computer vision techniques.

Scholar — Duro Felguera (Argentina), 2014/08

- Scolarship at Energy division in Duro Felguera.
  - Commisioning in the production of a combined cycle power plant in Timbúes.

EDUCATION

M.Sc. in Robotics and Automation — University Carlos III Madrid, 2019

- Average Score: 9.12/10
  - Master Thesis: "Visual Localization of an Underwater Robot in Flooded Mine Shafts". Development of algorithms for low-cost underwater robot localization, image enhancement, and Visual Odometry algorithms with OpenCV python API.

Electronics and Automation Engineer — University of Oviedo, 2015

- With a robotics specialization. Average Score: 7.85/10
  - Bachelor Thesis:"Visual Odometry for quadrucopters". Development of Visual Odometry algorithms with C++ and OpenCV in an AR Drone 2.0.

COURSES

Elite Robotics Summer School — Odense, Denmark, 08/2021

- Summer School in Robotics and Entrepeneurship at DTU
  - Lectures on advanced technologies for robotic systems (e.g. navigation, control, and planning) and entrepeneurship in robotics.

CCSS Summer School — Senigallia, Italy, 07/2019

- Summer School on Computing in Construction.
  - Lectures on intelligent construction inspection and assessment.

ABOUT

15/09/1993

CONTACT

Århus, Denmark

+34 618 00 75 45

olaya.tunon@gmail.com

olayasturias.github.io

github.com/olayasturias

TECHNOLOGIES

Python · C++ · Matlab · Git

TOOLS

OpenCV · ROS · Pytorch · AirSim · Gazebo · Raspberry · Arduino · Ardupilot · Inkscape · Blender · Unreal

OPERATING SYSTEMS

LANGUAGES

Spanish

English

German

HOBBIES

EEML Summer School — Bucharest, Romania, 07/2019

- Summer School on Deep Learning and Reinforcement Learning.
  - Practical Sessions and Lectures in Deep Learning and Reinforcement Learning for Computer Vision and Speech Recognition, among other applications.

Deep Learning Specialization — Coursera, 02-05/2020

- Neural Networks and Deep Learning: Foundations of Deep Learning, building and implementation of deep neural networks.
  - Credential ID: NA9Z4ZSMXTLF
- Structuring Machine Learning Projects: error diagnose and direction prioritization in the development of machine learning systems.
  - Credential ID: HS4LX3MCJZN3
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization.
  - Credential ID: 6XBDRV6YFMEG
- Convolutional Neural Networks: building of Convolutional Neural Networks for Computer Vision.
  - Credential ID: 24JZU7HRUMQC

ENTREPRENEURSHIP

EU-XCEL Virtual accelerator — University of Athens, 2015

- Selected to attend among participants from the European Union. Development of a Startup Project with an European Team.
  - Predictive Farming for vineyards: machine learning algorithms for an optimal use of irrigation in vineyards.

JOURNAL PUBLICATIONS

Álvarez-Tuñón, Olaya, et al. "An overview of monocular visual SLAM: (r)evolution from geometry-based to deep-learned pipelines." IEEE Transactions on Artificial Intelligence (2023).

Álvarez-Tuñón, Olaya, et al. "Generation and processing of simulated underwater images for robot infrastructure inspection." Sensors, 2019.

Bedford Michael, Álvarez-Tuñón, Olaya, et al. "Ultrasonic Inspection of Flooded Mineshafts for Stability Monitoring." Mining Technology, UK, 2019.

CONFERENCE PUBLICATIONS

Álvarez-Tuñón, Olaya, et al. "SubPipe: A Submarine Pipeline Inspection Dataset for Segmentation and Visual-inertial Localization" Oceans 2024 Singapore.

Martin Aubard, Sergio Quijano, Álvarez-Tuñón Olaya, et al. "Mission Planning and Safety Assessment for Pipeline Inspection Using Autonomous Underwater Vehicles: A Framework based on Behavior Trees" Oceans 2024 Singapore.

Álvarez-Tuñón, Olaya, et al. "Mimir-uw: A multipurpose synthetic dataset for underwater navigation and inspection" 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Álvarez-Tuñón, Olaya, et al. "Loss it right: Euclidean and Riemannian metrics in learning-based visual odometry" ISR Europe 2023; 56th International Symposium on Robotics.

Amer, Abdelhakim and Álvarez-Tuñón, Olaya, et al. "UNav-Sim: A High-fidelity Underwater Robotics Simulator and Synthetic Data-generation Framework." 21st International Conference on Advanced Robotics (ICAR 2023)

Álvarez-Tuñón, Olaya, et al."Reference Points Installation Module and Underwater Robot for Flooded Mine Shaft Inspection". Dissemination Workshop of RFCS project STAMS at Główny Instytut Górnictwa (GIG), 2018.

Álvarez-Tuñón, Olaya, et al. "Underwater Robot Navigation for Maintenance and Inspection of Flooded Mine Shafts." 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Special Session on Raw Materials, Tough Robots.

Álvarez-Tuñón, Olaya, et al."Reference Points Installation Module and Underwater Robot for Flooded Mine Shaft Inspection". Dissemination Workshop of RFCS project STAMS at Główny Instytut Górnictwa (GIG), 2018.

TEACHING ACTIVITIES

Teaching assistant — UC3M & Aarhus University, 2020-now

- Autonomous Mobile Robots
  - Theoretical lessons and practical sessions on visual SLAM. Assistance in ROS-based solutions for leveraging autonomy in robotics (i.e., localization, control, and planning).
- Deep Learning
  - Assistance in practical sessions consisting of deploying state-of-the-art deep learning architectures for computer vision, reinforcement learning, generative models, and sequence models.
- Control Systems
  - Assistance in practical sessions consisting of developing controllers for Quanser devices.
- Industrial Automation
  - Automation of an assembly plant using Siemens PLCs, Festo tools and TIA Portal. Design of the digital twin of the plant using Siemens NX.
- Industrial Robotics
  - Programming and Simulation of ABB Industrial Robots using RAPID and RobotStudio.

Bachelor and Master Thesis Mentoring — UC3M & Aarhus University, 2016-now

- David Felsager . "Design of an underwater ROV for ship propeller cleaning", 2023.
- Steven James Hughes, Andreas Calonius Kreth. "*Have I been here before?* Using cameras for visual place recognition in underwater environments", 2023.
- Martin Harder Bruun. "*What am I learning?* Metrics for assessing data selection for VO training", 2023.
- Emilio Hernández Rubio."Buoyager: Diseño electrónico de una boya low-cost para el sensado de la calidad de agua en puertos" (Buoyager: electronic design of a low-cost buoy for quality water sensing), 2021.
- Ana Laura Bermejo Escudero."Planificación de trayectorias para vehículos submarinos en ROS" (Path planning for underwater vehicles in ROS), 2017.
- Isaac Sánchez Rodríguez."Modelado de robot submarino en el simulador UWSim" (Underwater robot modelling in the UWSim simulator), 2017.