DANIEL SOTELO AGUIRRE

Robotics Engineer | MSc. in Robotics and Automation at UPM

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📞 +34 601 042 520   📍 Madrid, Spain

WORK EXPERIENCE

Robotics Research Engineer
Centre for Automation and Robotics (CSIC-UPM)

📅 01.10.2023 – 31.08.2024   📍 Madrid, Spain

- Programmed vision, planning, and NMPC control algorithms for 18-DoF quadruped manipulator search and rescue operations.
- Designed a social robot mechanical and electronic assembly from scratch, which won the best design prize.
- Performed robot dynamic simulations, 3D printing for manufacturing, C++ firmware programming and robot testing and validation.

Research Student
Tokyo Institute of Technology

📅 16.06.2023 – 25.08.2023   📍 Tokyo, Japan

- Developed and tested a C++ online inference program for deep learning-assisted laparoscopic surgery.
- Achieved 20% increase in inference speed.
- Awarded the UPM Scholarship to conduct research at Miura Lab.

EDUCATION

Double MSc. in Robotics and Industrial Automation
Technical University of Madrid

📅 05.09.2022 – 23.09.2024   📍 Madrid, Spain

- Top 1%. Honors in 19 courses. Grade: 9.38/10.00.
- Special focus on Computer Vision, Artificial Intelligence, Nonlinear Systems, and Optimal Control.
- Member of SENER's Robot National Challenge UPM Team.
- National Finalist of Global Management Challenge Spain 2022-2023. Led our team to emerge as one of the top 8 out of 427 contending groups demonstrating great strategic and management skills.

BSc. Mechatronics Engineering
Public University of Navarre

📅 03.09.2018 – 18.06.2022   📍 Pamplona, Spain

- Top 1 out of 119 students. Honors in 24 courses. Grade: 9.28/10.00.
- Extraordinary End of Studies Award (2021-2022).
- Erasmus+ Mobility Scholarship at UCLouvain (took courses in Machine Learning and Robotics). Grade: 9.84/10.00.
- International Program (74% of the courses taken in English).
- General background in Algebra, Calculus, Statistics, Analog and Digital Electronics, Programming, Control Theory, Numerical Methods, Material Science, Fluid Dynamics, Mechanics, Thermal Engineering, etc.

SOFTWARE SKILLS

Python
C++
MATLAB
Simulink
GitHub
ROS
Linux
LaTeX
AutoCAD
Autodesk Inventor
SOLIDWORKS

LANGUAGES

Spanish (C2) ●●●●●

English (C1) ●●●●●

French (B2) ●●●○○

German (A2) ●●○○○

Italian (A2) ●●○○○

RELEVANT COURSES

Deep Learning Specialization
Deep Learning AI. 122 h

📅 05.09.2023 – 27.12.2023

ROS2 For Beginners
Udemy. 12 h

📅 05.09.2023 – 14.09.2023

Machine Learning Specialization
Deep Learning AI. 50 h

📅 15.09.2022 – 02.01.2023

Graduate Seminar. Scientific research: research support resources
Universidad Politécnica de Madrid. 40 h

📅 01.11.2022 – 29.11.2022

RELEVANT PROJECTS

Development and Integration of a NMPC-Controlled Legged-Manipulator Platform for Search and Rescue Operations

Master's Thesis - Honors

📅 15.02.2024 – 31.08.2024

- Developed, implemented and tested both in simulation and real hardware a NMPC controller in a 18-DoF quadruped manipulator.
- Three modules were implemented: vision, planning and NMPC-WBC control. The developed architecture enables whole-body planning, end-effector motion tracking, and stability under force disturbances.
- Technologies used: OpenCV, YOLO, C++, Python, ROS Noetic, OCS2, ros-control, etc.

3D Point Cloud Generation and Visualization from Facial Video

Computer Vision Semester Project – Grade: 10.0/10.0

📅 11.09.2023 – 31.01.2024

- Reconstruction and visualization of 3D faces generated from videos using Python. Frame extraction and pre-processing, SIFT feature detection, matching and RANSAC 3D Point Cloud Reconstruction.
- Camera calibration through pattern detection: intrinsic matrix and distortion coefficients calculation.
- Libraries used: OpenCV, MediaPipe, dlib, NumPy, etc.

Development of C++ Online Inference Program for Deep Learning-Assisted Laparoscopic Surgery

Research Project at Miura Lab

📅 16.06.2023 – 25.08.2023

- Performed multiple object instance segmentation of the laparoscopic forceps to achieve real-time processing speed with high accuracy.
- Program based on YOLACT++ with 3 stages: frames pre-processing, model inference (using ONNX Runtime C++ API), and final post-processing of the model outputs.

Autonomous Drone Racing Challenge 2022-2023

INGENIA Anual Team Project at Technical University of Madrid

📅 05.09.2022 – 26.05.2023

- Project Manager of a team of 12 people. Development and implementation of software for self-piloted obstacle drone race.
- Systems architectural design, programming (C++, Git and ROS), subsystems model and control development, testing and validation.

PUBLICATIONS

- D. Sotelo, J. Laserna, D. Galán, F. Matía, "A New Emotional Social Robotic Platform" in *Proc. of 7*th *Iberian Robotics Conference (ROBOT2024)*, Madrid, Spain, 2024.
- D. Sotelo, J.J. Beato-López, E. Garayo and C. Gómez-Polo, "Design, Simulation, Construction and Characterization of a Vibrant Magnetic Structure for its Use in Magnetostrictive Energy Harvesters" in *Proc. of 14*th *Multidisciplinary International Student Workshop (MISW2023)*, Tokyo Institute of Technology, Japan, 2023.

SOFT SKILLS

Interpersonal Skills   Hard-working

Strong Communicator   Teamwork

Analytical Decision Making

Creative Problem Solving

INTERESTS

Robotics   Machine Learning   AI

Computer Vision   Nonlinear Control

Reinforcement Learning