Francisco Calatrava

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Work Experience

2022 **Research Engineer**, *University of Technology of Troyes*, Troyes, France
Six months Erasmus internship for mobile robotics skill development and elderly-focused human-robot interaction. I enhanced the TiaGo robot's autonomous navigation in this internship using ROS and Python. Simultaneously, I cultivated an interest in AI and machine learning; self-taught via online courses and undertook small projects using PyTorch and TensorFlow.

2020–2022 **Research Engineer**, *Technical University of Cartagena*, Cartagena, Spain
Contributed to Spain's Robwell project (RTI2018-095599-A-C22) under coordinator Oscar Martinez Mozos, focusing on mobile robotics, home automation, and Android app development for elderly care. I developed a non-intrusive home automation system to record human-environment interactions utilizing Zigbee protocol and Node-RED. Enhanced a coaching robot's autonomy by monitoring battery levels while executing navigation tasks, using ROS and Python. Created an Android app in Java for collecting a mood prediction dataset.

2019 **Research Student in Curricular Internship**, *University of Oviedo*, Gijón, Spain
Employed Matlab and Python for data collection and time series analysis of vibrations in solids.

Higher Education

2022–Now **Ph.D. on Computer Science**, *Örebro University*, Örebro, Sweden,
During my PhD, I am exploring Human Activity Recognition using sensor data (time series) and multimodal data, with a focus on contributing solutions for real-life applications. I am presently addressing the issue of labelled data scarcity through transfer learning and adversarial learning techniques.

2019–2020 **Master's degree in Electronic Systems and Instrumentation**, *Technical University of Cartagene*, Spain
Thesis: In this thesis, I developed solutions for real-home navigation, analyzed mobile robot battery autonomy, and integrated the robot into a smart setting using ROS, Python, and Shell.

2015–2019 **Bachelor's Degree in Industrial Electronics and Automation**, *Technical University of Cartagene*, Spain

Other Courses

2023 **Structuring Machine Learning Projects**, *DeepLearning.AI – Coursera*, Online

2022 **Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization**, *DeepLearning.AI – Coursera*, Online

2022 **Neural Networks and Deep Learning**, *DeepLearning.AI – Coursera*, Online

2022 **Deep Neural Networks with Pytorch**, *IBM – Coursera*, Online

2022 **Introduction to Computer Vision and Image Processing**, *IBM – Coursera*, Online

2022 **Introduction to Deep Learning and Neural Networks with Keras**, *IBM – Coursera*, Online

2022 **Machine Learning with Python**, *IBM – Coursera*, Online

2022 **Python for Science, Engineering, and Astrophysics**, *Technical University of Cartagena*, Spain

2022 **How to present research data: Tables and Figures**, *Technical University of Cartagena*, Online

Honours and Awards

2021 **Agustín Diéguez Award by The Higher Technical School of Industrial Engineering** , *Technical University of Cartagena, Spain*
Received the award for the best master's thesis presented in 2021.

2021 **Extraordinary End of Master's Degree Award 2019/2020**, *Technical University of Cartagena, Spain*
Top marks of the graduating class in the Master's Degree in Electronic Systems and Instrumentation.

Technical Skills

Python, Data Processing, analysis, and manipulation (Numpy, Pandas, Matplotlib, Seaborn, Scikit-Learn); Image Processing (OpenCV, Pillow); Machine Learning and Deep Learning (Pytorch, Tensorflow, Scikit-Learn).

C, Basic knowledge for algorithm implementation.

C++, Image Processing (OpenCV); Concurrency.

Matlab/Octave/Scilab, Basic experience with data processing and basic machine learning; experienced in simulating physical systems and digital controllers.

Publications

[1] **F. M. Calatrava-Nicolas and O. M. Mozos**, *"Light Residual Network for Human Activity Recognition using Wearable Sensor Data," in IEEE Sensors Letters,*, vol. 7, no. 10, pp. 1-4, Oct. 2023, Art no. 7005304, doi: 10.1109/LSENS.2023.3311623.

[2] **Barber R, Ortiz FJ, Garrido S, Calatrava-Nicolás FM, Mora A, Prados A, Vera-Repullo JA, Roca-González J, Méndez I, Mozos ÓM.**, *"A Multirobot System in an Assisted Home Environment to Support the Elderly in Their Daily Lives" in Sensors. 2022*, 22(20):7983. https://doi.org/10.3390/s22207983

[3] **Calatrava-Nicolás FM, Gutiérrez-Maestro E, Bautista-Salinas D, Ortiz FJ, González JR, Vera-Repullo JA, Jiménez-Buendía M, Méndez I, Ruiz-Esteban C, Mozos OM.**, *"Robotic-Based Well-Being Monitoring and Coaching System for the Elderly in Their Daily Activities" in Sensors. 2021*, 21(20):6865. https://doi.org/10.3390/s21206865

Languages

English, Professional working proficiency.

French, Limited working proficiency.

Spanish, Native.