

# Henar Domínguez Elvira

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Personal webpage: <https://henardoel.github.io/henardoel/>

## Executive summary

I am an Artificial Intelligence and Computer Vision researcher, currently **pursuing my Ph.D.** in the field of **material digitalization** and **image intrinsic decomposition** using **neural networks**. My research focuses on leveraging advanced techniques to analyze and process materials in a digital format.

Additionally, I also have experience in **data analysis and data engineering**, enabling me to extract valuable insights and drive impactful outcomes from complex datasets.

## Education

### GRADO EN INGENIERÍA DE TECNOLOGÍAS Y SERVICIOS DE TELECOMUNICACIÓN (GIST)

- **Universidad Politécnica de Madrid (UPM) | 2014 – 2018**
- My chosen specialty was **Image and Audio Digital Processing**.
- In my thesis I developed a system that improved the quality of the results of the **video segmentation** algorithm, using the joint bilateral filter (JBF).

### MÁSTER UNIVERSITARIO EN INGENIERÍA DE TELECOMUNICACIÓN (MUIT)

- **Universidad Politécnica de Madrid (UPM) | 2018 - 2020**
- I chose the specialty of **Machine Learning and Data Science**.
- During the development of my thesis I worked in Geotab and implemented the project explained in the Work Experience section.

### PROGRAMA DE DOCTORADO EN TECNOLOGÍAS DE LA INFORMACIÓN Y LAS COMUNICACIONES, ESCUELA INTERNACIONAL DE DOCTORADO (EID)

- **Universidad Rey Juan Carlos de Madrid (URJC) | 2022 - Today**
- The fundamental purpose of this thesis is to develop and design a comprehensive range of tools and algorithms with the aim of achieving thorough and accurate digitization of the mechanical and optical properties inherent in materials.
- The goal is to attain an unprecedented level of fidelity in the digital representation of these materials through the implementation of cutting-edge techniques and innovative strategies. The focus is on addressing the intrinsic challenges associated with characterizing their distinctive features, in order to establish a solid scientific and technological foundation that drives the advancement of research in this constantly evolving field.

## Skills and expertise

- Python
- Python for data analysis: pandas, numpy, sklearn, matplotlib, seaborn, plotly
- Python for deep learning: opencv, pytorch, pytorch lightning, kornia

## Working experience

### COMPUTER VISION ENGINEER | EVERIS | APRIL 2019 - OCT 2019

- I worked deploying a sign language recognition system based on convolutional neural networks (CNN).
- My tasks included acquiring the data (video files), extracting images from them, labeling and preparing them and then building, training and tuning the CNN.

### DATA SCIENTIST | GEOTAB | NOV 2019 - JUN 2020

- My work involved data engineering and data analysis of the information obtained from electric vehicles, for a later machine learning training to predict their autonomy.
- The aim of the project was to be able to reduce the range anxiety in electric vehicle drivers.

### COMPUTER VISION ENGINEER | EXCELTIC| OCT 2020 – DEC 2020

- At INECO I developed computer vision projects for Adif.
- Some of the tasks I carried out were: manually labeling and preprocessing images to build a dataset, choosing and designing between several Deep learning models, and finally implementing and training the selected ones.
- Using the predictions of the models I develop utilities for the final user.

### ARTIFICIAL INTELLIGENCE AND COMPUTER VISION RESEARCHER | SEDDI | JAN 2021 – MAY 2024

- My current work at SEDDI consists of researching new techniques based on artificial intelligence, computer vision and pattern recognition for the digitalisation of the optical and mechanical properties of materials.
- I was doing my PhD on the same topic, in collaboration with the Universidad Rey Juan Carlos in Madrid.

### ARTIFICIAL INTELLIGENCE AND COMPUTER VISION RESEARCHER | ARQUIMEA RESEARCH CENTER | MAY 2024 – TODAY

- My current work at Arquimea Reserach Center consists of researching new methods to capture and represent the optical and mechanical properties of materials, for its posterior simulation.
- I am doing my PhD on the same topic, in collaboration with the Universidad Rey Juan Carlos in Madrid.

## Other experience

- Cofounder of [Machine Learning Circle](#), a group that organizes meet ups and talks about machine learning and artificial intelligence in Madrid, bringing experts in each area.

## Publications

- [UMat: Uncertainty-Aware Single Image High Resolution Material Capture](#) (CVPR 2023)
- [Practical Methods to Estimate Fabric Mechanics from Metadata](#) (EG 2024)
- [3DGStrands: Personalized 3D Gaussian Splatting for Realistic Hair Representation and Animation](#) (COMPUTER AND GRAPHICS 2025)