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Armando Collado-Villaverde

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ABOUT ME

My career as a researcher began with the completion of my Computer Engineering studies at the University of Alcalá in 2012, where I graduated as the top student in my class and received a special distinction award. For my final project, I started conducting research on automatic fall detection using a triaxial accelerometer on the wrist, which was later expanded to incorporate sound analysis.

Additionally, I completed a master's degree in Video Game Design and Development at the Polytechnic University of Madrid, after which I developed the video game *Massira*, which was published on PlayStation 4.

After working in the video game industry, I returned to the research field at the university, focusing my studies on neural networks, particularly on time series problems. Initially, I worked on a predictive maintenance project for the Spanish Navy. Following this, I pursued a Master's Degree in Science and Technology from Space at the University of Alcalá. This was my first introduction to Space Weather, and for my final project, I developed a Neural Network model to forecast the SYM-H index, which was also published in the *Space Weather* journal and marked the beginning of my PhD.

Later, I applied to the Open Space Innovation Platform (OSIP) initiative by the European Space Agency (ESA) to fund my PhD, focused on forecasting geomagnetic indices using neural networks. I am currently finishing my PhD and have authored several publications in the Space Weather field using Machine Learning.

EDUCATION AND TRAINING

Masters Degree in Science and Technology from Space

University of Alcalá [2018 – 2020]

Website: https://www.uah.es/en/estudios/Ciencia-y-Tecnologia-desde-el-Espacio/

Masters Degree in Videogames Design and Development

Universidad Politécnica de Madrid [2016 – 2018]

City: Madrid | **Country:** Spain | **Website:** https://www.gamesupm.com/

University Degree in Computer Engineering

University of Alcalá [2011 – 2016]

City: Alcalá de Henares | **Country:** Spain

PhD in Space Research and Astrobiology

University of Alcalá [11/2020 – Current]

City: Alcalá de Henares | **Country:** Spain | **Website:** https://www.uah.es/en/estudios/Investigacion-Espacial-y-Astrobiologia-D443/ | **Level in EQF:** EQF level 8 | **Thesis:** Deep Neural Networks for Geomagnetic Indices Forecasting

- Artificial Intelligence (AI) – Design and implementation of Deep Neural Networks (DNNs) for predictive modeling.
- Time Series Forecasting – Real-time forecasting of geomagnetic indices
- Space Weather Analysis – Understanding and predicting geomagnetic storms and their impact on Earth's magnetic field.
- Operational Deployment – Implementation of real-time forecasting systems with confidence interval predictions.
- Scientific Research and Communication – Conducting scientific research, writing academic papers, and presenting findings in the field of space weather forecasting.

WORK EXPERIENCE

Doctoral Stay

European Space Agency - European Space Operations Centre [04/2024 – 07/2024]

City: Darmstadt | **Country:** Germany

Phd Student

University of Alcalá [11/11/2020 – Current]

City: Alcalá de Henares | **Country:** Spain

University research assistant

University of Alcalá [16/09/2018 – 15/09/2020]

City: Alcalá de Henares | **Country:** Spain

Software developer - Unity

Frost Monkey Games [06/2017 – 05/2019]

City: Madrid | **Country:** Spain

Developed a video game using the Unity Engine, acting as the lead programmer. My responsibilities included working on gameplay mechanics, artificial intelligence, and integrating PlayStation system functionalities, quality assurance, shader development.Developed

LANGUAGE SKILLS

Mother tongue(s): Spanish

Other language(s):

English

LISTENING C1 **READING** C2 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Core competences

Artifical Intelligence / Neural Networks and Deep Learning / Unity 2D/3D

Software Development

Python / Java Programming language / C#

Utilities

Git / Subversion

PUBLICATIONS

[2021]
Deep Neural Networks With Convolutional and LSTM Layers for SYM-H and ASY-H Forecasting.

Simulator to Support Machine Learning-Based Wearable Fall Detection Systems.

[2024]
Classifying and bounding geomagnetic storms based on the SYM-H and ASY-H indices

https://doi.org/10.1007/s11069-023-06241-1

[2023]
Neural Networks for Operational SYM-H Forecasting Using Attention and SWICS Plasma Features

https://doi.org/10.1029/2023SW003485

[2024]
A Framework for Evaluating Geomagnetic Indices Forecasting Models

https://doi.org/10.1029/2024SW003868

[2024]
Operational SYM-H Forecasting With Confidence Intervals Using Deep Neural Networks

Space Weather 2024

PROJECTS

[2017 – 2020]
Massira - PS4 Videogame
Lead programmer during the development

Link: https://store.playstation.com/es-es/product/EP5099-CUSA14220_00-MASSIRA123456789

[15/01/2022 – Current]
Deep Neural Networks for Geomagnetic Forecasting
European Space Agency (ESA) under the Open Space Innovation Platform (OSIP) program 3-17447 for the development of the PhD

HONOURS AND AWARDS

[2016] University of Alcalá
Best academic record Degree in Computer Science