FERNANDO GARCÍA GUTIÉRREZ

PhD Candidate in Computer Science

ga.gu.fernando.contact@gmail.com | +34 608 16 84 14 | garciagu-fernando | FernandoGaGu
https://fernandogagu.github.io/ | Carrer Marqués de Sentmenat, 47, 1-4, Barcelona, 08029, España

EXPERIENCE

Researcher in applied Artificial Intelligence (AI)

Department of Artificial Intelligence and Big Data applied to Neurology, Ace Alzheimer Center

April 2022 – Present | Barcelona

- Development of neuroimaging and speech processing pipelines.
- Speech analysis using AI techniques for the detection of cognitive impairment.
- Application of AI techniques to neuroimaging data.
- Implementation of statistical models for the analysis of neuropsychological data.
- Creation, standardisation, and maintenance of databases.
- Project management.
- Writing scientific articles.

Quantitative Analyst

Investing PROFit Wisely

May 2021 – April 2022 | Madrid

- Development and application of Machine Learning models in the financial field.
- Implementation of the company's internal data model.
- Creation of analytical dashboards.

Intern

Department of Computer Architecture and Automation, Complutense University of Madrid

February 2020 – July 2020 | Madrid

- Development of predictive models applied to neurodegenerative diseases.
- Writing scientific articles.

EDUCATION

PhD Student

Department of Computer Architecture and Automation, Complutense University of Madrid

September 2020 – Present

PhD Program in Computer Science

Thesis: New approaches based on Artificial Intelligence for the study of neurodegenerative diseases and brain connectivity.

Master's Degree in Computational Biology

Polytechnic University of Madrid

September 2019 – September 2020

Specialisation in Computational Biology and Big Data. Master's degree in English with honors in Big Data and Programming Foundations.

Thesis: Tool for automatic diagnosis of neurodegenerative diseases by Machine Learning techniques.

Biochemistry degree

University of the Balearic Islands

September 2015 – June 2019

Thesis: Exploring the development and applications of DESI-MS (desorption electrospray ionization mass spectrometry) and REIMS (rapid evaporative ionization mass spectrometry) technologies.

FEATURED PUBLICATIONS

- García-Gutiérrez, Fernando, et al. "Predicting changes in brain metabolism and progression from mild cognitive impairment to dementia using multitask Deep Learning models and explainable AI." NeuroImage 297 (2024): 120695.
- García-Gutiérrez, Fernando, et al. "Unveiling the sound of the cognitive status: Machine Learning-based speech analysis in the Alzheimer's disease spectrum." Alzheimer's Research & Therapy 16.1 (2024): 26.
- García-Gutiérrez, Fernando, et al. "Harnessing acoustic speech parameters to decipher amyloid status in individuals with mild cognitive impairment." Frontiers in Neuroscience 17 (2023): 1221401.
- Garcia-Gutierrez, Fernando, et al. "Diagnosis of Alzheimer's disease and behavioural variant frontotemporal dementia with machine learning-aided neuropsychological assessment using feature engineering and genetic algorithms." International journal of geriatric psychiatry 37.2 (2022).

TECHNICAL KNOWLEDGE

Programming

Proficient in several programming languages, design patterns, and software development methodologies. More than 5 years working with Python.

Artificial Intelligence

Extensive theoretical and practical knowledge of traditional Machine Learning models and Deep Learning techniques. Experienced in applying these models to real-world scenarios involving tabular, audio, and image data, as well as time series modeling.

Main areas of knowledge:

- Supervised, unsupervised and semi-supervised learning.
- Generative AI.
- Reinforcement learning.
- Probabilistic graphical models.
- Explainable AI.
- Graph Neural Networks.
- Feature selection techniques.

Statistics

Knowledge of descriptive and inferential statistics, probability, and data visualisation techniques.

Databases

Relational and non-relational databases as well as Ontology design.

Others

Proficient in Unix, GitHub, Jupyter, Docker, Pypi, and LaTex.
Knowledge of the main neuroimaging tools such as freesurfer, FSL, SPM12, CAT12, PETPVC, and ANTs.
Expertise with SOTA models from the disciplines of imaging, audio, and natural language processing.

Programming languages

Python | Cython | R | Ruby | C++ | Java | Scala | Julia | Matlab | SQL

Frameworks

Python:

torch | torchvision | torchaudio | torch_geometric | tensorflow | sklearn | keras | pyspark | gym | numpy | pandas | scipy | statsmodels | xgboost | joblib | deap | networkx | matplotlib | seaborn | plotly | nibabel | nilearn | nipype | stanza | nltk | spacy | librosa | opensmile | captum | shap | lime | optuna

LANGUAGES

Spanish (native)

English (accredited B2 level)

SKILLS

- Experienced in collaborative projects.
- Skilled in working on interdisciplinary projects.
- Self-motivated and adaptable in learning and developing ideas.
- Enthusiastic about programming and AI.
- Creative thinker.
- Strong critical thinking skills.
- Excellent communication skills.
- Proficient in team planning and management.

OTHERS

- Scientific publications: 5 as first author and 14 as co-author in indexed journals.
- Lecturer: presented at 3 international scientific congresses (ADPD 2024, EADC 2024, and IMCIC 2024).
- Participation in National and International projects:
  - SpeechDx: International consortium focused on developing early digital biomarkers for Alzheimer's disease.
  - COMFORTage: International project aimed at developing personalized interventions using AI.
  - TARTAGLIA: National project focused on creating federated networks for training AI models in healthcare.
  - SCAP-AD: National project aimed at developing precision preventive and diagnostic tools for Alzheimer's disease.
- Supervised a Final Degree Project at the Faculty of Computer Science at the Complutense University of Madrid titled "Deep Learning Application in Neuroimaging for the Diagnosis of Neurodegenerative Diseases".

CODE LIBRARIES

The following is a list of some of the public code libraries developed over the last few years:

- GoJo-ML: code library to accelerate and standardize the development of AI-based projects.
- antco: Python/Cython implementation of optimization algorithms based on Ant Colony Optimization.
- pywinEA2: implementation of feature selection algorithms based on population dynamics.