ANA SOUSA

AI Engineer/Data Scientist

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City: **Porto, Portugal**
Nationality: **Portuguese**

Summary

Ambitious Engineer with 4+ years of hands-on experience designing, deploying, and scaling ML/AI solutions across academia and industry, particularly in healthcare and manufacturing. Strong background in GenAI, NLP, signal processing, and deep learning. Experienced with multimodal models, end-to-end ML pipelines, and cutting-edge approaches such as diffusion models, VAE-GANs, and LLMs. Proven AI Research background with academic publications and top MSc honors, paired with strong practical skills in Data science, AI Eng, and core MLOps tools. Thrives in international environments, driven by curiosity, collaboration, and continuous growth.

Work Experience

DEUS: Human(ity)-Centered AI | PT & NL

AI Engineer 2025 - Present

- **European Advertising Standards Alliance (EASA):** Developed a scalable multi-agent system for ad compliance on Meta and Google, automating OCR text extraction, content categorization, issue flagging, and detailed ad description generation, with multi-language support and SRO collaboration.

Keywords: *LangGraph, LangChain, Langfuse, Postman, Azure, Docker, Git, Pydantic*

Bosch | Braga, PT

AI Researcher & Solution Developer 2023 - 2025 (2 years & 1 month)

- Designed and deployed classification and anomaly detection models for audio signals.
- Support the SW team and develop software for process optimization/monitoring;
- Responsible for a Strategic project that aims to improve and continuously monitor production processes, using AI;
- Design and implement systems using AI/ML frameworks to meet use cases requirements and ensure high product quality. Responsibilities include tasks in computer vision, NLP, and multimodal applications, such as OCR and QA.

Keywords: *MLOps, Abnomaly Detection, Classification, Signal Processing,Tensorflow, Keras , HuggingFace, Agile, Scrum*

University of Twente | Enschede, NL

Researcher **Section of Cognition, Data and Education** | BMS faculty UT 2021-2023 (2 years & 2 months)

- Enabled project acceleration by translating Clinical Neurophysiological needs into Data Science and ML/DL frameworks. This mediating capacity allowed successful collaboration of CoDE and CNPH groups, boosting the development of project and clinical validation.
- Built semi-supervised pipelines (VAE, GANs, diffusion models) for EEG anomaly detection
- Published key results with **81.9%** sensitivity and **91.7%** specificity in EEG signal classification

Keywords*: EEG, Abnomaly Detection, Autoencoder, VAE, VAE-GANs, Diffusion Models, Gen AI, Signal Processing, Tensorflow*

Assistant Researcher **Clinical Neurophysiology Group (CNPH)** |TechMed Center UT

- Review of state-of-the-art approach for captioning in image/signal/video and Inspired on that development, troubleshooting and comparison of **6** pipelines for EEG captioning.
- Achieved final grade of **19/20**; thesis recognized among top 10% of cohort
- **Awarded** for the performance in the master's thesis *"Learning to write medical reports from EEG data."* with a job position as Researcher.

Keywords: Attention models, Captioning, Classification, Video, Image, Time-series, Encoder-Decoder, NLP, Numpy, SciPy

Junior Researcher **Clinical Neurophysiology Group (CNPH)** |TechMed Center UT

- Proposed GAN-based signal augmentation for epileptic discharge detection in EEG
- Researched forecasting and time-series modeling with hybrid LSTM-GRU architectures
- Invited to develop a master's thesis at the institution, after obtaining the **Excellent** grade, **19/20** in this Erasmus+ internship, *"GANs and Data Augmentation Prediction Models in the Detection of Interictal Epileptiform Discharges (IEDs)".*

Keywords: *Time-series, Biosignal, GANs, CNN, LSTM / GRU and hybrid models.*

INESC Technology and Science | Porto, PT

Researcher Intern 2020-2021 (6 months)

- Applied DBNs and CV techniques to detect driver drowsiness in real-time systems (AUTOMOTIVE proj).
- *Characterize lesions associated with lung cancer, using an annotated computed tomography dataset.*

Keywords: *Computer Vision, Facial dynamic fusion , DBN, OpenCV, Scikit-learn, CT scans, Image Segmentation*

Publications

- *Detection of Interictal epileptiform discharges with semi-supervised deep learning*
  Biomedical Signal Processing and Control, Volume 88, Part B, 2024
- Learning to write medical reports from EEG data,
  Masters dissertation. Faculty of Engineering of the University of Porto, 2022

Education

ERASMUS+ Internship
Institution: Faculty of Science and Technology, University of Twente
February 2021 - August 2022 ***Final Grade:*** *19 / 20 (A)*

Bachelor & Master in Bioengineering - Biomedical Engineering
Institution: Faculty of Engineering, University of Porto
2017 - 2022 ***Final Grade:*** *18 / 20 (A)*

Awards

3rd Place - World Data League 2023
Member of the team 'CEOS'. We finished the international competition in **3rd** place among **29** teams of best minds in Data Science.

Selected Projects

This section highlights my primary interests in AI, where I have consistently advanced my knowledge and skills through self-study, Courses/ certifications. For more details, please visit my github repositories: **AMfeta99**

- ***Gen AI & LLMs***
  - *TimeMetamorphy: Object Evolution Generator system powered by AI agents (ReAct, HuggingFace, Gradio, Smolagents)*
  - *BankWise.AI: Smart voice-powered assistant delivering human-like support via specialized AI agents (Langgraph, OpenAI-api, Tavily, Whisper)*
  - *LM-vs.-Human-Minds: This game challenges humans to compete against LLM models in a variety of games. (LLM, LangChain, Ollama-api)*
- ***Biomedical AI*** & ***Computer Vision***
  - *ValueExtractionOCR: Automates receipt scanning with OCR to smartly extract/handle and return the total amount (Scikit-Learn, Google Vision)*
  - *Brain Tumor Diagnosis App developed with Gradio. ViT fine-tuned for binary classification of brain scans (Transformer, HuggingFace, Gradio).*
  - *Seizure Prediction in Intracranial EEG Recordings (Python, PyTorch, Scikit-Learn)*
  - *EEG Captioning: NLP-based automatic EEG report generator (Encoder-Decoder, Attention, Python, Tensorflow)*

Tech Skills

- **Most Used:** Python, Pandas, Numpy, Scipy, Scikit- Sklearn, Tensorflow, Keras, Pandas, matplotlib, Langgraph, Git, Langchain, Ollama, Flask, OpenAI-api
- **Frequently/Occasionally used:** Azure, Langfuse, Docker, HuggingFace, Transformer, OpenCV, HTML, CSS, SQL, XGBoost, Matlab, LightGBM, Pytorch, Gradio, Smolagents, R
- **Basic Knowledge:** C, C++, JavaScript, PHP, Arduino, Multisim, AWS, Vertex AI, GCP, streamlit

Soft Skills

- Adaptability, Creativity, Self-Drive
- Problem solver, Proactive, Resilience
- Empathy, Teamwork, Communication

Languages

- Portuguese (native)
- English (advanced)
- Spanish (beginner)
- Dutch (beginner)