ANA SOUSA

AI Research Engineer

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Summary

I'm an ambitious engineer with a passion for building impactful tools/solutions that improve people's lives. Driven by a tireless enthusiasm for challenges and innovation, I'm always seeking ways to grow both professionally and personally. With ~3 years of experience collaborating with talented, open-minded professionals in diverse, international settings, I thrive in environments that value cultural exchange and continuous learning.

Work Experience

AI Researcher & Solution Developer

Bosch | Braga, PT - 2023 - Present (1 year & 3 months)

- Developed advanced AI algorithms for audio processing and MLOps, designing efficient, continuous operation pipelines integrated with 5G and sensor systems.
- Support the SW development for process optimization/monitoring; Leading strategic project that aims to improve and continuously monitor production processes, using AI;
- Design and implement systems using AI/ML frameworks to meet client requirements and ensure high product quality. Responsibilities include tasks in computer vision, NLP, and multimodal applications, such as OCR and QA systems.

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

Researcher

Section of Cognition, Data and Education | BMS faculty UTwente | Enschede, NL - 2021-2023 (2 years & 2 months)

- Translated Clinical Neurophysiological research questions/needs into Data Science and ML/DL fields. This capacity allowed successful collaboration of CoDE and CNPH groups, boosting the development of project and clinical validation.
- Published unsupervised and semi-supervised deep learning pipelines for detection of EEG anomalies, implementing and optimizing robust algorithm achieving sensitivity of **81.9%** and a specificity of **91.7%.**

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

Assistant Researcher *(Master's Thesis)*

Clinical Neurophysiology Group (CNPH) |TechMed Center UTwente | Enschede, NL

- Conducted a comprehensive review of SOTA approaches for captioning in image/signal/video, leading to the development, troubleshooting and comparison of **6** pipelines for EEG captioning.
- Presentation and defense of master's thesis "Learning to write medical reports from EEG data." before a prestigious jury composed of AI and neurologist experts, having obtained the grade of **19/20**, result of **excellence** (among **10%** of higher grades).
- Recognized for outstanding performance in my thesis with a research position offer.

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

Junior Researcher *(Erasmus+ Internship)*

Clinical Neurophysiology Group (CNPH) |TechMed Center UTwente | Enschede, NL

- Research and implementation of various data augmentation approaches, from traditional signal transformations to more advanced generative models like GANs, enhancing the quality and diversity of EEG data.
- Provided important insight into EEG properties and behavior/potential of different approaches, stimulated further research and emergence of new projects.
- Invited to develop a master's thesis at the institution, after achieving an **Excellent** grade, **19/20** in this Erasmus+ internship, titled *"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.*

Researcher Intern

VCMI & C-BER Groups | INESC Technology and Science | Porto, PT - 2020-2021 (6 months)

- Analyzed the impact of facial dynamic fusion information and Deep Belief Networks (DBN) on the performance of drowsiness detection systems in "AUTOMOTIVE" project.
- Collaborated with master's and PhD students to develop a robust drowsiness detection system aimed at identifying driver fatigue, enhancing road safety.
- Characterize lesions associated with lung cancer, using an annotated computed tomography dataset.

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

Education

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

Personal Projects & Independent Learning

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

Machine Learning for Production (MLOPs) :
Training by @Google @TensorFlow @DeepLearning.AI
- P. Experiencie **@Bosch**
- Certification: **MLOPs_Specialization**

Generative AI (Gen AI):
Training by @LAMINI @Google Cloud @DeepLearning.AI @HuggingFace
- P. Experiencie **@Utwente**
- Projs & Certifications: **Master Thesis**; **NLP_LLM**

Natural language Processing & Large Language models:
Training by @LAMINI @Google Cloud @AWS @DeepLearning.AI
- P. Experiencie **@Utwente**
- Projs & Certifications: **NLP_LLM**

2D/3D Computer Vision:
Training by @TensorFlow @DeepLearning.AI @HuggingFace
- P. Experiencie **@InescTech**
- Projs & Certifications: **Advanced_CV**

Tech Skills

- **Most Used:** Python, Pandas, Numpy, Scipy, Scikit- Sklearn, Tensorflow, Keras
- **Frequently/Occasionally used:** HuggingFace, Ollama, Langchain, HTML, CSS, SQL, XGBoost, LightGBM, Matlab, Pytorch
- **Basic Knowledge:** C, C++, JavaScript, PHP, Flask, Gradio, Arduino

Soft Skills

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

Languages

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

Student Groups

IEEE Student Branch - 2021-2022
- Member of IEEE Engineering in Medicine and Biology. Organize workshops, and collaborate in EMBS projects together with other students.

Volunteer

Tankstation Cultureel Vulpunt - 2022-2023
- *Multicultural foundation with sociocultural meeting place that organizes and promotes musical, artistic and cultural activities and prepares food from around the world.*

Green Vibrations - 2022-2023
- *Event organization & Bartender in a truly unique music festival with it's own distinct identity with 3000 attendees and multiple stages in 10 years time.*

Cyclones Sports - 2014-2021
- *Support in the organization of events, organized by Cyclones Sports, such as the "Manuela Machado Half Marathon"*