DUARTE MOURA

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📍 Madrid, Spain

EXPERIENCE

ML Research Fellow
INESC-TEC

📅 Dec 2024 - Present   📍 Porto, PT (Remote)

- Researching explainable AI (XAI) methods for medical imaging as part of the AI4Lungs Project, improving transparency in disease classification.
- Developing a Vision Transformer-based self-explainable AI model for cancer nodule classification, integrating prototype-based interpretability. Co-authoring a research paper on its application in medical imaging.

Associate Solutions Architect
Amazon Web Services

📅 Sept 2022 – Dec 2024   📍 Madrid, ES

- Worked as Solutions Architect for a public sector team, guiding early adopters through cloud technology implementation.
- Executed foundational cloud migrations covering storage, databases, server deployment, and security.
- Led Large Language Model (LLM) integration into client business workflows across multiple organizations.
- Collaborated with research centers to optimize compute efficiency, model hosting, and data preparation pipelines.
- Developed data-driven proofs of concept demonstrating ML capabilities and cloud deployment value.
- Contributed to AWS AI/ML technical field community, driving cloud innovation across sectors and working with enterprise clients.

EDUCATION

M.Sc. in Machine Learning for Health
Universidad Carlos III de Madrid

📅 Sept 2024 – June 2025 (Expected)

- **Key Courses:** Deep Learning, Machine Learning, Computer Vision, Biosignals Bioimages, Neuroimaging, NLP, Statistical Signal Processing.
- **Research Thesis:** Developing a deep learning model to predict Alzheimer's disease progression in patients with mild cognitive impairment using tau-PET imaging biomarkers.

B.Sc. in Electronics Engineering
Instituto Superior Técnico de Lisboa

📅 Sept 2019 – June 2022

- **Key Courses:** Control Systems, PCB Design, Calculus I, II, and III, Linear Algebra, Probability and Statistics, Physics.

PROJECTS

Mechanistic Insights into Refusal in Transformers

- **Investigated** key transformer components driving refusal behavior in LLMs. Identified refusals as primarily encoded in the residual stream and specific MLP layers. Injecting refusal activations into neutral prompts induced refusals, offering insights into model alignment.

Post-Hoc Interpretability of Lung Nodule Classification

- **Compared** different gradient-based XAI (GradCAM, Hi-ResCAM, ScoreCAM) techniques for benign vs. malignant lung nodule classification using ResNet.

AI-Driven Traffic Management for Safer Cities

- Optimized traffic light operations using a deep reinforcement learning model in the SUMO simulator, leveraging real-time IoT sensor data.
- Deployed scalable training and testing infrastructure on AWS ML Services.
- Presented a **workshop** at **AWS Re:Invent 2024**.

SKILLS

Programming: Python, C, SQL, MATLAB
ML & AI Frameworks: PyTorch, scikit-learn, OpenCV
LLM & AI Toolkits: Langchain, Hugging Face Transformers, Transformer Lens
Data Processing: Numpy, Pandas, Jupyter
Cloud & DevOps: AWS, Git, Docker, SLURM, Terraform, CloudFormation

CERTIFICATIONS

AWS: Cloud Practitioner, AI Practitioner, Solutions Architect (Associate & Professional), SysOps Administrator, Machine Learning Engineer (Specialty), Security Specialty

LANGUAGES

Portuguese   Native

English   Fluent

Spanish   Fluent