University of Messina, Italy
Department of Mathematical and Computer Sciences,
Physical Sciences and Earth Sciences

Subject: Internship Proposal

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Project details

Title	Development of Explainable AI Tools for Brain MRI Analysis

Detailed description: Neurodegenerative diseases like Alzheimer's require interpretable AI tools to support clinical diagnosis. MRI scans provide a wealth of structural information, but deep-learning models analyzing these scans are often "black boxes." Clinical adoption relies on creating tools that clearly show which brain regions are driving AI predictions.

Internship Objectives:
Thorough literature review on explainable AI (XAI) methods for medical imaging (e.g., Grad-CAM, SHAP, saliency maps).

Design and implementation of overlays/heatmaps on brain MRI data highlighting regions influencing diagnostic predictions.

Development and integration of quantitative metrics (e.g., instability, uncertainty, overlap) to assess explanation reliability over time.

Preparation and execution of user studies with clinicians to evaluate the interpretability and practicality of visualizations.

Duration (month – max 12)	6
Duration (hours)	150
Open positions	2

Internship Skills

Technical requirements: Python, PyTorch or TensorFlow for AI model prototyping. Data visualization (e.g., matplotlib, Plotly). Good communication and feedback gathering.	
Other skills	