Giulia Zappoli

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Summary

Soon-to-be Master's Engineering Graduate with a strong interest in Human-Computer and Brain-Computer Interfaces. My work focuses on applying AI, machine learning, and signal processing to develop innovative interaction systems between humans and technology. I enjoy tackling interdisciplinary challenges at the intersection of artificial intelligence and medicine/neuroscience and I'm passionate about developing intelligent systems that enhance human experience.

Skills

Programming Python (numpy, scipy, scikit-learn, PyTorch, Hugging Face Transformers, unsloth, pandas, geoopt, ...), Matlab, Microsoft Office Package

AI Machine learning, deep learning, geometric deep learning, Generative AI (LLMs, diffusion models, GANs), computer vision (image segmentation, object detection), Agentic AI (smolagents, LangGraph, RAG)

Languages Italian (mother-tongue), English (C1), Spanish (C1), French (B2 - improving)

Soft Skills Problem solving, proactivity, time management, team work, public speaking, critical thinking

Research Experience

Geometric Deep Learning for Hand Gesture Recognition in Human-Computer Interaction **Mar 2025 – Sep 2025**
Graduate student researcher at Sensory-Motor Systems Lab of ETH Zurich

- Design of geometric deep learning models for hand gesture recognition from biopotentials recorded from the user's body, using manifold-aware architectures.
- Development and implementation of unsupervised domain adaptation methods for cross-subject and cross-session robustness evaluation.
- Design of a novel test-time adaptation technique on non-Euclidean space.
- Ongoing paper development for submission to future AI conferences/journals.

Heart Activity Monitoring Through Head Biopotentials with Deep Learning **Sep 2024 – Jan 2025**
Graduate student researcher at Integrated Systems Lab of ETH Zurich

- Reconstruction of ECG for heart activity monitoring using only biopotentials recorded from the head area, leveraging a deep AutoEncoder architecture.
- Design and implementation of a channel selection algorithm for real-time prediction of the most insightful signal for heart activity reconstruction, using ad hoc signal processing, feature extraction and machine learning (ML) methods.
- Data collection of head biopotentials with smart glasses from different subjects.

SASHA: Single Attribute Steering for Human Alignment in LLMs **Nov 2024 – Jan 2025**
Research project in Deep Learning at ETH Zurich

- Human Alignment of LLMs (LLaMa3.2 - 3B) for efficient instruction-following of multi-attributes-coupled prompts.
- Attribute-driven fine-tuning framework with precise exposure of the LLM to one alignment attribute at a time through independent updates (independent optimizers and losses).
- Dynamic training phase via probability-driven sampling of harder attributes to help the model focus the effort on difficult tasks.

Education

Eidgenössische Technische Hochschule Zürich (ETH Zurich), Switzerland **Sep 2023 – Sep 2025 (expected)**
Master of Science in Biomedical Engineering
Majors: Bioelectronics, Artificial Intelligence

Politecnico di Milano, Italy **Sep 2020 – Jul 2023**
Bachelor of Science in Biomedical Engineering

Relevant Coursework
Introduction to Machine Learning, Deep Learning, Image Analysis and Computer Vision, Introduction to Neuroinformatics, Mobile Health and Activity Monitoring, Signal Processing and Filtering, Calculus and Linear Algebra.