Matteo Ceradini

AI engineer | Computer Scientist

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About me

I am an Italian **computer scientist** currently completing a PhD in Biorobotics at the Sant'Anna School of Advanced Studies. My research focuses on **Brain-Computer Interface (BCI)** and **neuroengineering**, where I apply advanced **deep learning** and **machine learning** techniques—including transformer-based architectures—for neural signal processing and decoding.
I am an aspiring **AI engineer** seeking to apply strong theoretical and practical expertise in deep learning and neural data analysis gained through **academic**, **research**, and **industry experience**.

Tech stack

Python - *Advanced*
Pytorch - *Advanced*
Matlab - *Advanced*
GitHub - *Advanced*
PhP - *Advanced*
C# - *Intermediate*
MySQL - *Intermediate*
Unity 3D - *Intermediate*
Tensorflow - *Basic*
Docker - *Basic*
MongoDB - *Basic*
NodeJS - *Basic*
ReactJS - *Basic*

Major skills

AI Engineering
deep learning & transformers

AI driven neural engineering
deep learning & machine learning

Electrophysiological data analysis
like EEG and EMG

Education

PhD in Biorobotics - *Sant'Anna School of Advanced Studies* Sep 2021 - estimate Dec 2025
Main research topics:
- non-invasive Brain and Body Machine Interfaces (BMI) using EEG and EMG for neuroprosthetics applications
- development of immersive virtual reality environments to train and evaluate different control strategies for BMI applications targeting individuals with spinal cord injury

Master of Computer Science (spec. Artificial Intelligence) **-** *University of Torino* Oct 2018 - Apr 2021
Grade: 110/110 with honors and distinction
Thesis: Porting of DeepLabCut, a neural network for animal pose estimation, to an embedded system for real-time acquisition

Bachelor of Computer Science - *University of Padova* Oct 2015 - Sep 2018
Grade: 103/110
Thesis: Spam email classification using neural networks

Experiences

PhD in Biorobotics - *Sant'Anna School of Advanced Studies*
Oct 2021 - Oct 2025

Worked on the development of **Brain and Body Machine Interfaces for neuroprosthetic applications** in individuals with spinal cord injury, **combining neural signal decoding with online feedback systems**. Main activities included:
- Online decoding of upper-limb movement intentions from EEG signals.
- Online decoding of grasp patterns and individual finger movements from EMG signals recorded in SCI patients.
- Designed an immersive VR protocol to test and compare BMI strategies in clinical settings.

Visiting PhD Biomedical engineering - *University of Michigan*
Jul 2024 - Feb 2025

Visiting research period in the Chestek Lab, focused on the development of Brain and Body Machine Interfaces using **implantable signals from non-human primates**.
Main activities included online **decoding of individual fingers movements** from implanted EMG signal and **evaluation and explainability of Transformer networks** for EMG-based decoding.

Skills learned

- Neural signal analysis
- Design and training of deep learning models
- Neural signal analysis and decoding
- Development of serious games using immersive virtual reality
- Scientific communication (verbal and written)
- Project planning and time management

- Deep understanding of Transformers networks and other deep learning models
- Hands on experience working with non-human primates
- Exposure to collaborative research in an international, high impact US laboratory

Experiences

AI engineer - *Cynexo & SISSA*
May 2021 - Sep 2021

In collaboration with the Time Percepetion Lab at SISSA research center, I contributed to two main projects. The first involved **implementing DeepLabCut for real-time tracking** and behavioral tracking of mice in neuroscientific experiments. The second focused on **developing a proof-of-concept closed-loop system integrating deep learning models** for real-time EEG signal decoding and Transcranial Magnetic Stimulation (TMS) control.

AI engineer intern - *Cynexo & SISSA*
Sep 2020 - Mar 2021

In this period I conducted my master's thesis in collaboration with the startup Cynexo and the Visual Neuroscience Lab at SISSA, focusing on **porting of the DeepLabCut neural network for animal pose estimation to an embedded platform**. I explored and implemented various deployment strategies to optimize performance and developed a real-time application for pose extraction from live video.
[Thesis available here:bit.ly/39LngwC]

AI engineer intern - *Zextras*
Jul 2018 - Ago 2018

Two-month internship at Zextras during my bachelor's thesis. I conducted research to test the effectiveness of a **spam filter using deep learning**, successfully implementing a functioning prototype with high accurate rate in spam detection.

Web developer - *Tecnobit*
Jun 2016 - Sep 2020

From 2016 to 2020, while completing my bachelor's and master's degrees, I worked part-time as a **full-stack web developer**. My responsibilities included both front-end and back-end tasks, using PhP frameworks such as Codeigniter and Laravel. During this time, I maintained and developed websites such as sketchupitalia.it, corsigeometri.it, topgeometri.it, and others.

Skills learned

- Neural signal analysis and decoding with deep learning
- Integration of AI models into neuroscience pipelines
- Containerized deployment of applications using Docker

- Animal pose estimation using deep learning models
- Deployment of deep learning models on an embedded system
- Techinical communication and collaboration with industry and academic partners

- Deep learning models design
- Natural Language Processing for deep learning applications

- Front-end web design and implementation
- Back-end development and relational database integration
- Independent project management and development
- Clients communication and requirements gathering

Other experiences

Summer internships
Jun-Sep 2013 and Jun-Sep 2014

Summer internships at Margraf Project and Industrie Metalpress (2013–2014). At Margraf, I worked as a marble operator on polishing and finishing tasks. At Metalpress, I worked on the company intranet and developed a C#/.NET application for network activity monitoring via SNMP.

Languages

Italian - *Native*

English - *Fluent (C1 level)*

Publications

The Effect of User Learning for Online EEG Decoding of Upper-Limb Movement Intention
Ceradini et. al. 2025
IEEE Transactions on Medical Robotics and Bionics

A Virtual Reality-Based Protocol to Determine the Preferred Control Strategy for Hand Neuroprostheses in People With Paralysis
Losanno*, Ceradini* et. al. 2024 (* equally contributing)
IEEE Transactions on Neural Systems and Rehabilitation Engineering

Immersive VR for upper-extremity rehabilitation in patients with neurological disorders: a scoping review
Ceradini et. al. 2024
Journal of NeuroEngineering and Rehabilitation

Awards & Fellowships

Best paper presented by a young researcher
IEEE MetroXRAINE 2023 Conference

Zegna Scholarship Fellowship
Recipient of the Zegna Scholarship, funding an 8-month research stay at the University of Michigan on Brain and Body Machine Interfaces using implantable signals for neuroprosthetic applications.

Last update: July 2025