

# Alessandro Beatini

## EDUCATION



Scuola Superiore Sant'Anna & University of Pisa

Pisa, Italy

MSc bionics engineering

09/2021-10/2024

MSc Thesis – Visual Prediction of Soft Robot Deformations using Deep **Generative Models**

Developed a conditional recurrent variational autoencoder (c-VAE) to visually predict soft robot deformation from actions. Conducted thorough evaluation and ablation studies exploring the model robustness and predictive accuracy



TUM

Munich, Germany

Erasmus Exchange Program

10/2020-07/2021



University of Pisa

Pisa, Italy

BSc electronic engineering

09/2018-09/2021

## WORK EXPERIENCE

Machine Learning Research Engineer

Leonardo S.p.A.

10/2024 – ongoing

- Design and develop a Retrieval-Augmented Generation (**RAG**) system for internal procurement procedures; responsible for **architecture definition**, code implementation, **stakeholder engagement**, **evaluation design**, and **synthetic data creation**.
- Build and maintain **data engineering pipelines** for a European defense database; automate **label** quality assessment, data validation, error detection, and correction to ensure dataset reliability
- Currently exploring **pretraining** and **fine-tuning** of large-scale language models (**LLMs**) on multi-node GPU clusters using **DeepSpeed** and **Ray**, with a focus on distributed training strategies, memory optimization, and scalable data pipelines.

Software Engineer

MBDA

07/2024 – 10/2024

- Classified work. It involved C++, mission-critical real-time systems

## CONFERENCE WORKS

ICRA 2022 (International Conference on Robotics and Automation, IEEE)

Philadelphia, USA

Lightning talk abstract presentation at workshop “challenges in applying academic research to real world robotics”

23/05/2022



## AWARDS AND RECOGNITION

ISSNAF US Research scholarship

01/12/2023-26/2/2024

Physics informed neural networks to model and control robots.

The recipients of the ISSNAF's ([Italian Scientists & Scholars of North America Foundation](#)) scholarship join research groups in **prestigious North America institutions**.




LeadTheFuture mentee

09/2022- Ongoing





Among the few Italian students selected to be mentees for LeadTheFuture, a leading mentorship non-profit organization for students in STEM, LeadTheFuture empowers **top-performing students** to achieve their goals and



contribute to their communities by giving them one-on-one guidance from **high-impact mentors** coming from the world's leading STEM innovation hubs such as Silicon Valley and CERN.

-  • **TUM.AI “AI 4 social good” hackathon** **Munich, Germany**  
**1<sup>st</sup> START Munich - Satellites Startups & Sustainability track** 22-24/04/2022  
Developed an AI-driven solution leveraging **computer vision** and satellite imagery (**OpenCV, PyTorch**) to optimize crop yields and sustainability in agriculture. Built and trained deep-learning models to predict soil nitrogen quantity and suggest fertilizers allocation.
-  • **TUM.AI gpt-3 hackathon** **Munich, Germany**  
**1<sup>st</sup> Siemens track** 16-18/04/2021  
Designed and built a smart email orchestration platform for **automated customer service ticketing and routing** using **GPT-3 API**, achieving rapid, context-aware classification of customer emails with a validation accuracy of **76%**, as evaluated by Siemens
-  • **MRI Tech Challenge** **Munich, Germany**  
**Ranked 2<sup>nd</sup>** 10/2020-01/2022  
Engineered an integrated indoor navigation and appointment scheduling system using NFC and data analytics dashboards (**Python, C++**). The system featured fully network-free operation, intuitive booking management, and interactive analytics visualization.

## PROJECTS

-  **Scuola Superiore Sant'Anna** **Pisa, Italy**  
05/2023-06/2023  
Implemented a **computer vision** pipeline using **Optical Flow (OpenCV)** techniques to accurately track microrobot positioning within simulated human tissue. The project aimed to enhance precision and control for future minimally invasive microsurgical procedures
-  **CNR** **Pisa, Italy**  
Developed algorithms leveraging **Reservoir Computing**, signal processing, and classical **machine learning (PyTorch, MATLAB)** for closed-loop detection and prediction of sleep slow-wave patterns in EEG signals.
-  **Scuola Superiore Sant'Anna** **Pisa, Italy**  
Research project 07/2022-09/2022  
Designed and implemented a multispectral satellite image analysis pipeline using **deep learning** and **computer vision techniques (OpenCV, scikit-learn)** to estimate soil nutrients for sustainable agriculture.
-  **Start for future pre-incubation program (EU program)** 07/2022-09/2022  
Developed a multispectral image processing system integrating AI-driven predictive analytics (**scikit-learn, OpenCV**) to provide actionable insights for precision agriculture, targeting soil health optimization.
- Student representative, electronic engineering's degree council** **Pisa, Italy**  
2020-2022

## SKILLS

### Languages

- Italian (Native). English (IELTS 8.0). French (DELTA B2)

### Programming languages and OS.

- Python. Matlab. C++. Assembly. Windows. Linux

### Frameworks and libraries

- Pytorch. DeepSpeed. Ray. Docker. Git. Weights and Biases. Rclpy. Gym. Yarp. OpenCv. Langchain. Transformers. Scikit-learn. ROS. Pandas. Numpy. Matplotlib. ONNX. FastAPI. Vllm.

Firma

Alessandro BEATINI

(firma autografa omessa ai sensi dell'art. 3 del D.lgs. n. 39/1993)