UNNAT ANTANI

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Education

École Polytechnique Fédérale de Lausanne — **Geneva, Switzerland**
PhD, Robotics Engineering, LNCO - Blanke Lab — **October 2025 - Present**
Leadership Experience: Supervising Master's and Bachelor's students, reviewing papers

Johns Hopkins University — **Baltimore, MD, USA**
Masters of Science, Robotics Engineering — **Aug 2021 - May 2023**
Related Coursework: Computer-Integrated Surgery, Nonlinear Control, Medical Robotics System Design
Graduate Thesis with MathWorks: "Deep Learning based motion planning of manipulators"

Skills

Languages: Python, C++, Javascript, Typescript, MATLAB, C, Lua

Software/Tools: Torch, LangGraph, LangChain, ROS, Jira, Git, Perforce, PostgreSQL, Docker, Vite, AWS, Gradio, Huggingface

Hardware: Arduino, Raspberry-pi, NVIDIA Jetson, M5Stack, ESP Boards, C210X Devices, LIDAR, IMU, Intel RealSense

Experience

Software Engineer — **June 2023 - October 2025**
MathWorks — **Natick, MA**

- Built a scalable heuristic graph search algorithm using priority queue and dynamic programming in C++ for motion planners, and validated with SotA benchmarks, delivering a **10x** performance boost for Hybrid A* planner.
- Architected and led development of **Medical Imaging** team's first datastore, optimizing data processing for **3D, 2D, and 2.5D workflows**, enhancing **data accessibility** for diverse medical formats and reducing pre-processing time by **70%**.
- Led the development of a framework for implementing a **single hypothesis tracker for sensor fusion in autonomous applications**, upgrading existing tracking tools to **integrate video-based tracking capabilities**.
- Optimized Simulink's simulation engine core, achieving a 10x performance improvement for large-scale model simulations.

Robotics Co-op — **Jan 2023 - May 2023**
MathWorks — **Natick, MA**

- Leveraged concept of **entropy** to **quantify quality** of synthetic training environments for robot navigation, ensuring high-quality training set and significantly improving performance in unseen complex scenarios.
- Designed, tested, and benchmarked models for redundant manipulators, achieving an average planning time reduction of **65%**.
- Final shipped feature: https://www.mathworks.com/help/robotics/ref/dlchomp.html

Deep Learning Robotics EDG Intern — **May 2022 - Aug 2022**
MathWorks — **Natick, MA**

- Designed an end-to-end pipeline involving data generation, training, and execution to enhance robot manipulator trajectory optimization using initial trajectories predicted by NN with basis point set encoding.
- Conducted tests using CHOMP optimizer and observed a 50% average reduction in planning time, confirming the model's effectiveness as a superior starting point for optimization-based path planners.

Research and Development Software Engineer — **Jul 2020 - May 2021**
Fero.Ai — **Ahmedabad, India**

- Enhanced and deployed **vehicle routing algorithm** for Order Planning using **Google OR Tools**, augmenting real-world constraints and vehicle restrictions achieving 90% increase in order planning process.
- Developed a custom **OpenStreetMap** service to calculate distances and routes, eliminating reliance on the Google Maps API and saving approximately **$15,000** annually, with performance and accuracy comparable to Google Maps and superior to Bing Maps.

Relevant Projects

Data driven Neuropsychologist Chatbot, EPFL — **2026**

- Developed and tested a chatbot capable of doing semi-structured interview with patients.
- Grounded the chatbot with a RAG, exploiting the historical data to drive the questioning strategy.
- Engineered a multi-agent system to track the questioning topics and ensure exploration of valid phenomenological topic.

Skills: Langchain, Transformers, Generative AI, Fullstack, Multi-modal Agentic Workflow, RAG

Patient Hallucination Classification using AI, EPFL — **2026**

- Developed classification of Patient interview whether they have hallucination or not using text embeddings.
- Achieved 82% accuracy using LLM and achieved 73% accuracy ML classifiers trained on text embeddings.
- Performed sub-classification of Hallucination type, for data capturing purposes, reducing data logging time by 70%.

Skills: LLM, Langchain, Machine Learning, Embedding Models, UMAP