

Edoardo Ghini

Senior SLAM Engineer

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CAREER MOTIVATION

I find profound fulfillment in working as a SLAM software engineer, as it provides the types of challenges I enjoy solving most. I strongly value collaboration and believe that working effectively within a team is paramount. Driven by curiosity, I am eager to deeply understand how systems work. I have a strong passion for programming and prefer using statically typed languages. I bring seven years of professional experience with **C++** and have been learning **Rust** for the past year.

EDUCATION HISTORY

2013 – 2016 Computer Engineering

FINAL GRADE 95 /110
Bachelor of Science
Roma Tre University

This course covered all the fundamentals of computer engineering, introducing me to programming. My thesis was based on the experience gained in a four months internship as a PHP back-end developer. **Thesis:** *Unit testing avoiding regression in CI*

2016 – 2019 Master's in Artificial Intelligence and Robotics

FINAL GRADE 103 /110
MScEng
La Sapienza, University of Rome

Completed a Master's degree in Robotics with a strong focus on SLAM and autonomous systems. Built expertise in kinematics, dynamics, navigation, filtering, and AI (planning and reasoning). Worked on multiple hands-on robotics projects, applying theoretical concepts to real-world challenges. For my thesis, developed a 3D LiDAR SLAM pipeline in C++ and ROS, using a probabilistic least-squares approach to extract high-level geometric features.

Thesis: *Position tracking using high order primitives*

SUBJECTS

CALCULUS
PHYSICS
OPERATIVE SYSTEMS
DATABASES
NETWORK PROTOCOLS
ALGORITHMS
SOFTWARE ARCHITECTURE

SUBJECTS

PROBABILISTIC ROBOTICS
COMPUTER VISION
CONTROL THEORY
MULTIAGENT SYSTEMS
PATH PLANNING
FIRST-ORDER LOGIC
COMPUTER GRAPHICS
NEURAL NETWORKS
DRONES CONTROL
MACHINE LEARNING
ROBUST CONTROL
HUMANOID'S GAIT

WORK HISTORY

MAR 2016 – JUL 2016 (FULL TIME)

Internship with Translated *Back-end developer*

Maintained and improved the codebase of a web application written in **PHP** (**Matecat**). Developed unit tests to ensure correctness of core application logic. Worked with **MySQL**, **Redis**, and **Apache** for database management, caching, and client-server communication. Gained experience with advanced testing techniques, including **mocking dependencies**, **reflection**, and **test-driven development (TDD)**.

OCT 2020 – APR 2022 (FULL TIME)

INRIA, National Institute for Research in Digital Science and Technology *Robotics Software Engineer*

Developed a system from scratch to teleoperate an industrial robot in hazardous environments. Implemented each pipeline module in **C++**, containerized with **Docker**, and integrated using **ROS**. Simulated system dynamics in a **digital twin** using **DART** and **Gazebo**. Applied advanced control techniques with **Pinocchio** and **TSID** libraries to control the robot in both **Cartesian** and **joint space**. Designed a **GUI** for teleoperation using **ImGui**, implementing quaternion-based visualization and a **state machine** for automation. Gained hands-on experience with **control laws** on humanoid robots through **dynamic programming**. Built **URDF** models and worked with modern C++ frameworks. Acquired practical experience with lab robots: *Franka manipulator* and *Talos* humanoid. Contributed to a research **paper** published at **IEEE ARSO 2023 (Berlin)**.

JUN 2022 – PRESENT (FULL TIME)

Kudan *Senior SLAM Engineer*

Contribute to the development and maintenance of a **C++ 3D LiDAR-based SLAM library**, focusing on the algorithmic core. Investigate and resolve complex bugs, validate new algorithmic approaches, and provide technical support to **FAE teams** testing the product on-site. Develop internal **GUI** and **CLI** tools to improve developer workflows. Integrate data from multiple sensors (**GNSS**, **INS**, **wheel odometry**, **IMU**) to enhance SLAM robustness. Apply advanced methods in state estimation, sensor fusion, graph optimization, Lie algebra ($SE(3)$ manifolds), and covariance handling. Strengthen expertise in multi-threading, software architecture, and design patterns. Lead design and implementation of major epics; promote modern practices such as modern **C++** standards and **Docker** containerization. Conduct thorough **code reviews**, producing feedback appreciated by the team. Write clear, user-friendly technical documentation. Perform structured **handovers** to ensure smooth knowledge transfer when colleagues leave or change teams. Support **onboarding** of new hires by preparing documentation and providing algorithmic guidance to accelerate their ramp-up. Collaborate within a **SAFe framework**, improving communication, epic planning, risk assessment, and time estimation. Support colleagues, foster strong team relationships, and contribute to a collaborative environment. Currently expanding skills with **ROS2**.

PERSONAL PROJECTS

Spiking network CNN for classification

Implemented a custom tensorflow layer to obtain a NN of spiking neurons to be used in image classification.

Chess endgames RL engine

Developed a reinforcement learning Chess agent, in python, that is able to play autonomously on a simpler chessboard (3x8 squares board with a King and 3 Pawns on each side).

3D game in WebGL using shaders and lighting techniques

Created an imitation of the game *Slenderman* using computer graphics primitives in Javascript.

Multi agent algorithm for camera field of view coverage

Implemented an article in C++ to solve the problem of multiple cameras at the corners of a room trying to minimise blind spots. Created a visualisation of it using OpenGL.

Hex game simulator

Developed a simulation of the board game Hex in Rust. Used GitHub actions to build the CI/CD pipeline.

Conway's Game of Life

Built a simulation and visualisation of the Game of Life in Rust.

REFERENCES

Dr. Serena Ivaldi

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Dr. Giorgio Grisetti

Professor

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