

# Federico Mazzoni

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AI Engineer with research and production experience, delivering LLM-powered applications and ML tools that enhance business workflows. Proven ability to prototype and deploy AI solutions in production environments.

## EXPERIENCE

### AI Engineer

May 2024 – Present

*Domotz*

*Pisa, Italy*

- Helped establish the company's AI team and defined initial roadmap and priorities.
- Built a FastAPI RAG-based chatbot used by around 100 customers daily. Integrated Qdrant for vector search, PostgreSQL for memory, and LangChain with OpenAI's models for orchestration. Deployed on AWS.
- Designed a web-based IDE to test chatbot prompts, models, and knowledge bases. Used internally by support and marketing teams to query internal sources, streamline testing, and improve feedback loops.
- Created automation tools to streamline data retrieval by integrating third-party APIs, visualization tools, and AI-driven queries, enhancing communication and decision-making efficiency within the sales and security teams.
- Developed a zero-shot LLM classifier for customer inquiries, identifying common issues in the product.
- Combined LOF outlier detection algorithm and LLMs to detect anomalies in time series data for risk assessment.
- Coordinated with multiple stakeholders, and leveraged platforms such as AWS (deployment), BitBucket (codebase, code review), JIRA (Agile development), Zendesk (chatbot integration).

### PhD Research Fellow in Artificial Intelligence

Nov. 2022 – May 2024

*University of Pisa / National Research Council of Italy*

*Pisa, Italy*

- Designed a hybrid decision-making system to learn human behaviour patterns and assist in decision-making.
- Quantified conversational trust between speakers, following embedding similarity and information density.
- Researched algorithmic fairness and developed novel methods to enhance it, both in networks and tabular data.
- Published 7 peer-reviewed articles (Google Scholar), and gained expertise in analyzing complex data, independently managing multiple projects, and designing novel approaches based on state-of-the-art literature.
- Transitioned to industry halfway through the PhD program to focus on business-impacting AI applications.

### Freelance Data Analyst

2022

*Self-Employed*

*Pisa, Italy*

- Developed a recommendation system using both content-based and collaborative filtering techniques.
- Compiled a new dataset by scraping Wikipedia and independent websites with Selenium and BeautifulSoup.
- Researched *R* bioinformatics algorithms to analyze Rett syndrome.

## PERSONAL PROJECTS

**StockAgent:** An AutoGen multi-agent system for stock market insights, with a custom MCP yfinance server.

**HINTT:** Sending screenshots of texts to OpenAI/Ollama for real-time text translations. Employed tkinter and mss.

**Simple Palette Maker:** An app to colorize black-and-white GameBoy palettes. Deployed on Streamlit. 1k+ users.

## SKILLS

**Languages:** Italian (Native), English (C1), German (A2)

**Programming Languages:** Python, JavaScript, SQL, R, HTML/CSS

**Machine Learning:** Supervised Learning, Unsupervised Learning, Continual Learning, Large Language Models

**Data Science:** Data Mining, Social Network Analysis, Textual Analysis, Predictive Analytics

**Tools & Platforms:** Git, Docker, JIRA, BitBucket, AWS, PostgreSQL, Zendesk, Salesforce, n8n

**Libraries:** FastAPI, LangChain, LangGraph, AutoGen, Scikit-Learn, PyTorch, HuggingFace, RiverML, Streamlit

## EDUCATION

### University of Southern Denmark

2023

*Summer School on Deep Learning*

*Odense, Denmark*

### University of Pisa

2020 – 2022

*Master's Degree in Digital Humanities (Data Science and NLP) — 110/110 with honors*

*Pisa, Italy*

- Relevant Exams: Data Mining, Social Network Analysis, Text Analytics, Distributed Data Analysis and Mining, Semantic Web, Laboratory of Data Science, Applied Linguistics, Computational Linguistics.
- Master's Thesis: *GenFair*. A synthetic data generation framework to reduce algorithmic bias.

### University of Pisa

2014 – 2017

*Bachelor's Degree in Philosophy — 110/110 with honors*

*Pisa, Italy*