Francesco Vigni, Ph.D.

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Engineer with over 6 years of international experience in autonomous systems, applied machine learning, and human-robot interaction (HRI). Contributed to both industry and research settings across Europe, developing real-time robotic behaviours, intelligent interfaces, and user-centered autonomous systems. Combines hands-on engineering with scientific rigour, holding a Ph.D. in ICT for Health.

Skills

Programming & Scripting: Python, C/C++, MATLAB, R, JavaScript, MySQL, Bash, LaTeX

Frameworks & Tools: ROS, Docker, Portainer, Git, CI/CD, Simulink, Google Colab, Scikit-learn, TensorFlow, PyTorch, OpenCV, Pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly

Machine Learning & Data Science: Supervised & Unsupervised Learning, Bayesian Inference, Statistical Modeling, Feature Engineering, Time Series Analysis, Optimization, Data Preprocessing & Cleaning

Human–Robot Interaction (HRI): Experimental Design, Social Robotics, Non-verbal Communication, Interaction Modeling, Interaction Metrics, User Studies, Quantitative & Statistical Analysis

Languages: Italian (Native), Spanish (Native), English (Professional), German (Conversational)

Work Experience

Research Fellow — Naples, Italy
University of Naples Federico II - EU H2020 MSCA project PERSEO — *Dec 2021 – Feb 2025*
- Designed and implemented spontaneous interaction frameworks for HRI
- Published 7+ peer-reviewed articles on HRI and autonomous systems in top-tier conferences
- Supervised 5+ bachelor/master students in robotics and HRI projects

Robotic Engineer — Munich, Germany
Roboception GmbH — *May 2021 – Nov 2021*
- Developed core components for in-house robot vision products (ROS, C++, Python)
- Optimized grasping strategies for backend systems, improving success rates by 9%

Autonomous System Developer — Munich, Germany
Sttech GmbH — *Apr 2020 – May 2021*
- Deployed non-holonomic mobile robots in real-world settings (ROS, C++, Python, Coppeliasim)
- Built a proof-of-concept for autonomous vehicles in unstructured environments (CARLA simulator)
- Prototyped an embedded vision system for real-time object detection (Jetson Nano, YOLO)

Technical Consultant — Mid-North Italy
Contractor — *Jan 2018 – Apr 2018*
- Trained 200+ Daimler dealership staff on cloud-based vehicle ICT solutions

Research Experience & Education

PhD Student — Naples, Italy
PhD in Information and Communication Technology for Health (ICTH) — *Dec 2021 – Feb 2025*
University of Naples Federico II; Additional label: Doctor Europeaus

Visiting Researcher — Vienna, Austria
Vienna University of Technology (TUW) — *Oct 2023 – Feb 2024*
- Implemented autonomous and safe bartending manipulation on a dual-arm TIAGo++ robot (ROS, Python)

Visiting Researcher — Eindhoven, The Netherlands
Noosware BV — *Jun 2023 – Aug 2023*
- Analyzed emotional responses to robot motion trajectories in controlled social environments (ROS, C++)

Research and Teaching Assistant — Munich, Germany
Technical University of Munich (TUM) — *Apr 2019 – Apr 2020*

- Developed bio-inspired robotic hand designs for human-like motion and control
- Created lecture materials for "Fundamentals of Human-Centered Robotics" (bachelor's course)

Intern — Zurich, Switzerland
Disney Research Zurich — *Sep 2018*
- Designed force controllers for human-robot handshakes, optimizing force exchange dynamics

Graduate Student — Siena, Italy
M.Sc. in Computer and Automation Engineering ***(Cum Laude)*** — *Oct 2015 – Oct 2018*
University of Siena

Undergraduate Student — Siena, Italy
B.Sc. in Management Engineering — *Sep 2011 – Oct 2015*
University of Siena

Awards & Achievements

Best Paper Award Finalist, IEEE ICRA 2019: with the manuscript: The role of closed-loop hand control in handshaking interaction

Merit Grant: Awarded for best Master Thesis by BCC Ravennate, Forlivese e Imolese Soc. coop.

Merit Grant: EU-funded research in HRI (Grant No. 645599), University of Siena.

Projects

PErsonalized Robotics as SErvice Oriented applications - PERSEO | *link*
- Member of the supervisory board as the students' representative

Centers of Excellence Network for Trustworthy Robotics and Intelligent Systems - CENTRIS | *link*
Center for Tactile Internet with Human-in-the-Loop - CETI | *link*
SOft MAnipulation - SOMA | *link*

Academic Activities

Reviewer for: IEEE RA-L, IROS, ICRA, IJSR, HAI, ISRR, ROMAN

Co-organised: WARN@RoMAN2023, WARN@RoMAN2024, BEAR@RoMAN2025

Coursework: Fundamentals of Human-Robot Interaction @ TUM 2019/2020
ROS Introduction Tutorials @ UNINA 2023/2024

Organizations

Registered Information Engineer — *Feb 2025 – Present*
National Council of Italian Engineers (Forlì-Cesena Chapter), Section A

Member of IEEE — *Dec 2019 – Present*
Institute of Electrical and Electronics Engineers

Executive Director in real estate SME — *Dec 2018 – Dec 2023*
Edilrevi srl - trading and leasing real estate

Radio speaker and web developer — *Set 2013 – May 2018*
uRadio - Webradio of University of Siena

Selected Publications

Vigni, F., et al. "The role of closed-loop hand control in handshaking interactions." *IEEE Robotics and Automation Letters* 4(2), 2019, pp. 878-885. *[DOI]*

Vigni, F., et al. "Sweet Robot O'Mine - How a Cheerful Robot Boosts Users' Performance in a Game Scenario." *2023 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2023. *[DOI]*

Vigni, F., et al. "Too Close to You? A Study on Emotion-Adapted Proxemics Behaviours." *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (ROMAN)*, 2024. *[DOI]*

Vigni, F., et al. "A Rosbag Tool to Improve Dataset Reliability." *HRI'24: Companion of the 2024 ACM/IEEE International Conference on Human-Robot Interaction*, 2024. *[DOI]*

Vigni, F., et al. "Exploring Non-verbal Strategies for Initiating an HRI." *International Conference on Social Robotics*, Springer Nature, 2022. *[DOI]*