Vincenzo Yuto **Civale**

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Education

University of Florence — *Florence, Italy*

Master's Degree in Biomedical Engineering — *Sept. 2023 - Oct. 2025 EXPECTED*

- Awards: Scholarship by DSU (Regional Student Assistance Office)
- Coursework: Computational Genomics, Single Cell Omics, Application of Deep Learning, Geometric Deep Learning, Explainable AI, Computer Vision

University of Florence — *Florence, Italy*

Bachelor's Degree in Biomedical Engineering — *Sept. 2020 - July 2023*

- Awards: Scholarship by DSU Tuscany
- Coursework: Bio-Imaging, Biomedical Instrumentation, Biomechanics, Software Engineering, Fundamentals of AI, Statistics

Experience

Research Fellow — *Florence, Italy*

Bio-Imaging Lab, University of Florence — *Sept. 2024 - Aug. 2024*

- Developed deep learning pipeline for medical image segmentation, with performance validated by radiologists.
- Conducted research on neurological behavioral differences between digital natives and immigrants as part of a PRIN (Project of National Interest), revealing cognitive impacts of digital technology across generations.
- Collaborated on the development of a medical image volume visualization system for Hololens2
- Supervised 7 thesis students, guiding them in writing code that adhered to maintainability guidelines and best practices in software engineering

Publications

2024 — *"Realistic Texture Mapping of 3D Medical Models Using RGBD Camera for Mixed Reality Applications"*; C. Aliani, A. Morelli, E. Rossi, S. Lombardi, V.Y. Civale, V. Sardini, F. Verdino, L. Bocchi; **Applied Sciences** — *Journal*

Skills

Programming: Python, ROS, SQL, C, C#
ML Stack: PyTorch, HuggingFace, NumPy, Scikit-learn, OpenCV
OS and Tools: Linux, LaTex, Unity, Tableau
Languages: Italian , Japanese, English

Side Projects

Spatial Transcriptomics Cell Classifier — *Machine Learning*

- Developed a multimodal single-cell classification pipeline combining spatial transcriptomic profiles and cell morphology features to distinguish 49 distinct cell types.
- Engineered data preprocessing to integrate gene-expression vectors with spatial coordinates and imaging descriptors.
- Performed hyperparameter optimization and cross-validation to ensure robust generalization across tissue sections.

ROSA (Robotic Operating System Agent) — *Machine Learning*

- Extended the Chetshire AI framework to enable a single AI agent to autonomously connect to and control multiple ROS instances via roslibpy.
- Implemented dynamic system configuration parsing using Retrieval-Augmented Generation (RAG) with Qdrant to automatically discover ROS topics and message formats.
- Integrated support for both external LLM APIs and local models (e.g., OLLAMA) to provide flexible natural language control.

UnityIGTConnector — *Mixed Reality*

- Integrated OpenIGTLink protocol in Unity for real-time medical data exchange in mixed reality.
- Supports TRANSFORM, IMAGE, and POLYDATA message types for surgical planning.
- Visualizes 3D medical data via UnityVolumeRendering, compatible with HoloLens 2.