

MICHELE GIARLETTA

Computer Vision Engineer

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WORK EXPERIENCE

Computer Vision and Machine Learning Engineer

Deep Vision Consulting, Modena

🔗 Computer Vision Deep Learning Experimental Analysis Segmentation Signal Extraction

📅 Feb 2025 – Ongoing

- **Sealing Quality Analysis (Global Packaging Leader):** Developed a **production-ready, certifiable metrology system** for industrial seal analysis from the ground up, integrated within a multi-team platform alongside HMI, backend and DevOps teams.
 - Designed a complex **classical computer vision and image processing** pipeline, applying **geometric constraints and morphological analysis** to achieve **sub-pixel precision** on critical seal measurements, and co-designed the **illumination and hardware setup** to eliminate spurious reflections and vibration artefacts.
 - Built a structured **regression test suite (pytest)** backed by thousands of labelled samples, organised in standardised failure subsets to ensure robustness across releases.
 - Introduced **custom PyTorch models** to handle features that proved unstable with classical methods alone, pushing system performance beyond original target specifications.
- **Agronomic Scene Understanding (Global AgTech Leader):** Designed a **perception pipeline** to automate seedbed quality assessment, taking full ownership from **data collection** through **model selection, training experiments** and signal extraction.
 - Iterated through multiple signal extraction strategies including **stereo depth, point cloud analysis** and **end-to-end regression** before converging on an **instance segmentation** approach combined with a **domain-specific aggregation function** to produce a robust soil coarseness scalar.
 - Grounded the aggregation function in agronomic priors collected through field campaigns and domain expert sessions, and ran **interpretable ML experiments** to identify the most discriminative features among the candidates.
 - Designed a **relative pseudo-ground-truth** validation protocol by incrementally varying tillage intensity and measuring **ranking consistency**, addressing the lack of a measurable ground truth by design.
- **Monocular Field of View Estimation (Global Eyewear Leader):** Addressed critical edge-case failures in a client-facing webapp where inaccurate FoV estimates were degrading end-user experience.
 - Reviewed **20+ FoV estimation methods** from literature and ran a controlled **experimental campaign** across a defined set of scene variables, collecting **~800 annotated videos** to benchmark competing **deep learning** approaches.
 - The selected method achieved a **35-40% reduction** in mean depth and FoV estimation error over the client baseline, with over **60% reduction in 90th-percentile error** on the edge cases that originally motivated the project.

Computer Vision and Machine Learning Engineer Intern

Deep Vision Consulting, Modena

🔗 Computer Vision Deep Learning Projective geometry Mathematical Optimization Multi-view Geometry

📅 Jul 2024 – Feb 2025

- Engineered an end-to-end computer vision pipeline for automatic volleyball court registration, implementing a modified instance segmentation convolutional architecture to robustly segment court lines under varying lighting and occlusions.
- Developed a novel calibration framework that exploits **3D line geometric constraints**, utilizing a custom iterative optimization strategy to jointly estimate camera extrinsics and intrinsics.
- Curated and annotated a proprietary dataset of **~4,200 images**, utilizing **RANSAC-based** post-processing to enforce geometric consistency and achieve reprojection errors comparable to robust point-based methods.
- Built downstream sports analytics applications, integrating the calibration pipeline with **custom-trained object detectors** and multi-view triangulation to enable metric player positioning and 3D ball trajectory reconstruction.

EDUCATION

ELLIS PhD & Postdoc Winter School on Foundation Models

University of Amsterdam

📅 Mar 2026

- **Core Topics:** Innovations in Foundation Models, Large-Scale Models, Multi-Modal Learning, and Self-Supervised Learning.
- **Highlights:** Intensive program focusing on cutting-edge AI, featuring lectures and networking with ELLIS Fellows, industry leaders, and academic experts.

M.Sc. in Computer Science Engineering - Artificial Intelligence curriculum

University of Modena and Reggio Emilia

📅 Sept 2022 - Feb 2025

- **Vision & ML:** Geometry, Video/Image Understanding, CNNs & Self-attention, Generative/Discriminative models.
- **Scalable AI:** LLMs, RAG, Efficient Transformers (Linformer, Flash Attention), PEFT (LoRa, Adapters), HPC.
- **Data & Systems:** Multimedia (C++), Big Data & Text Analysis, IoT & 3D Systems, Distributed AI.
- **Tools:** PyTorch, Scikit-suite, OpenCV, NumPy, Pandas, Matplotlib.

Foundations: Algorithms & Data Structures, Operative Research, Databases; **Systems & Engineering:** Software Engineering, System Design, Operating Systems, Networking.

PATENTS

Computer-Implemented System for the Automatic Analysis of a Volleyball Match

PCT International Patent

Designed and prototyped an automated system for volleyball match analysis, providing advanced scouting insights. Developed capabilities for player positioning and tracking, volleyball action detection, and 3D ball trajectory estimation to enhance performance evaluation.

🌟 Pending, 2024

PROJECTS

WSI-Preprocessing-Framework

</> [Computer Vision](#) [Deep Multi Instance Multi Label Learning](#) [Python](#)

Synthetic WSI preprocessing end to end

🔗 [OOfScope/WSI-Preprocessing-Framework](#)

Microcosm

Gamified educational platform utilizing synthetically generated images for histopathologist training

</> [Flutter](#) [Dart](#) [Gamification](#) [Synthetic Data](#) [Diffusion Models](#)

🔗 [OOfScope/microcosm-frontend](#)

Harvest Easy

</> [IoT](#) [Time Series Forecasting](#) [React](#) [Docker](#) [Distributed Computing](#) [Flask](#)

IoT solution for Municipal Waste Management

🔗 [mich2k/Harvest-Easy](#)

Emotion recognition and gaze analysis of retrieved faces

</> [Computer Vision](#) [Deep Learning](#) [Deep Facial Emotion Recognition](#) [Python](#)

Real-Time Facial Emotion Recognition

🔗 [SLG-Vision/EmotiVision](#)

Sorting, Visualized.

</> [Full Stack](#) [React](#) [HMI](#)

Educational software [↗](#)

🔗 [mich2k/sorting-visualized](#)

Offsite Eyes

</> [Android SDK](#) [HMI](#) [Java](#)

Android app built to ease offsite student and worker's lives

🔗 [mich2k/offsite-eyes](#)

BEYOND

- **Broader Tech Interests:** Actively expanding my expertise into Cloud Architectures, DevOps, containerization, self-hosted solutions, and Linux systems.
- **Research & Analysis:** Experienced in conducting comprehensive, detailed literature reviews.
- **Workflow & Soft Skills:** Proficient in Git version control; bring a results-driven, highly collaborative approach to team projects.