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 | Analysis | Experimental Analysis | Instance Segmentation

Feb 2025 – Ongoing

- **Agronomic Scene Understanding (redacted customer):** Engineered an end-to-end perception pipeline for automated seedbed quality assessment, integrating **Stereo-Vision** hardware with **Instance Segmentation** networks to quantify soil granulometry in unstructured environments. Designed a **Morphological Analysis** framework to map 2D segmentation masks into 3D metric measurements (e.g., clod diameter distribution), validating the system through extensive field testing to correlate visual features with physical agronomic standards under varying lighting and soil conditions.
- **Sealing Quality Analysis (redacted customer):** Engineered a modular computer vision framework for the **Automated Metrology** of industrial packaging seals. Leveraged **Geometric Computer Vision** and **Morphological Analysis** to implement robust algorithms for **Feature Extraction**, enforcing **Geometric Constraints** to achieve **Sub-pixel Precision** in critical measurements. Designed and executed **Experimental Validation** protocols to quantify **Hardware-Software Sensitivity**, conducting **Ablation Studies** on visual feature upgrades and illumination setups to optimize **Computational Efficiency** and robustness against real-world data variance.
- **Monocular Field of View Estimation (redacted customer):** Investigated **Deep Learning-based paradigms** for intrinsic calibration, evaluating the comparative efficacy of direct regression models against architectures utilizing intermediate representations like **Point Maps**. Executed a systematic **Sensitivity Analysis** to decouple the impact of **scene texture** and geometric composition on inference stability, leveraging these insights to **regress optimal acquisition conditions** for high-reliability deployment. Curated a **Heterogeneous Dataset** (300+ sequences across 18 sensor topologies) to strictly benchmark these competing methodologies against physical ground truth.

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 (FoMo), 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.

B.Sc. in Computer Science Engineering — **University of Modena and Reggio Emilia**

Sept 2019 - Sept 2022

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

Docker & Kubernetes — **Udemy**

Moden React with Redux — **Udemy**

PATENTS

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

PCT International Patent

Pending, 2024

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.

PROJECTS

WSI-Preprocessing-Framework

Synthetic WSI preprocessing end to end

Computer Vision | Deep Multi Instance Multi Label Learning | Python

OOfScope/WSI-Preprocessing-Framework

Microcosm

OOfScope/microcosm-frontend

Gamified educational platform utilizing synthetically generated images for histopathologist training

Flutter | Dart | Gamification | Synthetic Data | Diffusion Models

Harvest Easy

IoT solution for Municipal Waste Managment

IoT | Time Series Forecasting | React | Docker | Distributed Computing | Flask

mich2k/Harvest-Easy

Emotion recognition and gaze analysis of retrieved faces

Real-Time Facial Emotion Recognition

Computer Vision | Deep Learning | Deep Facial Emotion Recognition | Python

SLG-Vision/EmotiVision

Sorting, Visualized.

Educational software

Full Stack | React | HMI

mich2k/sorting-visualized

Offsite Eyes

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

Android SDK | HMI | Java

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.