FRANCESCO SARNO

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Professional Experience

Computer Vision and Robotics Lead Research Engineer Feb 2023 – Current
Switzerland Innovation Park Biel/Bienne, Swiss Battery Technology Center, Biel, CH

Leading the R&D department for computer vision:

- Designed and implemented detection, segmentation, 3D reconstruction and pose estimation pipelines for EV battery components using multi-view geometry and deep learning.
- Built a synthetic data generation framework in NVIDIA Omniverse to create and augment training datasets and ensure robust model validation.
- Integrated ROS2 for real-time inference computer vision tasks within robotic disassembly workflows.
- Applied deep RL for automated task trials in simulation, contributing to early-stage real-world methodologies.
- Led the end-to-end development and submission of competitive proposals, securing approval and funding for both European Commission and Innosuisse R&D projects.

Computer Vision Specialist Sep 2023 – Present
ETH Juniors, Zürich, Switzerland

Leading multiple POCs based on computer vision:

- *Segmentation & Object Detection*: Developed defect detection and localization models on challenging surfaces, leveraging OpenCV, PyTorch, and custom CNN architectures.
- *3D Scene Synthesis*: Used vision-language models (VLM) and NVIDIA Omniverse to generate and validate synthetic 3D environments for data training.
- *LLM and OCR*: Built text recognition systems for information extraction and fraud detection, covering the full ML lifecycle from data collection to inference monitoring.

Computer Vision Research Engineer Feb 2022 – Mar 2023
EPFL, Computer Vision Lab, Lausanne, CH
Conducted research in 3D reconstruction, Graph Convolutional Neural Network (GCNN), biomedical imaging: reconstruction and deformation of human organs, crowd counting, Structure From Motion (SFM), Simultaneous Localization And Mapping (SLAM) and camera calibration.

Computer Vision Research Assistant May 2021 – Dec 2021
ETH Zürich, Computer Vision Lab, Zurich, CH
Conducted research in Automated Machine Learning (AutoML), 3D vision, photometric stereo, and view synthesis: Neural Radiance Fields (NeRF). Concluded with two publications at WACV22.

Computer Vision Engineer Aug 2021 – Dec 2021
Solera Holdings, Qapter via ETH Juniors, Zürich, CH
Engineered deep learning and NeRF-based pipelines to reconstruct 3D vehicle surfaces, perform precise segmentation and depth estimation, and automatically detect, classify, and quantify damage extents.

Computer Vision Engineer Intern Feb 2020 – Dec 2020
Rheinmetall Air Defence, Qapter, Zurich, CH
Developed algorithms aimed at firings' accuracy evaluation and 3D visualization.

Education

M.Sc. in Robotics, Systems and Control 2018 – 2021
ETH Zürich
Advisor: Prof. Dr. Roland Siegwart
Grade: 5.61/6.00

B.Sc. in Automation Engineering 2015 – 2018
Politecnico di Milano
Grade: 106/110

High School Diploma 2010 – 2015
Liceo Scientifico Statale N. Copernico
Grade: 95/100

Skills

Programming Skills
Python, PyTorch, C, C++, ROS2, MATLAB, C#, Unity, OpenCV, Open3D

Computer Vision
3D Reconstruction, View Synthesis, Photometric Stereo, Detection, Segmentation, Pose Estimation, Camera Calibration, SLAM, SFM, OCR, VLM

Machine Learning
Deep Neural Networks (DNN), Diffusion Models (T2I, T2V), Large Language Models (LLM), Multimodal AI, AutoML (Neural Architecture Search, Evolutionary learning), Deep Reinforcement Learning (DRL), Generative Models (GAN, Normalizing Flow).

Language Skills
Italian (Native), English (Proficient), Spanish (Intermediate), German (Basic), French (Basic)

Selected Projects

Master's Thesis
ETH Zürich, Computer Vision Lab
Advisor: Prof. Dr. Luc Van Gool, Dr. Suryansh Kumar, Dr. Berk Kaya
Completed with distinction 5.75/6.00
Exploring Automated Machine Learning Framework for Deep Photometric Stereo: developed an automatically designed pipeline that achieves state-of-the-art results in uncalibrated photometric stereo.

Semester Project
ETH Zürich, Autonomous Systems Lab
Advisor: Prof. Dr. Roland Siegwart, Dr. Abel Gawel, Dr. Hermann Blum
Semantically informed localization in building structures: developed a pipeline for localization of a four-wheel robot in indoor environments using a segmentation-oriented neural network and point clouds.

Course Project
ETH Zürich, Computer Vision and Geometry Group
Advisor: Prof. Dr. Marc Pollefeys
Fully Convolutional Place Recognition Network: developed an algorithm for sparse SLAM with point clouds in large outdoor environments.

Course Project
ETH Zürich, Innovation Center Virtual Reality
Advisor: Prof. Dr. Andreas Kunz
AMazing videogame: created a maze-based video game from scratch, playable with keyboard and HTC VIVE.

Certificates and Awards

Best Poster Presentation Award @ Nvidia GTC 2025
ICVSS 2024: Computer Vision in the Age of Large Language Models, 2024
IEEE RAS Summer School on Multi-Robot Systems, CTU Prague, 2022
IELTS (International English Language Testing System), Grade: 7.5, 2018

Publications

WACV 22 Neural Architecture Search for Efficient Uncalibrated Deep Photometric Stereo. Francesco Sarno, Suryansh Kumar, Berk Kaya, Zhiwu Huang, Vittorio Ferrari, Luc Van Gool. IEEE/CVF Winter Conference on Applications of Computer Vision, 2022, Hawaii, USA.
WACV 22 Neural Radiance Fields Approach to Deep Multi-View Photometric Stereo. Berk Kaya, Suryansh Kumar, Francesco Sarno, Vittorio Ferrari, Luc Van Gool. IEEE/CVF Winter Conference on Applications of Computer Vision, 2022, Hawaii, USA.

Volunteering

Core Team Member, Google Developer Student Club Zürich, Oct 2021 – Oct 2022
Football Coach, GSO Azzano Mella, Aug 2022 – Current
Volunteer, Gruppo Volontariato Primavera, Aug 2022 – Current

References

Prof. Dr. Luc Van Gool, Prof. Dr. Pascal Fua, Prof. Dr. Roland Siegwart, Prof. Dr. Suryansh Kumar, Dr. Berk Kaya, Dr. Udaranga Wickramasinghe