Luca Zanella

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Citizenship: Italian. **Languages**: Italian (native), English (fluent)

Education

PhD in Machine Learning — Trento, Italy
University of Trento — Nov 2022 - Current
Supervisor: Elisa Ricci (University of Trento & Fondazione Bruno Kessler).
Co-Advisor: Massimiliano Mancini (University of Trento).
Research Interests: Vision-language models for video understanding. Recent focus on grounding natural language steps in procedural videos. Previously: video-language alignment and anomaly detection.

MSc in Computer Science — Trento, Italy
University of Trento, Grade: 110/110 *summa cum laude* — Sep 2018 - Mar 2021

BSc in Computer Science — Trento, Italy
University of Trento, Grade: 110/110 — Sep 2015 - Oct 2018

Work Experience

Research Assistant, Fondazione Bruno Kessler *(Trento, Italy)* — Apr 2021 - Nov 2022
Developed deep learning models for video surveillance analysis using PyTorch, including video anonymization, object detection, tracking, and anomaly detection. These models were deployed and validated in multiple pilot tests for the Horizon 2020 projects MARVEL and PROTECTOR.

MSc Student Intern, Huawei *(Munich, Germany)* — Mar 2020 - Sep 2020
Developed deep learning models using TensorFlow and Detectron2 to automatically correct road networks for microscopic traffic simulation from satellite imagery, reducing traffic simulation preparation time. Implemented ELK-based logging environment to collect and visualize traffic simulation results in a dashboard.

BSc Student Intern, Zucchetti Healthcare (ex CBA Group) *(Rovereto, Italy)* — Feb 2018 - Jul 2018
Developed a client-server system for centralized data quality monitoring of electronic health records, integrating data from distributed databases using Spring Framework and PostgreSQL.

Publications

1. **Luca Zanella**, Massimiliano Mancini, Willi Menapace, Sergey Tulyakov, Yiming Wang, Elisa Ricci.
"Can Text-to-Video Generation help Video-Language Alignment?"
In CVPR - *IEEE/CVF Conf. on Computer Vision and Pattern Recognition*, 2025. Nashville, USA.

2. **Luca Zanella**, Benedetta Liberatori, Willi Menapace, Fabio Poiesi, Yiming Wang, Elisa Ricci.
"Delving into CLIP Latent Space for Video Anomaly Recognition"
Computer Vision and Image Understanding (Elsevier), 2024.

3. Błażej Leporowski, Arian Bakhtiarnia, Nicole Bonnici, Adrian Muscat, **Luca Zanella**, Yiming Wang, Alexandros Iosifidis.
"MAVAD: Audio-Visual Dataset and Method for Anomaly Detection in Traffic Videos"
In ICIP - *IEEE Int. Conf. on Image Processing*, 2024. Abu Dhabi, UAE.

4. **Luca Zanella**, Willi Menapace, Massimiliano Mancini, Yiming Wang, Elisa Ricci.
"Harnessing Large Language Models for Training-free Video Anomaly Detection"
In CVPR - *IEEE/CVF Conf. on Computer Vision and Pattern Recognition*, 2024. Seattle, USA.

5. Giulio Mattolin, **Luca Zanella**, Elisa Ricci, Yiming Wang.
"ConfMix: Unsupervised Domain Adaptation for Object Detection via Confidence-based Mixing"
In WACV - *IEEE/CVF Winter Conf. on Applications of Computer Vision*, 2023. Waikoloa, USA.

6. Nicola Dall'Asen, Yiming Wang, Hao Tang, **Luca Zanella**, Elisa Ricci.
   "Graph-based Generative Face Anonymisation with Pose Preservation"
   In ICIAP - *Int. Conf. on Image Analysis and Processing*, 2022. Lecce, Italy.

Professional Activities

Teaching

- Teaching Assistant for the course on *Introduction to Machine Learning*, University of Trento (Feb – Sep 2024).
- Tutor at the UniTN Summercamp 2019 for high school students learning Python.

Reviewer

- *Conferences*: NeurIPS '25, ICCV '25, CVPR '25 (Outstanding), CVPR '24, ECCVW '24, EUSIPCO '22, BMVC '21, ICIAP '21.
- *Journals*: TMLR, TIP, TPAMI.

Grants

- *Principal Investigator*: ISCRA-C grant (10,000 GPU hours on Leonardo supercomputer).
- *Collaborator*: Two ISCRA-B grants (233,524 + 87,600 GPU hours on Leonardo), one EuroHPC Development Access grant (14,000 GPU hours on MareNostrum 5).

Projects

PROTECTOR: (2021-2023) Horizon 2020 Europe-funded project aimed to enhance the protection of places of worship against hate crime and terrorism. **Role**: Developed video surveillance technologies (object detection, tracking, anomaly detection).

MARVEL: (2021-2023) Horizon 2020 Europe-funded project aimed to enable privacy-preserving multimodal perception in smart city environments. **Role**: Developed video anonymization technologies.

JGEA: Java framework for Evolutionary Computation. **Role**: Developed covariance matrix adaptation evolution strategy (CMA-ES).

2D-VSR-Sim: Simulation environment for 2D voxel-based soft robots. **Role**: Developed lidar sensor module and terrain with obstacles.

Honors & Awards

2025 - CVPR **Outstanding Reviewer**.

2024 - **Excellent Innovation** awarded to VideoAnony, developed under the Horizon 2020 project MARVEL, by the European Commission's Innovation Radar.

2023 - **Best Project Award**, ELLIS Summer School on Large-Scale AI, Modena, Italy.