Luigi **Capogrosso**

Ph.D. Student in Artificial Intelligence

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Education

Polytechnic of Turin, in collaboration with the University of Verona *Verona, Italy*

Ph.D. in Artificial Intelligence *2021 - 2024*

- My research interests cover the broad area of deep learning, and the main topics I am currently working on can be grouped into the classes of efficient deep learning and representation learning.

University of Verona *Verona, Italy*

M.Sc. in Computer Engineering for Robotics and Smart Industry *2019 - 2021*

- Grade: 110/110 Cum Laude.
- Thesis title: Embedded Deep Learning for Computer Vision: a Case Study on Object Tracking.

University of Verona *Verona, Italy*

B.Sc. in Computer Science *2016 - 2019*

- Thesis title: Linux Kernel – Organization, Structures and Process Management.

Research Experience

Humatics | SYS-DAT Group *Verona, Italy*

Research Fellow *Jan. 2021 - Aug. 2021*

- Deep learning models are often computationally expensive, hindering their use in resource-constrained edge systems. During this period, my work was focused on implementing pruning and quantization optimization techniques on company confidential deep learning models.

EDALAB s.r.l. *San Giovanni Lupatoto, Italy*

Research Fellow *Oct. 2019 - Dec. 2021*

- Communication protocols are the foundation of Internet of Things (IoT) applications. During this period, my work was focused on implementing the Modbus, OPC-UA, and MQTT protocols inside the company's BOXIO embedded system.

Professional Experience

Marie Curie High School *Pergine Valsugana, Italy*

High School Professor *Sept. 2021 - Oct. 2021*

- Teacher of Computer Science and Network Design courses.

Digital Restaurant s.r.l. *Verona, Italy*

Junior Software Developer *Jun. 2019 - Sept. 2019*

- Developed an AI-powered Android application for the restaurant industry.

Eurogest s.r.l. *Bolzano, Italy*

Junior Software Developer *Jun. 2016 - Dec. 2016*

- Worked as one of the developers and analysts of the Infojuice company's project.

Teaching Experience

University of Verona *Verona, Italy*

Teaching Assistant *2023 - 2024*

- Course: "Systems Design Laboratory (2023/2024)" of the Master's degree in Computer Engineering for Robotics and Smart Industry.

University of Verona *Verona, Italy*

Teaching Assistant *2022 - 2023*

- Course: "Machine Learning & Artificial Intelligence (2022/2023)" of the Master's degree in Computer Engineering for Robotics and Smart Industry.

University of Verona *Verona, Italy*

TEACHING ASSISTANT *2022 - 2023*

- Course: "Computer Vision & Deep Learning (2022/2023)" of the Master's degree in Artificial Intelligence.

University of Verona *Verona, Italy*

TEACHING ASSISTANT *2022 - 2023*

- Course: "Signal and image processing (2022/2023)" of the Bachelor's degree in Computer Science.

University of Verona *Verona, Italy*

TEACHING ASSISTANT *2020 - 2021*

- Course: "Network Programming and Security (2020/2021)" of the Bachelor's degree in Computer Science.

University of Verona *Verona, Italy*

TEACHING ASSISTANT *2020 - 2021*

- Course: "Elements of Operating Systems and Networks (2020/2021)" of the Bachelor's degree in Bioinformatics.

University of Verona *Verona, Italy*

TEACHING ASSISTANT *2020 - 2021*

- Course: "Programming I (2020/2021)" of the Bachelor's degree in Computer Science.

Reviewer

JOURNALS

2023 - Present	**International Journal of Computer Vision**, Springer Netherlands.
2023 - Present	**IEEE Internet of Things Journal**, IEEE Inc.
2023 - Present	**Future Generation Computer Systems**, Elsevier B.V.
2022 - Present	**Pattern Recognition**, Elsevier Ltd.

CONFERENCES

2024	**Computer Vision and Pattern Recognition Conference (CVPR)**, CVF/IEEE Inc.
2024	**European Conference on Computer Vision (ECCV)**, Springer.
2023 - Present	**International Conference on Learning Representations (ICLR) TinyPapers**, OpenReview.
2023 - Present	**Design, Automation and Test in Europe Conference (DATE)**, IEEE Inc.

Committees

2024	**Member of the Program Committee**, International Workshop on Fashion AI at ECCV 2024.	*Milan*

Honors & Awards

2023	**Young Entrepreneur Prize**, Premio Nazionale per l'Innovazione.	*Milan, Italy*
2022	**Honorable Mention**, ICCAD 2022 ACM/IEEE TinyML Design Contest.	*San Diego, U.S.A*

Presentation

Presenter for the International Centre for Theoretical Physics (ICTP) *Trieste, Italy*

WORKSHOP ON MACHINE LEARNING ON LOW-POWER DEVICES: APPLICATIONS AND ADVANCED TOPICS *2024*

- Presentation title: "A Machine Learning-oriented overview on Tiny Machine Learning: Theory, Methods and Applications".

Presenter for the Department of Computer Science of the University of Verona *Verona, Italy*

HOW TO LEVERAGE ARTIFICIAL INTELLIGENCE TO GROW YOUR BUSINESS: THE HUMATICS SYS-DAT GROUP WORKSHOP *2023*

- Presentation title: "Enabling Machine Learning Systems in Industry 4.0".

Presenter for the Department of Engineering for Innovation Medicine of the University of Verona *Verona, Italy*

A HOLISTIC APPROACH TO COMPUTER ENGINEERING FOR INDUSTRY 4.0 WORKSHOP *2023*

- Presentation title: "TinyML: how to fit heavy networks almost everywhere".

Personal Qualities & Interests

Scientific interests	Efficient Deep Learning, Representation Learning, Multi-Task Learning, Industry 4.0, IoT, Embedded Systems.
Personal traits	Ambitious, hard-working, practical, eager to learn new skills, and highly focused on goals.
Programming	Python, PyTorch, TensorFlow, C, C++.
Languages	Italian, English.

Selected Publications

Leveraging Latent Diffusion Models for Training-Free In-Distribution Data Augmentation for Surface Defect Detection

F Girella, Z Liu, F Fummi, F Setti, M Cristani, **L Capogrosso** *2024*

- 21st International Conference on Content-based Multimedia Indexing (CBMI).

MTL-Split: Multi-Task Learning for Edge Devices using Split Computing

L Capogrosso, E Fraccaroli, S Chakraborty, F Fummi, M Cristani *2024*

- 61st Design Automation Conference (DAC).

A Machine Learning-oriented Survey on Tiny Machine Learning

L Capogrosso, F Cunico, DS Cheng, F Fummi, M Cristani *2024*

- IEEE Access.

Diffusion-based Image Generation for In-distribution Data Augmentation in Surface Defect Detection

L Capogrosso, F Girella, F Taioli, M Dalla Chiara, M Aqeel, F Fummi, F Setti, M Cristani *2024*

- 19th International Conference on Computer Vision Theory and Applications (VISAPP).

Disentangled Latent Spaces Facilitate Data-Driven Auxiliary Learning

G Skenderi, **L Capogrosso**, A Toaiari, M Denitto, F Fummi, S Melzi, M Cristani *2023*

- Currently under review in Pattern Recognition Letters.

Split-Et-Impera: A Framework for the Design of Distributed Deep Learning Applications

L Capogrosso, F Cunico, M Lora, M Cristani, F Fummi, D Quaglia *2023*

- Design and Diagnostics of Electronic Circuits and Systems (DDECS).

HermesBDD: A Multi-Core and Multi-Platform Binary Decision Diagram Package

L Capogrosso, L Geretti, M Cristani, F Fummi, T Villa *2023*

- Design and Diagnostics of Electronic Circuits and Systems (DDECS).

Towards Deep Learning-based Occupancy Detection Via WiFi Sensing in Unconstrained Environments

C Turetta, G Skenderi, **L Capogrosso**, F Demrozi, PH Kindt, A Masrur, F Fummi, M Cristani, G Pravadelli *2023*

- Design, Automation and Test in Europe Conference (DATE).

I-SPLIT: Deep Network Interpretability for Split Computing

F Cunico, **L Capogrosso**, F Setti, D Carra, F Fummi, M Cristani *2022*

- International Conference on Pattern Recognition (ICPR).

Extracurricular Activity

Executive Committee of the Associazione Italiana Arbitri
Trento

Member *Jan. 2021 - Present*

Youth Commission of the Municipality of Pergine Valsugana
Pergine Valsugana

Member *Jan. 2021 - Present*

Culture Commission of the Municipality of Pergine Valsugana
Pergine Valsugana

Member *Nov. 2020 - Present*