



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'm 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 company Infojuice 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

TEACHING ASSISTANT

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

Verona, Italy

2022 - 2023

University of Verona

TEACHING ASSISTANT

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

Verona, Italy

2022 - 2023

University of Verona

TEACHING ASSISTANT

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

Verona, Italy

2020 - 2021

University of Verona

TEACHING ASSISTANT

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

Verona, Italy

2020 - 2021

University of Verona

TEACHING ASSISTANT

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

Verona, Italy

2020 - 2021

Presentation

Presenter for the International Centre for Theoretical Physics (ICTP)

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

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

Trieste, Italy

2024

Presenter for the Department of Computer Science of the University of Verona

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

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

Verona, Italy

2023

Presenter for the Department of Engineering for Innovation Medicine of the University of Verona

A HOLISTIC APPROACH TO COMPUTER ENGINEERING FOR INDUSTRY 4.0 WORKSHOP

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

Verona, Italy

2023

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.

Honors & Awards

- 2023 **Young Entrepreneur prize**, Premio Nazionale per l'Innovazione.
- 2022 **Honorable mention**, ICCAD 2022 ACM/IEEE TinyML Design Contest.

Milan, Italy

San Diego, U.S.A

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 Languages** 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**

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

2024

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

L CAPOGROSSO, E FRACCAROLI, S CHAKRABORTY, F FUMMI, M CRISTANI

• 61st Design Automation Conference (DAC).

2024

A Machine Learning-oriented Survey on Tiny Machine Learning

L CAPOGROSSO, F CUNICO, DS CHENG, F FUMMI, M CRISTANI

• IEEE Access.

2024

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

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

2024

Disentangled Latent Spaces Facilitate Data-Driven Auxiliary Learning

G SKENDERI, **L CAPOGROSSO**, A TOAIARI, M DENITTO, F FUMMI, S MELZI, M CRISTANI

• Currently under review in Pattern Recognition Letters.

2023

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

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

2023

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

L CAPOGROSSO, L GERETTI, M CRISTANI, F FUMMI, T VILLA

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

2023

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

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

2023

I-SPLIT: Deep Network Interpretability for Split Computing

F CUNICO, **L CAPOGROSSO**, F SETTI, D CARRA, F FUMMI, M CRISTANI

• International Conference on Pattern Recognition (ICPR).

2022

Extracurricular Activity

Executive Committee of the Associazione Italiana Arbitri	<i>Trento</i>
MEMBER	<i>Jan. 2021 - Present</i>
Youth Commission of the Municipality of Pergine Valsugana	<i>Pergine Valsugana</i>
MEMBER	<i>Jan. 2021 - Present</i>
Committee on Culture of the Municipality of Pergine Valsugana	<i>Pergine Valsugana</i>
MEMBER	<i>Nov. 2020 - Present</i>