Massimiliano Ciranni – Curriculum Vitae

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SUMMARY

Personal Information:
Name: **Massimiliano Ciranni**
Date of Birth: **September, 3, 1995**
Citizenship:
Gender:

Current Address:

Current Position:
Ph.D. Student in Computer Science, in the Machine Learning & Vision (MLV) unit at MaLGa Machine Learning Genoa Center, DIBRIS, Università degli Studi di Genova (Genoa, Italy).

EDUCATION

M.Sc. in Computer Science, Data Science & Engineering – Artificial Intelligence Graduating March, 29 , 2023
Università degli Studi di Genova, Genoa (GE), IT 110/110 cum laude
Dipartimento di Informatica, Bioingegneria, Robotica e Ingegneria dei Sistemi (DIBRIS)
Relevant coursework: Machine Learning, Advanced Machine Learning, Computer Vision, Natural Language Processing, Digital Signal and Images Processing, High-Performance Computing

B.Sc. in Computer Science Graduating April, 29 , 2020
Università degli Studi di Genova, Genoa (GE), IT 106/110
Dipartimento di Informatica, Bioingegneria, Robotica e Ingegneria dei Sistemi (DIBRIS)
Relevant coursework: Logic, Linear Algebra and Calculus , Algorithms and Data Structures, Distributed Programming, Databases, Advanced Software Development

High School Diploma (Italian *Diploma di Maturità*) Graduating June 2014
Liceo Scientifico G.D. Cassini*,* Genoa (GE)*,* IT 90/100
Scientific Studies (Italian *Liceo Scientifico*)
Relevant coursework: General Education with a focus on scientific disciplines

Foreign Languages: Italian (native speaker), English (Fluent, written and spoken – B2 Certificate)

TECHNICAL SKILLS

Design, Training and Testing of Machine Learning and Deep Learning Models:
Pytorch [specialized], Keras [specialized], Scikit-Learn [specialized], TensorFlow [advanced].
Scientific Computing, Data Analysis, Statistics, and Visualization:
C/C++ [specialized], Data-Analysis and Signal-Processing in Python environments (Pandas, Scikit-Learn, Scikit-Image**,** MatplotLib, Jupyter Notebook, Colab) [specialized], High-Performance and Parallel Computing Frameworks (OpenMP, OpenMPI, CUDA) [advanced].
Programming:
Python, C, C++, C#, Java, JavaScript, MATLAB, SQL, Bash.
Integrated Development Environments (IDEs):
Visual Studio Code, Visual Studio, PyCharm, IntelliJ IDEA.
Mark-up Languages:
LaTeX, Markdown, HTML, CSS.
Database Management Systems (DBMS):
PostgreSQL, MySQL, Microsoft SQL-Server, MongoDB.
Office Automation:
Microsoft Office, LibreOffice, Google Documents.

RESEARCH WORK EXPERIENCE

Machine Learning Genoa Center (MaLGa), Genoa, Italy: Ph.D. Student November 2023 – present
Università degli Studi di Genova – DIBRIS

- Unsupervised Learning and Self-Supervised Learning
- Representation Learning and Dimensionality Reduction
- Biological and Biomedical Applications

Machine Learning Genoa Center (MaLGa), Genoa, Italy: Post-Graduate Researcher April 2023 – October 2023
Università degli Studi di Genova – DIBRIS

- Unsupervised Learning on Biological Images
- Representation Learning and Dimensionality Reduction
- Anomaly Detection and Fine-Grained Classification

PUBLICATIONS

Computer Vision and Deep Learning meet Plankton: Milestones and Future Directions 2024
M. Ciranni, V. Murino, F. Odone, V.P. Pastore;
"Computer Vision and Deep Learning meet Plankton: Milestones and Future Directions"
2024,*Image and Vision Computing* (Elsevier, ISSN: 1872-8138),
DOI: `https://doi.org/10.1016/j.imavis.2024.104934`.

Anomaly detection in feature space for detecting changes in phytoplankton populations 2024
M. Ciranni, F. Odone, V.P. Pastore;
"Anomaly detection in feature space for detecting changes in phytoplankton populations"
2024, *Frontiers in Marine Science* (Frontiers Media, ISSN: 2296-7745),
DOI: `https://doi.org/10.3389/fmars.2023.1283265`.

Efficient unsupervised learning of biological images with compressed deep features 2023
V.P. Pastore, M. Ciranni , S. Bianco, J.C. Fung, V. Murino, F. Odone;
"Efficient unsupervised learning of biological images with compressed deep features",
2023, *Image and Vision Computing* (Elsevier, ISSN: 1872-8138),
DOI: `https://doi.org/10.1016/j.imavis.2023.104764`.
Equally contributing first author.

ACADEMIC PROJECTS

Efficient unsupervised learning of plankton Images with compressed deep features October 2022 – March 2023
Master's Thesis in Computer Science, Data Science & Engineering – Artificial Intelligence track, University of Genoa
Supervisor: Vito Paolo Pastore, Examiner: Nicoletta Noceti

Abstract:
Plankton organisms play a key role in the aquatic environment: they are at the bottom of the aquatic food chain, with crucial involvement in climate regulation and oxygen production. In addition, their unique biological characteristics and sensitivity to subtle modifications in their environment, make them a fundamental tool for assessing the health of aquatic ecosystems and monitoring the impact of climate change. In the last few years, the development of automatic systems for in-situ image acquisition has been generating a massive amount of plankton images, making expert manual classification impractical. To address this challenge, machine learning and deep learning techniques have been widely employed for plankton image classification. However, most of these approaches are supervised, necessitating rich datasets of human-annotated data. In this thesis we provide a rich analysis of the techniques developed from the scientific community with regard to this problem and, more importantly, we propose a fully unsupervised method that enhances the representational power of features extracted from large vision models pre-trained on ImageNet, a big-size and general-purpose dataset for image classification. By developing a compression method that significantly reduces the dimensionality of automatically extracted deep features, which we call Reconstruction-VAE, we enable the application of efficient unsupervised algorithms, showing that is possible to substantially improve the baseline performance of unsupervised learning applied to plankton image analysis.

Teoria dei Codici Lineari (Eng: Theory of Linear Codes) January 2020 – April 2020
Bachelor's Thesis in Computer Science, University of Genoa
Supervisor: Alessandro Verri

OTHER ACADEMIC WORK EXPERIENCE

Tutor in the *Deep Learning and Computer Vision 2023 Ph.D. summer school*, Genoa, Italy: June 2023
Ph.D. summer school hosted by MaLGa's Machine Learning & Vision unit of the University of Genoa:

- Tutor for a laboratory hands-on activity on Generative Adversarial Networks

- Tutor for the final team project

Tutor for the course *Computational Vision* (M.Sc. in Computer Science), Genoa, Italy: June 2023
Tutor for two final projects for the course *Computational Vision*, part of the academic offer in the M.Sc. in Computer Science of the University of Genoa.

Part-time collaborator (150h), DIBRIS, University of Genoa, Genoa, Italy: 2019
Assistance to faculty staff for administration and high-school stage activities.