

ALESSANDRO PIGHETTI

Current Position

PhD Student in "Architectures supporting Machine Learning"

Joint Doctorate on Interactive and Cognitive Environments

Curriculum: Self-Aware Autonomous Systems

University of Genoa (ELIOS Lab) / Queen Mary University of London (Centre of Intelligent Sensing)

Areas of Specialisation

Adversarial Learning; Reinforcement Learning; TinyML for edge devices; Simulation Environments; Automated Driving;

Technical Skills

Programming Languages:

Python, C#, Java, C++, MATLAB, JavaScript, HTML, CSS, Bash

Machine Learning:

TensorFlow, PyTorch, Keras, tensorflow-optimization, Larq Compute Engine, TFLite, scikit-learn, DeepSeek API

Reinforcement Learning / Simulation Environments:

Stable Baselines3, ElegantRL, Gymnasium, CARLA Simulator, Unity, ML-Agents, Unreal Engine, Ray RLLib, SIMULINK (*Basic Familiarity*), Isaac Gym (*Basic Familiarity*)

Computer Vision, Image Processing:

Torchvision, OpenCV, Albumentations, scikit-image, Pillow

Data analysis and visualization:

NumPy, Pandas, Matplotlib, D3.js

Development Tools:

Git, Docker, NVIDIA Cuda Toolkit, NVIDIA JetPack, Jupyter Notebook, Google Colab

Documentation Tools:

LaTeX, Zotero

Robotics - Middleware:

ROS (Robot Operating System) (*Basic Familiarity*)

Education

Since 2022 PhD in Architectures supporting Machine Learning, University of Genoa / QMUL
2019–2022 MSc in Computer Science - Curriculum: Artificial Intelligence, University of Genoa
2016–2019 BSc in Computer Science, University of Genoa
2008–2013 Scientific High School Diploma, German School of Genova (DSG)

Working experience and internships

2016–2022 Front-end Web Developer (part-time), PatronMultimedia, Chiavari (GE), Liguria, Italy
2014 Internship in Web Development, Wuwu.Media Werbeagentur, Munich, Bavaria, Germany
2012 Internship at Z.I.M. Italy in Genoa, Liguria, Italy

Languages

Italian (Mother tongue)
German (C2, German Abitur)
English (CEFR C1)
French (B2)

Research Projects

European project H2020 (GA 101006664) "Addressing challenges toward the deployment of higher automation" (Acronym: HI-DRIVE), as a member of the research unit of the University of Genoa. The project sees the collaboration between the most important European car manufacturers and many universities active in the sector. Hi-Drive develops and tests advanced automated driving capabilities on a large scale, moving from conditional automation (SAE L3) to high automation, in different scenarios and road contexts. - www.hi-drive.eu

European project HORIZON-CL5-2023-D6-01-02 "Generation of scenarios for development, training, virtual testing and validation of CCAM systems" (Acronym: SYNERGIES CCAM), as a member of the research unit of the University of Genoa. The project sees the collaboration between the most important European car manufacturers and many universities active in the sector. Synergies aims to generate a wide range of test scenarios for training, testing and validation of CCAM systems, with a focus on urban and rural traffic, for which there is significantly less knowledge about relevant scenarios than highway driving. - www.synergies-ccam.eu

National project PRIN2022 "Green Machine Learning for the IoT" (Acronym: GEMINI), as a member of the research unit of the University of Genoa. The project is in collaboration between DII - UNITN and DITEN - UNIGE. GEMINI aims to implement a new framework that supports the development of fully sustainable TinyML applications deployed along an edge-to-cloud continuum. The GEMINI framework is intended for battery-free embedded devices, including those without network connectivity.

Regional project DIP WORKING2021, as a consultant from the research unit of the University of Genoa. The project was aimed at developing a virtual training system for underwater operators working in high-risk shallow or deep-water environments. The system is based on VR technologies integrated with hardware-in-the-loop simulators, enabling immersive 3D visualization of underwater operational contexts—both in standard and extreme conditions, including the simulation of virtual hazards. design and implementation of an automated scoring interface, aimed at evaluating operator performance in real time based on safety and mission-specific criteria. - www.b-k.it/sito/dip.php

Scopus Metrics

PUBLICATIONS: 14
INTERNATIONAL JOURNAL PUBLICATIONS: 2
H-INDEX: 4
CITATIONS: 32



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Teaching Activities

- 2024/25 Teaching support — "Tiny Machine Learning" (114752), University of Genoa
- 2023 Teaching support — "Cyber Physical Systems" (72306), University of Genoa

Reviewer Activity

- 2025 IEEE Intelligent Transportation Systems Society Conference (ITSC)
- 2025 Digital Heritage 2025
- 2024 IEEE Intelligent Transportation Systems Society Conference (ITSC)
- 2024 IEEE International Conference on Vehicular Electronics and Safety (ICVES)
- 2024 International Conference on Applications in Electronics Pervading Industry, Environment and Society
- 2024 Games and Learning Alliance

Publications

INTERNATIONAL JOURNALS

- [1] R. Berta, L. Lazzaroni, A. Capello, M. Cossu, L. Forneris, A. Pighetti, and F. Bellotti, “Development of deep-learning-based autonomous agents for low-speed maneuvering in unity,” *Journal of Intelligent and Connected Vehicles*, vol. 7, no. 3, pp. 229–244, 2024
- [2] L. Forneris, A. Pighetti, L. Lazzaroni, F. Bellotti, A. Capello, M. Cossu, and R. Berta, “Implementing deep reinforcement learning (drl)-based driving styles for non-player vehicles,” *International Journal of Serious Games*, vol. 10, no. 4, pp. 153–170, 2023

INTERNATIONAL CONFERENCES PROCEEDINGS

- [3] R. Berta, F. Bellotti, M. Cossu, L. Forneris, L. Lazzaroni, and A. Pighetti, “RL-based generation of a synthetic automotive driving scenario dataset,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 395–402, Springer, 2024
- [4] L. Lazzaroni, F. Bellotti, A. Dabbous, A. Pighetti, and R. Berta, “Quantization of mobilenetv2 for resource-constrained microcontrollers,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 497–504, Springer, 2024
- [5] H. Ballout, R. Berta, A. Dabbous, M. Fresta, L. Lazzaroni, A. Pighetti, and F. Bellotti, “Performance comparison of yolov8 and yolov10 for traffic light detection on a jetson nano board,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 242–249, Springer, 2024
- [6] A. Dabbous, R. Berta, L. Lazzaroni, A. Pighetti, and F. Bellotti, “Benchmarking microcontrollers with ultra-low resolution images classification,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 234–241, Springer, 2024
- [7] A. Dabbous, L. Lazzaroni, F. Bellotti, S. M. Presentación, A. Pighetti, and R. Berta, “Tinymml acceleration with max78000,” in *Annual Meeting of the Italian Electronics Society*, pp. 468–474, Springer, 2024
- [8] A. Pighetti, F. Bellotti, C. Oh, L. Lazzaroni, L. Forneris, M. Fresta, and R. Berta, “Investigating adversarial policy learning for robust agents in automated driving highway simulations,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 124–129, Springer, 2023
- [9] L. Lazzaroni, A. Pighetti, F. Bellotti, and R. Berta, “Building a pipeline for efficient production of synthetic datasets for improving rl in automated driving,” in *Annual Meeting of the Italian Electronics Society*, pp. 351–356, Springer, 2023
- [10] L. Lazzaroni, A. Pighetti, F. Bellotti, A. Capello, M. Cossu, and R. Berta, “Automated parking in carla: A deep reinforcement learning-based approach,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 352–357, Springer, 2023
- [11] A. Pighetti, L. Forneris, F. Bellotti, A. Capello, M. Cossu, G. Gioco, and R. Berta, “A teacher-configurable scoring system for serious games,” in *International Conference on Games and Learning Alliance*, pp. 254–263, Springer, 2023
- [12] M. Fresta, A. Dabbous, F. Bellotti, A. Capello, L. Lazzaroni, A. Pighetti, and R. Berta, “Low-cost, edge-cloud, end-to-end system architecture for human activity data collection,” in *International Conference on Applications in Electronics Pervading Industry, Environment and Society*, pp. 444–449, Springer, 2023
- [13] A. Pighetti, L. Forneris, L. Lazzaroni, F. Bellotti, A. Capello, M. Cossu, A. De Gloria, and R. Berta, “High-level decision-making non-player vehicles,” in *International Conference on Games and Learning Alliance*, pp. 223–233, Springer, 2022

NATIONAL CONFERENCES

- [14] A. Pighetti, F. Bellotti, R. Berta, A. Cavallaro, L. Lazzaroni, and C. Oh, “Adversarial policy generation in automated parking,” in *ECCV 2024 Workshop on Corner Cases*, 2024. [Online]