5th IEEE International Workshop on PErvasive and Resource-CONstrained Artificial Intelligence

co-located with International Conference on Pervasive Computing and Communications (PerCom 2026)

Important dates

Deadlines for workshop paper submission and notification:

- **Paper submission deadline:** **November 17th, 2026 (AoE)**
- **Paper notification:** **January 5th, 2026**

Steering Committee

Prof. Plamen Angelov
Lancaster University, UK
Dr. Paolo Dini
CTTC/CERCA, ES
Dr. Lorenzo Valerio
IIT-CNR, IT

Workshop Organizers

Prof. Mario Luca Bernardi
University of Sannio, IT
Dr. Franco Maria Nardini
ISTI-CNR, IT
Prof. Riccardo Pecori
eCampus University, IT
IMEM-CNR, IT
Dr. Lorenzo Valerio
IIT-CNR, IT

Useful information

Website:
https://perconai.iit.cnr.it/

e-mail:
perconai@iit.cnr.it

Motivations & Vision

PeRConAI aims to advance truly pervasive AI, empowering edge devicesregardless of their resource constraintsto perform both training and inference under full, weak, or no supervision.

As the number and capability of edge devices grow, so does the volume, velocity, and variability of data generated at the edge of the internet. This shift is catalyzing a shift from centralized AI systems, traditionally reliant on remote data centers, toward decentralized, edge-centric paradigms. These new systems must process and learn from data near its sourceat the edgewhere resources are often constrained, connectivity is intermittent, and data is inherently heterogeneous.

Unlike the predictable environments of cloud computing, edge contexts present challenges such as limited compute power, memory, and battery life, as well as unreliable or policy-limited network availability. Moreover, data collected across edge devices often varies significantly even when related to the same phenomenon, complicating model generalization. Human intervention remains a bottleneck, especially in early AI lifecycle stages like labeling and pre-processing, hampering scalability.

PeRConAI envisions a future where every edge device can actively participate in the AI pipeline, not only by processing local data but by collaborating with other devices to derive and share knowledge. Although progress has been made toward enabling training and inference at the edge, achieving the vision of pervasive AIflexible, adaptive, and ubiquitousremains a substantial challenge.

To bridge this gap, several critical research questions must be addressed:

- How to design, train, and optimize advanced machine learning (ML/DL) models in pervasive contexts where edge devices have limited resources (i.e., computational power, storage, and energy)?
- How to implement and optimize distributed ML/DL systems on small devices that can collaboratively exploit local data while preserving privacy?
- How to move from heavily supervised edge ML/DL systems to weakly supervised or unsupervised systems by also leveraging unlabeled data?
- How to enable pervasive ML/DL systems running on limited devices to adapt to possibly evolving contexts?

Call for Papers

The PeRConAI workshop aims at fostering the development and circulation of new ideas and research directions on pervasive and resource-constrained machine learning bringing together practitioners and researchers working on the intersection between pervasive computing and machine learning, stimulating the cross-fertilization between the two communities. The PeRConAI workshop solicits contributions on, but not limited to, the following topics:

- **Foundations of Advanced Machine learning algorithms and methods for pervasive systems subject to resource limitations addressing the following open challenges**:
  - Distributed/decentralized and collaborative ML for resource-constrained devices (e.g., resource-efficient federated learning, imbalanced data distribution among devices);
  - Brain- and bio-inspired ML algorithms for pervasive computing (e.g., Echo State Networks, Liquid State Machines, Spiking Neural networks);
  - State-Space Models (SSMs) for resource-constrained devices;
  - Learning Foundation models at the edge;
  - Physics-informed ML for efficient training in pervasive computing,
  - Continual learning for distributed edge contexts;
  - Efficient compression of deep learning models for real-time inference;
  - Privacy-preserving and robust ML in distributed/decentralized learning for pervasive and resource-constrained scenarios;
  - Self- and Semi-supervised learning in pervasive and resource-constrained scenarios (e.g., energy efficient generative models);
  - Contrastive learning in distributed edge environments;
  - Split learning and Over-the-air computing for distributed/decentralized learning systems in pervasive and resource-constrained scenarios;
  - Pervasive and distributed unlearning methods;
- **Applications of Advanced Machine learning algorithms, methods and approaches for pervasive computing under resource-limitations applied to the following application domains**:
  - Health and well-being applications (e.g., activity recognition, health monitoring).
  - Anomaly/Novelty detection (e.g., Industry 4.0, predictive maintenance, condition monitoring, intrusion detection, privacy, and security).
  - Audio signal processing (e.g., sound event detection, speech recognition/processing).
  - Wireless sensing (e.g., mm-wave radars);
  - Video streams processing on resource-constrained devices.
  - Natural Language Processing and Information Retrieval (e.g., conversational applications running on resource-constrained, mobile, or edge devices).
  - Intersection between mobile computing and ML/DL on resource-constrained devices.
  - Remote sensing and Earth observation (resource-efficient satellite edge computing);
  - AI applications in UAV, e.g., agriculture, logistics, disaster relief, surveillance, and infrastructure inspection;
  - Any other real-world applications and case studies wherein the pervasiveness of resource-constrained devices is central for knowledge extraction.

Papers, written in IEEE LaTeX or Microsoft Word templates, must adhere to the formatting instructions specified **here**, must be 6 pages (10pt font, 2-column format), including text, figures, and tables.