Frugal and sober AI and digital technologies

Digital technologies grow everywhere
- The energy demand to power digital technologies increases 6-9% per year
- Digital technologies contribution to GHG emissions increases drastically

Towards digital sobriety by low-complex distributed and frugal methods for embedded AI technologies

How we contribute
- Distributed and Federated Learning
- Orchestration of AI processing
- Multi-objective metrics for AI
- Resilience and convivial machine learning

Selected Publications

- Online Non-preemptive Scheduling on Unrelated Machines with Rejections, Ioannis Luck, Argonne Nat. Lab., USA
- Short-Term Ambient Temperature Forecasting for Smart Heaters, Danilo Carastan-Santos, Anderson Andrei Da Silva, Alfredo Goldman, Angan Mitra, Yanik Ngoko, Clément Mommessin, Denis Trystram
- Evaluating Computation and Data Placements in Edge Infrastructures through a Common Simulator, Anderson Andrei Da Silva, Christophe Cérin, LIPN, Paris 13
- Improving the Performance of Batch Schedulers Using Online Job Runtime Classification, Christophe Cérin, LIPN, Paris 13
- A Federated Learning Framework for IoT: Application to Industry 4.0, Jean-Luc Borsalino, Frédéric Desprez, Mohamed Kandi, Youssef Miloudi, Hamza Safri, Denis Trystram

Industrial Partners

- Heterogeneous Data
- Smart Building
- IoT
- Frugal AI
- Job Orchestration
- Reinforcement Learning
- Distributed Learning
- Federated Learning
- Embedded AI

Orchestration of AI processing

Objective
- Execution Time 📈 = Energy Consumption 🎈 🎈
- To reduce energy consumption through efficient allocation of AI tasks
- Hybrid Infras Compute & Storage Offloading
- Global Continuum Multi-objective Placement
- Federated-Decentralized Resource Management

Distributed Learning

Objective
- Build frugal distributed learning loop
- Efficient communication
- Monitoring energy consumption
- Learn a shared prediction model collaboratively while maintaining the training data locally

Collaborations

International Collaborations
- Ian Foster, Argonne Nat. Lab., USA
- Anne-Marie Kermarrec EPFL, Switzerland
- Benjamin Moseley, Carnegie Mellon University, USA

National Collaborations
- Christophe Cérin, LIPN, Paris 13
- Laurent Lefèvre, ENS Lyon, AVALON-Inria
- Romain Couillet, MIAI LargeDATA Chair