USEEU9 - Green AI Computing for Connected Industries

Mis à jour le 06-10-2025

Code : USEEU9

Unité spécifique de type cours

3 crédits

Responsabilité nationale : EPN05 - Informatique / Stefano SECCI

Présentation

Prérequis

Computer networks

Objectifs pédagogiques

The main goal of this course is to cover the main aspects related to the design of green solutions for AI computing applied to connected industries. Students will learn not only the basic issues but also different applications. Finally, the course will also cover important challenges and future trends in this domain.

Programme

Contenu

The course is divided into two parts. In the first part, the students will learn all the theoretical aspects as described below. In the last part they will focus on practical aspects with directed studies on an Edge distributed platform with green nodes.

Topics:

- Understanding Green environment and environmental impact.
  - Introduction to energy consumption and environmental impact
    - Overview of the concept and importance of green AI computing.
    - Principles of sustainability and environmental responsibility.
    - Environmental impacts of traditional computing and AI.
  - Fundamentals of AI and Sustainability
    - Basics of artificial intelligence and machine learning.
    - Basics of Generative and Behavioral artificial Intelligence
  - Energy-Efficient Computing Techniques
    - Techniques for energy-efficient AI model training and inference.
    - Optimization strategies for reducing computational resource usage.
- Applications in Connected Industries
  - Industry 4.0 and Connected Systems
    - Overview of Industry 4.0 and the integration of AI in industrial processes.
    - Importance of connectivity and data exchange in modern industrial settings.
  - Green AI Applications in Manufacturing
    - Energy-efficient process optimization using AI.
    - Predictive maintenance and asset management for sustainable operations.
  - Smart Energy Management
    - AI-driven solutions for optimizing energy consumption in industrial settings.
    - Integration of renewable energy sources and demand-side management.
- Implementing Green AI Solutions
  - Case Studies and Best Practices
    - Real-world examples of successful implementations of green AI in connected industries.
    - Lessons learned and best practices for achieving sustainability goals.
  - Challenges and Opportunities
    - Identification of challenges in implementing green AI solutions.
    - Opportunities for innovation and collaboration in the field.
  - Future Directions and Research Trends
    - Emerging technologies and research directions in green AI computing.
    - Potential impacts of green AI on the future of connected industries.

complementary content: New AI techniques and security energy consumption.

Modalités de validation

- Contrôle continu

- Examen final

Description des modalités de validation

Lab reports