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Green AI Training: CSR, ESG, and Responsible AI

3 days (21 hours)

Overview

Green AI refers to practices that enable the design, evaluation, and optimization of more energy-efficient, responsible, and sustainable artificial intelligence systems. This approach combines responsible AI, frugal AI, digital frugality, CSR, ESG, and regulatory compliance.

Our Green AI: CSR, ESG, and Responsible AI training will help you understand how to reduce the environmental impact of AI while managing performance, inference costs, and AI compliance requirements.

You will learn to measure AI's carbon footprint, model energy consumption, GPU usage, cost per token, and key metrics useful for ESG reporting.

By the end of the training, you will be able to compare responsible LLMs, SLMs, Small Language Models, frugal RAG architectures, local inference, and edge AI to choose the AI model best suited to your business constraints.

This training also covers optimization techniques such as LoRA, QLoRA, quantization, model distillation, pruning, and model compression, as well as the principles of responsible MLOps, AI governance, AI auditing, and AI Act compliance.

Like all our courses, this one will introduce you to **the latest stable version** of the technology and its new features.

Objectives

- Understand the principles of Green AI, responsible AI, frugal AI, and sustainable AI

- Assess the environmental impact of AI, the energy consumption of models, and inference costs
- Integrate CSR, ESG, RGEN, AI Act, and AI compliance considerations into an artificial intelligence project
- Compare LLMs, SLMs, compact models, frugal RAG, local inference, and edge AI
- Optimize AI models with LoRA, QLoRA, quantization, distillation, pruning, and compression
- Implement a framework for governance, AI auditing, ESG reporting, and responsible MLOps

Target Audience

- AI managers, innovation managers, and AI project managers
- Data scientists, ML engineers, and MLOps engineers
- AI architects, cloud architects, and technical leads
- CIOs, data managers, and compliance officers
- CSR or ESG managers looking to engage with AI technical teams

Prerequisites

- General knowledge of AI, data, or digital projects
- Basic understanding of AI models, LLMs, or machine learning is a plus
- No advanced expertise in model training is required

Technical prerequisites

- No mandatory technical prerequisites
- A computer with a modern web browser is recommended for the analysis, benchmarking, and mapping workshops

Green AI Training Program

[Day 1 - Morning]

Green AI, Responsible AI, and CSR/ESG Challenges

- Understanding the principles of Green AI, responsible AI, frugal AI, and sustainable AI
- Identify the challenges of digital frugality, energy efficiency, and digital eco-design as they apply to artificial intelligence systems
- Understand the role of CSR, ESG, and ESG reporting in managing AI projects
- Assess the environmental impact of AI: training, inference, storage, data, network, and infrastructure
- Understand the concepts of AI carbon footprint, environmental impact measurement, and model lifecycle

- Hands-on workshop: mapping an AI service and identifying its main sources of environmental, energy, and organizational impact

[Day 1 - Afternoon]

RGESN, AI Act, and AI compliance

- Understanding the contributions of the RGESN to digital eco-design and the assessment of digital services incorporating AI
- Discover the principles of the AI Act and their impact on AI systems used in business
- Identify AI compliance requirements: documentation, traceability, risk management, monitoring, and governance
- Implement an AI governance framework aligned with CSR, ESG, and regulatory objectives
- Understand the ethical challenges of AI, including accountability, acceptable use, and human oversight
- Develop an RGESN/AI Act analysis framework to assess a corporate AI use case

AI risks, bias, explainability, and auditing

- Identify key AI risks: hallucinations, uncontrolled use, data leaks, decision errors, and vendor lock-in
- Understand algorithmic biases and their impacts on decisions, users, and of transparency
- Implementing principles of model transparency, documentation, usage restrictions, and human review
- Understand AI explainability and its limitations depending on models, data, prompts, and architectures used
- Organize traceability for models, datasets, prompts, versions, evaluations, and deployment decisions
- Prepare an AI audit with evidence, logs, metrics, documentation, and a remediation plan

[Day 2 - Morning]

Measure the environmental and economic impact of AI models

- Understand the energy consumption of models and the factors influencing their impact: size, architecture, data, hardware, and frequency of use
- Analyze GPU consumption, cloud resources, storage, network, and the duration of AI processing
- Compare training, fine-tuning, and inference costs across business scenarios
- Measure inference costs, cost per token, latency, throughput, and the impact of context size
- Link energy efficiency, model performance, operating costs, and user experience
- Hands-on workshop: Comparing multiple AI inference scenarios based on cost per token, GPU usage, latency, and estimated environmental impact

[Day 2 - Afternoon]

Choosing the right model: Responsible LLMs, SLMs, and frugal AI

- Understanding the challenges of responsible LLMs in a business context: costs, security, compliance, performance, and resource efficiency
- Comparing LLMs vs. SLMs based on business needs, task complexity, confidentiality, and deployment constraints
- Discover SLMs (Small Language Models) and compact language models to reduce costs and energy consumption
- Defining a method for selecting an AI model based on accuracy, latency, cost, carbon footprint, governance, and maintainability
- Establish an AI model benchmark incorporating quality, cost, performance, energy consumption, and compliance
- Select an AI model suited to a business use case by comparing LLMs, SLMs, compact models, and ESG constraints

Frugal RAG, local inference, and edge AI

- Understand the role of frugal RAG in limiting systematic fine-tuning and reducing unnecessary processing
- Optimize RAG architectures: chunking, embeddings, vector indexing, context size, reranking, and document filtering
- Compare RAG vs. fine-tuning based on cost, available data, governance, accuracy, and environmental impact
- Identify use cases suited to local inference, embedded models, and edge AI
- Reducing model calls, unnecessary tokens, embeddings, and redundant processing in a generative AI architecture
- Optimize a RAG architecture to reduce LLM calls, context sent, and
[Day 3 - Morning]

[Day 3 - Morning]

Optimizing AI models and frugal AI techniques

- Understanding AI model optimization levers to reduce costs, resource consumption, and latency
- Implementing an inference optimization strategy tailored to production constraints
- Discover efficient fine-tuning with LoRA and QLoRA to adapt a model without full retraining
- Understanding quantization, its benefits, and its trade-offs in terms of quality, memory, and performance
- Discover model distillation, pruning, and model compression
- Hands-on workshop: defining an optimization strategy for an AI service combining quantization, LoRA, a compact model, and reduced inference cost

[Day 3 - Afternoon]

Responsible MLOps and Green AI Industrialization

- Understand the principles of responsible MLOps to industrialize efficient, traceable, evaluated, and compliant models
- Track versions of models, datasets, prompts, parameters, metrics, evaluations, and deployment decisions
- Implement controls for performance, drift, costs, energy consumption, and AI risks in production
- Define alert thresholds for latency, cost per token, inference volumes, errors, and usage drift
- Integrate ESG reporting, AI compliance, AI audit, and governance requirements into the MLOps lifecycle
- Design a responsible MLOps pipeline with Green AI metrics, traceability, and cost tracking

Design a responsible, efficient, and compliant AI service

- Analyze an AI use case from the perspective of Green AI, CSR, ESG, the AI Act, GDPR, performance, costs, and governance
- Choose the most suitable architecture: LLM, SLM, frugal RAG, local inference, edge AI, or efficient fine-tuning
- Define key performance indicators: AI carbon footprint, GPU consumption, cost per token, latency, quality, and AI risks
- Propose optimizations: choice of AI model, quantization, compression, distillation, pruning, LoRA or QLoRA
- Develop an AI governance strategy with auditing, traceability, explainability, transparency, and ESG reporting
- Present a comprehensive Green AI roadmap for a responsible, frugal, and compliant

Target Companies

This training is intended for both individuals and companies, large or small, wishing to train their teams in new advanced IT technologies or to acquire specific business knowledge or modern methods.

Assessment upon enrollment

The pre-training assessment complies with Qualiopi quality standards. Upon final registration, the learner receives a self-assessment questionnaire that allows us to evaluate their estimated proficiency in various types of technologies, as well as their expectations and personal goals regarding the upcoming training, within the limits imposed by the selected format. This questionnaire also allows us to anticipate certain connection or internal security issues within the company (intra-company or virtual classroom) that could pose challenges for monitoring and ensuring the smooth running of the training session.

Teaching Methods

Practical Course: 60% Practical, 40% Theory. Training materials distributed in digital format to all participants.

Organization

The course alternates between theoretical input from the trainer, supported by examples and reflection sessions, and group work.

Assessment

At the end of the session, a multiple-choice questionnaire is used to verify that the skills have been properly acquired.

Certification

A certificate will be issued to each trainee who has completed the entire training program.