Sustainable AI: Green Computing and Energy-Aware Models

Duration: 5 Days

Language: en

Course Code: PI2 - 135

Objective

By the end of this course, participants will be able to:

- Understand the environmental impact of AI systems and large-scale computing.
- Design and implement energy-efficient machine learning models.
- Apply green computing principles across data processing, training, and storage.
- Assess trade-offs between performance, accuracy, and sustainability.
- Integrate environmental responsibility into AI policies and procurement.

Audience

This course is ideal for:

- AI Engineers and Data Scientists.
- Cloud Infrastructure and DevOps Professionals.
- Sustainability Officers in tech organizations.
- Policy makers and regulators shaping AI governance.
- Tech company leaders and CTOs.
- Researchers in environmental computing and responsible AI.

Training Methodology

The course incorporates interactive lectures, comparative case studies, model optimization labs, and cross-disciplinary discussions. Participants will engage in simulations and impact assessments of real-world AI projects to apply sustainability metrics.

Summary

As Artificial Intelligence becomes more deeply integrated into global systems, the energy and environmental impact of AI models is raising urgent concerns. This course provides a strategic overview of how to develop, deploy, and manage AI systems responsibly—balancing

technological advancement with environmental sustainability.

Participants will explore the carbon footprint of AI, energy-efficient model architectures, eco-conscious data practices, and green data centre operations. The course combines theoretical foundations with case studies, technical strategies, and policy discussions to enable a sustainable AI lifecycle.

Course Content & Outline

Section 1: Understanding AI's Environmental Footprint

- The growth of AI and its energy demands.
- Measuring carbon emissions from AI training and inference.
- Life cycle analysis of AI systems: From data to deployment.
- The role of big data and cloud computing in energy consumption.
- Case study: Carbon footprint of GPT-class models.

Section 2: Principles of Green Computing

- Definition and scope of green computing.
- Low-power computing architectures and edge AI.
- Sustainable software design practices.
- Cloud sustainability and efficient resource provisioning.
- Choosing green cloud providers: AWS, Google, Microsoft benchmarks.

Section 3: Energy-Efficient AI Model Design

- Lightweight model architectures: Distillation, pruning, quantization.
- Trade-offs: Accuracy vs. efficiency vs. latency.
- Techniques for reducing compute intensity.
- Tools for profiling energy usage in model training.
- Lab: Optimize a neural network for lower energy usage.

Section 4: Sustainable Data and Infrastructure Practices

- Eco-aware data acquisition and management.
- Smart data sampling and minimising redundant storage.
- Sustainable data centre infrastructure: Cooling, hardware, energy sources.
- Federated learning and edge deployment for lower central compute.

- Case Study: Sustainability strategy of a global AI company.

Section 5: Policy, Ethics, and Long-Term Responsibility

- Environmental AI governance frameworks.
- Procurement policies that prioritise green tech.
- AI ethics in the context of climate justice and global equity.
- The role of open-source and community-driven sustainable AI.
- Final workshop: Drafting a sustainable AI policy for your organization.

Certificate Description

Upon successful completion of this training course, delegates will be awarded a Holistique Training Certificate of Completion. For those who attend and complete the online training course, a Holistique Training e-Certificate will be provided.

Holistique Training Certificates are accredited by the British Accreditation Council (BAC) and The CPD Certification Service (CPD), and are certified under ISO 9001, ISO 21001, and ISO 29993 standards.

CPD credits for this course are granted by our Certificates and will be reflected on the Holistique Training Certificate of Completion. In accordance with the standards of The CPD Certification Service, one CPD credit is awarded per hour of course attendance. A maximum of 50 CPD credits can be claimed for any single course we currently offer.

Categories

AI, Data and Visualisation, Health, Safety & Environment HSE, IT & Computer Application, Technology

Tags

Green Technology, Green AI, Sustainable AI, Energy-Aware Models

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