MINISTÈRES AMÉNAGEMENT DU TERRITOIRE TRANSITION ÉCOLOGIQUE
Liberté Égalité Fraternité

Commissariat Général au Développement Durable

ECO LAB
Innovation - Écologie - Territoires

ENGAGEMENT KIT FOR FRUGAL ARTIFICIAL INTELLIGENCE WITHIN YOUR ORGANISATION

15 best practices made available and submitted for consultation by the Ecolab of the General Commission for Sustainable Development (CGDD)

In partnership with

HUB FRANCE IA

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CONTEXT

Following the publication of the General Framework for Frugal Artificial Intelligence (AI) (AFNOR-Spec 2314) [1] in June 2024, the Ecolab of the General Commission for Sustainable Development (CGDD), in partnership with the Hub France IA and AFNOR Standardisation, is publicicing and submitting for consultation a list of best practices on frugal AI for public and private stakeholders. Each organisation can adapt this list and cite it in AI charters, such as ethics charters. This list aims to encourage organisations that adopt it, to have a reasoned development of the technology, by questioning the need for AI above all and by promoting efficient AI systems. This list of best practices aims to propose operational and achievable actions.

[[1] General reference framework for frugal AI – Measuring and reducing the environmental impact of AI, https://www.boutique.afnor.org/fr-fr/norme/afnor-spec-2314/referentiel-general-pour-lia-frugale-mesurer-et-reduire-limpact-environneme/fa208976/421140

Contribute and give your opinion on these good practices by participating in the consultation

PREAMBLE

The European AI Regulation [2] defines an AI system as an automated system designed to operate at varying levels of autonomy, capable of adapting after deployment, and capable of generating outputs, such as predictions, content, recommendations, or decisions that can influence physical or virtual environments, based on explicit or implicit objectives.

An AI system encompasses both specialised machine learning algorithms and general-purpose AI systems, which will become widely available from the end of 2022. The latter can perform a wide range of distinct tasks with significant generality, using large amounts of data. Due to their size and complexity, general-purpose AI models, such as those used for content generation, are the most likely to have significant environmental impacts across an organisation. Organisations deploying it are particularly encouraged to follow these frugal AI best practices.

Many organisations are already harnessing AI to optimise production, improve customer service, increase process efficiency, analyse data, perform predictive maintenance, detect issues in real time, and more. AI can be used for multiple purposes.

The large-scale deployment of artificial intelligence in our society has environmental impacts throughout the entire lifecycle of an AI system, from the extraction of raw materials to manufacture the computing resources needed to store and process data, to the intensive use of this equipment in water-scarce areas, and the end-of-life of IT equipment.

[2] EU Regulation 2024/1689 of June 13, 2024, https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=OJ:L_202401689

Would you like to appear as a contributor? Participate in the consultation

While the digital sector currently represents a limited share of France's carbon footprint (4.4% of the country's carbon footprint [3]), a significant increase in this footprint is anticipated, due to the massive development of data centers dedicated to AI, the increase in the number and complexity of AI models, and their widespread use.

In a report dated April 10, 2025 [4], the International Energy Agency warns of an increase in electricity demand due to the development of AI in the coming years, which is expected to reach 945 TWh by 2030, equivalent to Japan's annual consumption today. However, figures on the environmental impact of AI remain incomplete, as large companies that supply AI systems provide little or no information on their environmental impact.

Frugal AI, as defined by the General Framework for Frugal AI, goes beyond simple efficiency issues by also questioning the need to use an AI system and placing resource constraints as paramount over performance objectives. To complement this, frugal AI also involves the implementation of the best practices and the use of AI that aims to remain within planetary boundaries [5].

[3] Assessment of the environmental impact of digital technology in France, Update of the ADEME-Arcep study, Final report, January 2025, https://ecoresponsable.numerique.gouv.fr/docs/2024/etude-ademe-impacts-environnements-numerique.pdf
[4] Energy and AI, International Energy Agency, 2025
[5] Planetary limits, notre-environnement.gouv, updated November 2023, https://www.notre-environnement.gouv.fr/themes/societe/article/limites-planetaire

WHO IS CONCERNED?

Any organisation that uses one or more AI systems as part of its operations. The AI system can be developed internally or deployed through a service provider.

Find Ecolab's resources on frugal AI

HARDWARE

The environmental impact is defined above all by the hardware components that enable the use of an AI system: processors in data centres, networks, data capture equipment, etc.

IN THIS DOMAIN, THE ORGANISATION IS COMMITTED TO:

1 Obtain as much information as possible about the physical resources used for data storage and computing, including data centres and Edge servers: location, ISO 30134 standard metrics (Power Usage Effectiveness, Water Usage Effectiveness, etc.), waste heat reuse practices, virtuous practices for data centre construction, extending equipment lifespans, or processing electronic waste. When the organisation uses Cloud services, it will ensure that environmental indicators are integrated into the choice of services and that environmental clauses are included in a call for tenders. When the organisation has its own computing resources, it will ensure that the best possible practices are implemented on its infrastructure.

In charge: Head of infrastructure

SOFTWARE

TNot all AI solutions are equal when it comes to their environmental footprint. For example, a general-purpose AI system will consume more energy than one specialised for specific tasks.

IN THIS DOMAIN, THE ORGANISATION IS COMMITTED TO:

2 Precisely qualify the business need for using AI and define a level of algorithm performance that matches the identified need, without exceeding it. Identify the maturity of the technology and the maturity of the organisation to ensure a long lifespan for the AI system.

In charge: Project Steering Committee

3 Favouring AI models that consume the least resources to perform a task (using Hugging Face's AI Energy Score [6]), which may imply favouring specialised and customised AI systems for specific tasks. In many cases, general-purpose AI models are overpowered in terms of knowledge and capabilities for a specific task.

[6] AI Energy Score, ranking the energy efficiency of AI models, https://huggingface.co/AIEnergyScore

In charge: Project Steering Committee

4 Use eco-design methods for algorithms, such as algorithm compression methods [7].

[7] For example, at the time of writing, the open-source Pruna AI library allows the application of quantisation, distillation, and pruning algorithms: https://github.com/PrunaAI/pruna

In charge: Datascientist

5 Prioritise the reuse of technological building blocks (pre-trained models, for example) to avoid new calculations and share the algorithms developed as much as possible for future reuse (within the organisation, or even open-source). In the case of using an external service provider, this action will be included in the contract.

In charge : Datascientist or AI project manager

DATA

Artificial intelligence systems are trained using datasets. During operation, data is inserted as input and new data is generated as output. Managing the overall lifecycle of these different types of data is fundamental to the proper functioning of the AI system.

IN THIS AREA, THE ORGANISATION IS COMMITED TO:

6 Build databases that are as high-quality as possible and of an appropriate size to the needs of the AI project, while avoiding integrating unnecessary data into the solution.

In charge: Datascientist, AI developer

7 Define the most virtuous data management policy possible, in terms of redundancies and archiving.

In charge: Head of infrastructure

EVALUATION AND COMMUNICATION

To be able of reducing the environmental impact of AI, it is essential to measure this impact, but also to communicate about this impact to raise awareness among users.

IN THIS AREA, THE ORGANISATION IS COMMITED TO:

8 Integrate environmental assessments of AI systems into its broader approach to responsible digital technology, which can be based on the general framework for eco-design of digital services [8].

[[8] General Framework for Eco-Design of Digital Services, 2024 https://ecoresponsable.numerique.gouv.fr/publications/referentiel-general-ecoconception/

In charge: Project Steering Committee, CSR Division

9 Monitor the energy impacts of AI system developments with recognised or certified tools, such as Code Carbon [9] (real-time impact of algorithm runs) or Ecologits [10] (impact of API calls for language models). The organisation will be able to anticipate these impacts by testing small amounts of data to extrapolate the impact of the project and find measures to limit it, or by referring to similar projects to anticipate this impact (for example, with the Green Algorithms tool [11]).

[9] GitHub repository on Code Carbon, https://github.com/mlco2/codecarbon
[10] GitHub repository on Ecologits, https://github.com/genai-impact/ecologits
[11] Green Algorithms http://calculator.green-algorithms.org/[9] GitHub repository on Code Carbon, https://github.com/mlco2/codecarbon

In charge: Datascientist

10 Carry out the most comprehensive environmental impact assessments possible across the entire life cycle of an AI system and several environmental indicators (depletion of natural resources, climate change, consumption of energy and water resources, ocean acidification, fine particle emissions, ionising radiation, etc.). With this assessment, the organisation documents the scope of the life cycle analysis (stages taken into account), the source of the impact calculation methodologies, the quality and date of the data. Build a database on the environmental impacts of the organisation's AI projects.

In charge: CSR department

11 Display the energy consumption or carbon impact of a query to a general-purpose AI system, with remarkable equivalents, for all queries by a user and all queries for the organisation. For this, estimates can be made using the open-source Ecologits library.

In charge: AI Portal Designer

12 Communicate and share best practices implemented to limit the environmental impact of AI through scientific articles or in specialist journals (such as Medium).

In charge: AI Project Manager

PROJECT MANAGEMENT AND GOVERNANCE

To limit the environmental impact of AI, before any deployment, it is necessary to question both the need for AI concerning alternative solutions, and to adapt the AI system to the desired task.

IN THIS AREA, THE ORGANISATION IS COMMITED TO:

13 Organise a review of environmental impact indicators within the project steering committees, which meet regularly.

In charge: AI Project Manager

14 Organise training sessions on AI frugality issues: the impact on resources, associated greenhouse gas emissions, best practices to adopt in project management and programming. Raise awareness among businesses of the opportunities of AI to bring out relevant use cases for which AI systems are differentiating.

In charge: Management, HR Department

15 Designate a frugal AI lead to coordinate the above commitments. This could be the responsible digital lead or an AI project manager.

In charge: Management

Are you part of an organisation using AI systems? Do you have feedback on these best practices?

Contribute and share your opinion by participating in the consultation. Your organisation may be featured in the next publication.

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