

Ethical Guidelines

FOR AI IN ENVIRONMENTAL RESEARCH

Need for Guidelines

While AI offers powerful tools for understanding and addressing environmental challenges, environmental researchers must also consider its trade-offs. By adopting these practices, researchers can help ensure that AI contributes positively to environmental sustainability, rather than exacerbating existing challenges.

Guidelines

The following guidelines outline responsible and sustainable AI usage. While similar recommendations have been proposed elsewhere, these guidelines draw on ethical lenses. All these lenses provide perspectives on AI's impact on the environment and how to help use it responsibly. Deontology focuses on how AI affects rights by upholding them, especially for vulnerable groups, and also acknowledges conflicts between rights. The Justice lens examines how AI disproportionately impacts certain groups and identifies solutions such as community-based research and partnerships with directly affected groups. A Utilitarian calculus focuses on maximizing benefits and minimizing harms by weighing AI's harms against benefits and adjusting how researchers use the technology. Daoism takes a holistic approach and emphasizes that humans are part of nature and thus have a duty to protect it. Instead of a Utilitarian calculus, this approach recognizes that AI is part of a larger system and requires researchers to use AI in ways to support nature, including human well-being. All these lenses provide complementary views on how researchers can use technology to benefit the environment.

These guidelines also build on existing guidance for AI use. These include the National Centre for Atmospheric Science (n.d.), which provides AI usage tips for researchers in "Conscious Use of AI: Practical Tips and Thoughts from environmental researchers"; the Massachusetts Institute of Technology's (2025) "Guidance for use of Generative AI tools"; and the University of Florida's (n.d.) "Guidance for Researchers. The guidelines are further informed by discussions with professionals in environmental research and sustainability-related fields.

Guidelines

Researchers should be conscious of when to use AI.	Researchers should use alternatives if they are equally effective or more sustainable. Rather than defaulting to AI, they should evaluate whether it is necessary for a given task.
Researchers should use a variety of techniques to make AI more sustainable.	1. Researchers should use more precise prompts to decrease the number of queries needed to attain a result and lower the overall computational demand. 2. Choosing the appropriate model can also reduce environmental impact. Researchers should use smaller or more specialized models to help reduce a task's carbon footprint. 3. Various tools help schedule computation during cleaner electricity times. Some software forecasts when low-carbon electricity is available and the corresponding times.
Researchers should use Tools to Improve Transparency on Environmental Impacts.¹	Researchers should ensure transparency regarding AI's usage and its impact on the carbon footprint. Researchers can use carbon and energy calculators to track impacts. Examples of such tools include the ML CO2 Impact calculator by Schmidt et al and AI Energy Consumption Calculator by AI Energy Calculator . There is also AI EnergyScore implemented by HuggingFace (Luccioni et al., n.d.), which suggests energy-efficient AI models. To promote transparency, researchers must document their own AI usage and other tracked environmental emissions. This involves citing where AI was used and can also include reporting results from calculators used in research papers.
Engage with Local Communities that are Impacted by AI.	Researchers can support communities through policy engagement, community partnerships, and other mitigation efforts. This responsibility can be difficult in practice, as researchers may not know where data centers supporting AI tools are located. In such cases and in general, engagement can take broader forms, such as supporting transparency and advocating for more sustainability in technology. This may involve engaging the community more in the research process, such as in community-based participatory research.

1. The impact of these tools has yet to be thoroughly studied, and may depend on a variety of factors such as the scale of the project.

AI Usage Note:

Generative AI tools were used to assist in identifying sources and for minor editing and text refinement. Specifically, tools were used to find sources (eg, journal articles), improve clarity and grammar, and help organize the paper.

Work Cited

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