

Environmental Impacts of Artificial Intelligence

Sanae Khali Issa^{1,*}, Lamiae Khali Issa², Ahmed Raissouni², Hicham Berbar³

¹Innovative Technologies Laboratory, Faculty of Science and Technology, Tangier, Morocco

²Marine Environment and Natural Hazards Research Team, Faculty of Science and Technology, Tangier, Morocco

³Ecole Normale Supérieure, Tetouan, Morocco

Email address:

skhaliissa@uae.ac.ma (Sanae Khali Issa), lamiae2608@gmail.com (Lamiae Khali Issa),

a.raissouni@uae.ac.ma (Ahmed Raissouni), h.berbar@uae.ac.ma (Hicham Berbar)

*Corresponding Author

Abstract

Nowadays, Artificial Intelligence (AI) tools have revolutionized various sectors, leading to significant advancements in efficiency, productivity, and innovation. However, the environmental implications of these technologies are increasingly concerning. This paper examines the negative impacts of AI tools on our environment, focusing on energy consumption, resource depletion, and electronic waste. The energy-intensive nature of AI model training and deployment contributes significantly to greenhouse gas emissions. High-performance computing centers required for AI operations consume vast amounts of electricity, often sourced from non-renewable energy. For instance, the training process for a single AI model can consume thousands of megawatt hours of electricity and emit hundreds of tons of carbon. Additionally, the production and disposal of AI hardware — such as servers, GPUs, and data centers — result in the depletion of natural resources and generation of electronic waste, exacerbating pollution and environmental degradation. Furthermore, the rapid pace of AI development promotes a cycle of continuous hardware upgrades, leading to shorter device lifespans and increased electronic waste. AI-generated text requires significantly less energy than AI-generated images. Using the most efficient text generation model studied, creating text 1,000 times can use as much energy as 9% of a full smartphone charge. Generating images is by far the most energy- and carbon-intensive AI-based task. Training the bigger, more popular AI models like GPT-3 produced 626,000 pounds of carbon dioxide, equivalent to approximately 300 round-trip flights between New York and San Francisco. This paper emphasizes the need for sustainable practices in the development and deployment of AI tools, including the adoption of energy-efficient algorithms, renewable energy sources, and effective recycling programs. Policymakers, researchers, and industry leaders must collaborate to create sustainable AI solutions that balance technological advancement with environmental preservation.

Keywords

Artificial Intelligence, Environment, Energy Consumption, Resource Depletion, Electronic Waste