

## **THE IMPACT OF AI ON THE ENVIRONMENT AND NATURAL RESOURCES**

Artificial intelligence is often mistakenly perceived as "cloud technology." In reality, it is a massive physical infrastructure consisting of millions of tons of metal. Every request to a neural network initiates the operation of thousands of graphics processing units which require rare-earth and critical metals such as lithium, cobalt, tantalum, and copper. According to the International Energy Agency report, the production of such technologies requires intensive extraction of critical minerals [2]. For example, lithium extraction is extremely water-intensive and contributes to environmental degradation in regions such as Chile and Argentina. Thus, AI is not just an algorithm; it is also linked to the depletion of natural resources.

The real scale of AI's environmental impact is significant. Several facts support this claim. Training large AI models requires substantial amounts of electricity. For example, training models like GPT-3 consumed over 1,000 MWh of energy, comparable to the annual consumption of more than 100 households [4].

In addition, data centers require large volumes of water for cooling. Microsoft reported a sharp increase in water consumption due to AI expansion [1]. Researchers estimate that interactions with AI systems may require water for cooling processes, although the exact amount varies depending on data center efficiency and location [3].

The heaviest burden falls on regions with cheap energy and weak environmental regulation. The construction of large data centers can deplete local water resources and lead to conflicts with agricultural communities. In 2024, a court in Chile halted a Google data center project due to concerns over water usage [5].

Recent studies emphasize that the main environmental impact of AI is not an individual request, but the scale of its global use. In 2024, artificial intelligence accounted for approximately 15–20% of total data center electricity consumption [6]. According to the International Energy Agency, global data center energy consumption may reach nearly 945 TWh by 2030, largely driven by AI technologies [2]. Furthermore, the total water footprint of AI systems is projected to reach hundreds of billions of liters annually.

Consequently, the question of whether AI is a step forward or a step back remains open. While technological progress offers many benefits, it also creates serious environmental challenges. Without improving energy efficiency and resource management, the rapid development of AI may lead to long-term ecological consequences.

At the same time, the solution lies not in rejecting technology, but in changing priorities. We must focus on projects capable of reducing environmental impact. One example is the GraphCast model, which improves climate forecasting [7]. Such technologies demonstrate that AI can become a tool for environmental protection rather than destruction. However, achieving this requires balancing innovation with sustainability.

### **REFERENCES**

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