Ateneo de Davao University
Emilio Jacinto Street, Davao City

The Environmental Cost of Artificial Intelligence

Laboratory 4 - Mini Project Documentation Report

Prepared by:
Marc Vincent Jacob
Computer Science | 2A
16 - 607

Submitted to:
Sir. Gabriel I. Quibod

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Introduction

Artificial Intelligence (AI) has been at a rapid development, with this there is an environmental cost. From providing multiple changes in different industries, from computer science to healthcare, there are many benefits to receive. With these various benefits, there also come extreme effects. For AI systems to work, data centers are required, these establishments require a large amount of electricity, water and natural resources. With this, our environment is negatively affected by what is required to keep AI systems functioning. This issue becomes relevant as the global demand for AI increases. Without sustainable measures, this only brings more problems to the ecosystem. Therefore, everybody in the world, especially organizations and individuals using AI are affected by the environmental consequences AI brings.

Problem Description

With the many demands of AI, multiple negative impacts are done on the environment, the main reason for this is due to AI data centers. AI data centers are facilities made to train, deploy and deliver AI applications and services (Jonker & Gomstyn, 2025). Without AI data centers, AI applications that are regularly used would not be possible.

For these data centers to function, many natural resources are being used. To prevent overheating, water is being utilized. In the past, the training of GPT-3 used approximately 700,000 liters of freshwater to cool the now outdated system (Li et al., 2025). In these data centers as well, electronic waste is produced that contain hazardous materials to the environment like mercury and lead (UNEP, 2025). To power these machines, a large amount of electricity is needed, large enough that in 2023, around 1.5% of global energy consumption is used up by AI data centers (Sun, 2025).

In tackling this issue, many challenges arise. It becomes difficult to balance AI innovation for the greater good while being sustainable. Additionally, with the greater demand for AI developments, even more resources are required. Which is why with all the things needed for AI application to function, the earth's environment is at risk. If not addressed, AI boosts environmental degradation.

Proposed Solution

In order to reduce the negative impacts of AI to the environment, a solution to this would be the development of energy efficient and sustainable AI systems while being assisted with a management system to ensure sustainability. Measures that are to be accomplished for a more sustainable development include: real-time monitoring of the usage of natural resources in AI data centers, optimization of systems to reduce computing tasks and automated reports on the

sustainability of the AI system. With this, the target users are individuals and organizations who manage AI data centers and AI applications. This solution thus is expected for energy, water and the consumption of other natural resources to be reduced. Additionally less electronic waste is expected to be produced. With these outcomes, the negative impacts of AI towards the environment is possible.

Conclusion

With the many developments of AI, multiple benefits are made at the cost of extreme environmental effects. AI data centers consume a large amount of natural resources like water and energy while contributing to electronic waste. The effects of these facilities contribute to environmental degradation if not addressed. To address this, the development of sustainable AI systems accompanied by a sustainability management system is proposed. With this, it allows for the reduction of energy and water use while also lowering electronic waste. This solution offers a balance between technological innovation and environmental responsibility. In implementing sustainable AI practices, it ensures that AI continues to develop without the risk of harming the earth.

References

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