Artificial Intelligence, Data Centers and Water Consumption

Purpose: Inform readers about how data centers and AI affect the environment.

Abstract

Today, people have started to express concern for the increasing amounts of water consumption resulting from the upward trend of usage and load in artificial intelligence and data centers. It has become apparent that the lack of water efficiency and transparent reports of resource consumption in companies harm the environment. Authorities must take steps towards improving sustainability and regulation for an environmentally friendly usage of technology.

1. Introduction

Since the 2000's, usage of internet has risen significantly[1], and has become much more integrated in our lives than ever before. As a consequence, with corporations expanding and attempting to handle the huge amount of traffic passed through the world every day; modern data centers, and AI, are draining water supplies fast, and the consumption of natural resources is increasing.

2. Background

Today, most people store their data in the "cloud". Many people do not know what this exactly means, and it is taken for granted. When services say that your photographs, videos, playlists, passwords, and applications are stored in the cloud, they say that your data is stored in computers which send you the data you want when you make a request to it. These computers, called "servers", are located in data centers, which are large buildings similar to warehouses. The number of servers in these data centers vary from 500 to more than 5000[2].

The operations of Large Language Models, also called Artificial Intelligence or AI in short, also take place in data centers. They are often used in automation, analytics, virtual assistants, programming among others[3].

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[1] Visual Capitalist: "Growth of Global Internet Users" https://www.visualcapitalist.com/visualized-the-growth-of-global-internet-users-1990-2025/

[2] OneChassis: "How Many Servers are in a Data Center?" https://gpuservercase.com/blog/how-many-servers-are-in-a-data-center/

[3] Google Cloud: "1,001 real-world gen AI use cases" https://cloud.google.com/transform/101-real-world-generative-ai-use-cases-from-industry-leaders

The most used type of AI, called generative AI or GPT, relies on making word-by-word predictions based on context. These models go through a lengthy and laborious process called “training” to be able to make correctly structured, and coherent responses, and predict word sequences[4]. Training an AI involves feeding the model a large sum of data, also called “scraping”. Scraping, also called “data mining”, is an operation in which servers scan entire databases in the internet. This process imposes a heavy load on these computers and proves to be costly in resources.

Data centers consume an enormous amount of electricity as the computers often operate under load to complete their tasks efficiently. In addition to this, as they use more electricity, they also generate heat. Usage of AI largely contributes to this heat generation as its training process and usage results in high power draw[5].

In order to keep data centers under stable heat conditions, various cooling methods are used. Among these cooling methods, reliance on water is apparent. It is consumed in high amounts as it is considered accessible and cheap.[6] A data center of average size is reported to spend 1 million liters of water in a single day.[7] Lawrence Berkeley National Laboratory reported that in 2023, the water cooling systems of data centers located in USA consumed 66 billion liters of water and indirectly exhausted an additional 800 billion liters from water consumption in production of electricity.[8]

In addition to spent electricity and water cooling systems, the production costs of server parts also have a role in water consumption. The average chip production facility consumes 37 million liters of water a day,[9] though most of this is recycled.

Most data centers lack transparency in reporting and documenting their consumption and exhaustion of resources.

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[4] NN/g: “How AI Models are Trained” https://www.nngroup.com/articles/ai-model-training/
[5] Inside Climate News: “AI Is Everywhere Now—and It’s Sucking Up a Lot of Water” https://insideclimatenews.org/news/28092024/ai-water-usage/
[6] “Making AI Less “Thirsty”: Uncovering and Addressing the Secret Water Footprint of AI Models”: https://arxiv.org/pdf/2304.03271
[7] “Data Centers Face Water Scarcity” https://www.npr.org/2022/08/30/1119938708/data-centers-backbone-of-the-digital-economy-face-water-scarcity-and-climate-ris
[8] “2024 United States Data Center Energy Usage Report” https://escholarship.org/uc/item/32d6m0d1
[9] http://web.archive.org/web/20251116213831/https://www.fdiintelligence.com/content/c31f977a-a8b7-5ffc-9eaa-daa48a8d1d41

3. Potential Results of Unbalanced Consumption of Water

- **Insufficient Resources**

As ecosystems' balance break from the lack of water, and indirectly, other resources, other systems break down; access to nutrition, other basic needs, and stability face difficulty. Economic conditions degrade. Countries may fight wars in need of water or other resources. Society may face corruption. People may have to fight for their lives every day.

- **Companies' Management of Crises**

One factor that many might not realize is that present corporations like Google, Meta, Amazon; as well as Coca-Cola, Nestlé may aim to monopolize on natural resources. This is already observable today.[10]

4. How to Lessen the Water Footprint of Data Centers

- **Restrict "Spam" Content**

"Spam" is content uploaded to the internet, considered not of use. It is often posted onto social media platforms like Instagram, Youtube, X, Reddit, and can also be found in email inboxes.

Today, a considerable amount of spammed text, videos, and photos contain AI-generated content. According to a research, 20% of the videos shown to new users on YouTube are entirely made with AI, or at least involve the containment of AI-generated content.[11] Reducing the amount of content retaining these elements and disallowing users of uploading such content may reduce unnecessary usage of AI, potentially benefiting water consumption by lightening the load data centers bear

- **Transparent and Comprehensive Reports**

In order to increase the sustainability of AI and the constant transferring of data, corporations should opt to show detailed reports of their resource usage.

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[10] The Guardian: "https://www.theguardian.com/world/2017/mar/01/indian-traders-boycott-coca-cola-for-straining-water-resources"

[11] The Guardian: "More than 20% of videos shown to new YouTube videos are AI slop" https://www.theguardian.com/technology/2025/dec/27/more-than-20-of-videos-shown-to-new-youtube-users-are-ai-slop-study-find

- Locating Data Centers Correctly

Where a data center is located can affect water consumption greatly because of weather conditions and accessibility. It is also beneficial to train an AI model in a data center with a higher water efficiency relative to another.

- Usage of Sustainable Energy Resources

Consuming electricity that is produced in an environmentally friendly manner like solar panels, hydroelectric, and wind turbines can result in less water consumption.

- Lessening AI Features on Platforms

Leaving AI-powered features like DuckDuckGo “Search Assist”, or Google “AI Overview” disabled by default can lighten the amount of unnecessary operations performed in data centers, thus reducing consumption of water.

5. Conclusion

With the ever-increasing water consumption in contrast to decreasing resources, it is very important to prioritize sustainable usage of water, and regulating how much water using internet and AI can consume is an important step to take. With necessary precautions taken, consumption of water can become much more balanced.

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