DeWitt Community Library

NATURE, SOCIETY & AI REALITY

AN INTRODUCTION TO AI TECHNOLOGY

A DIGITAL EXHIBIT

WITH ANDREW GEHLSEN

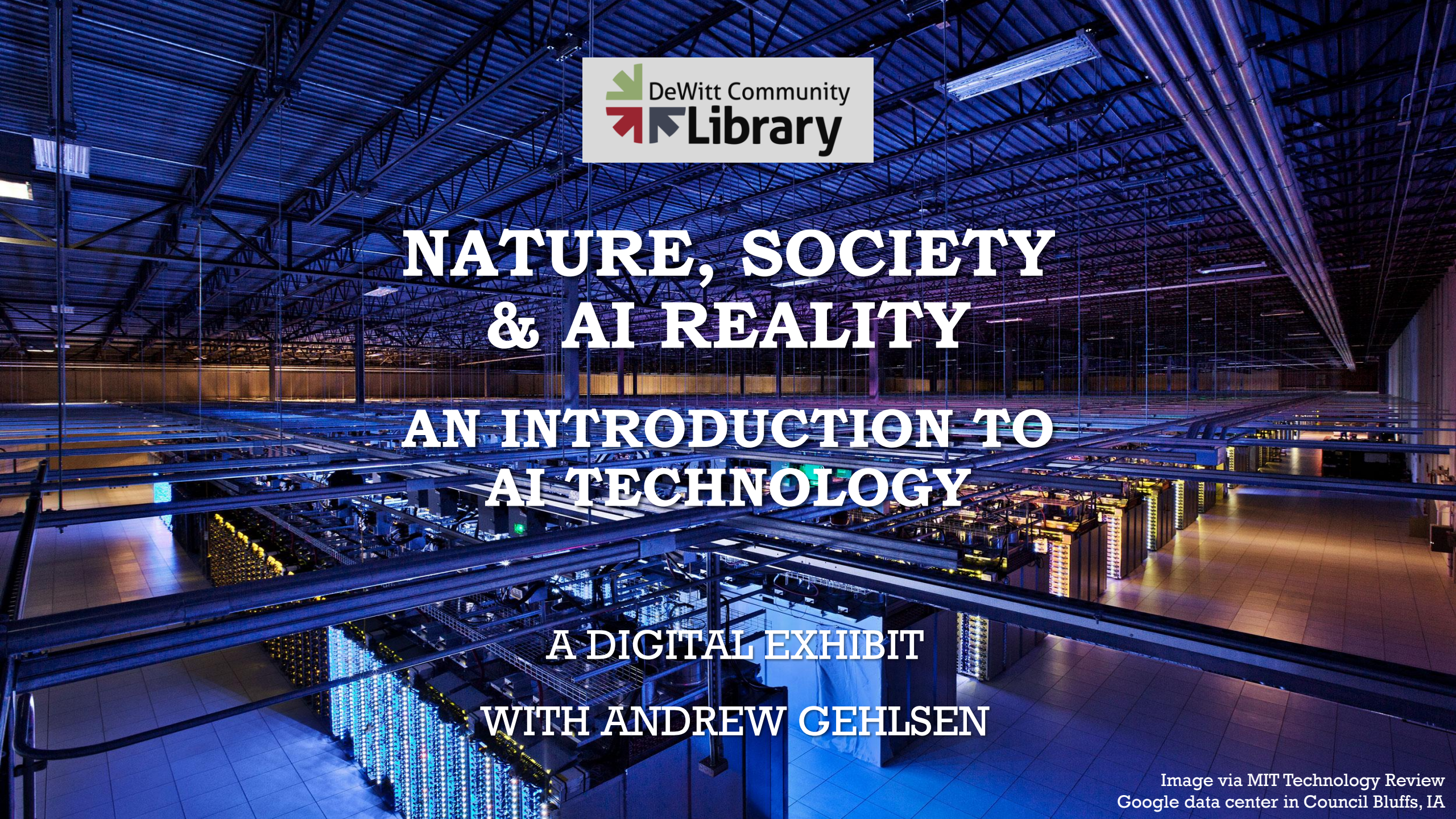


Image via MIT Technology Review
Google data center in Council Bluffs, IA

TABLE OF CONTENTS:

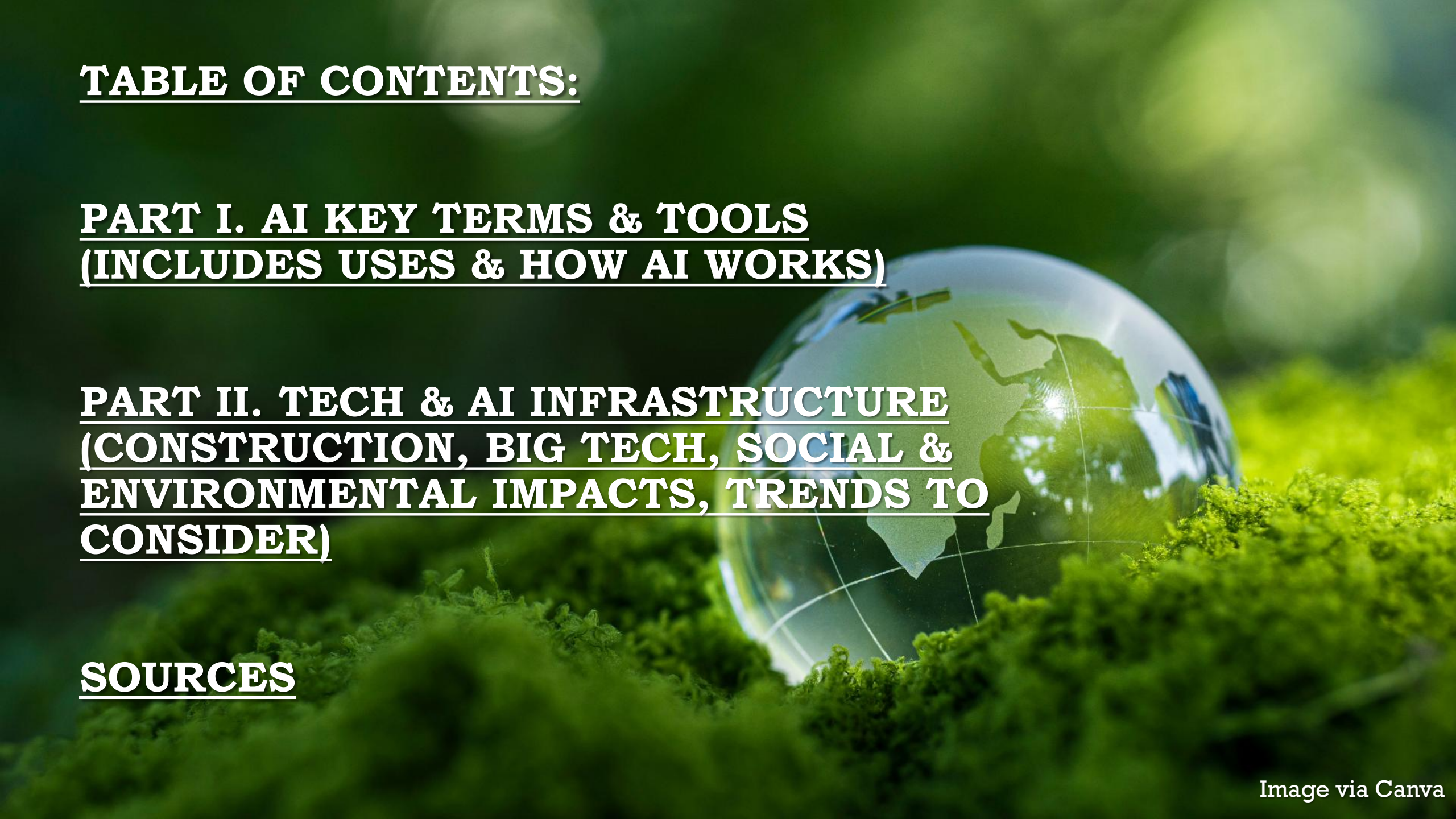


Image via Canva

PART I. AI KEY TERMS & TOOLS

- Some AI Examples You May Not Have Known You Were Using
- AI Use At the Library
- AI Key Terms
- Arizona Libraries Multimedia Tutorial – (parts 2-5, 9-13, but all of it is so helpful!)
- Professor Ramakrishnan at MIT Sloan School – On ChatGPT – How ChatGPT works – (1st 4 minutes, though you are welcome to watch it all!)
- Examples of AI Tools – including:
  - Grammarly, Microsoft CoPilot, Consensus, ChatGPT, NotebookLM, and more research tools.

"The thought is the language, as Wittgenstein has put it. A technical vocabulary is merely a language within a language. A consideration of this technical vocabulary will be at the same time an attempt to discover the reality which the words disclose or conceal."

-R.D. Laing
The Divided Self

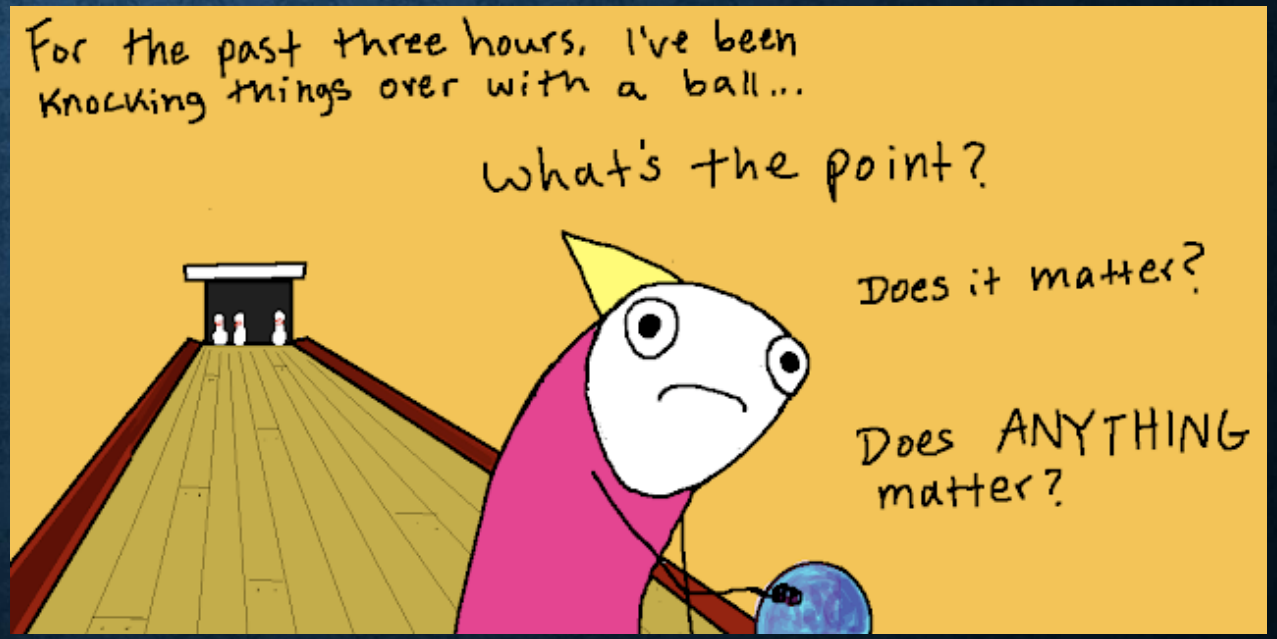


Image via Allie Brosh

AI YOU MAY NOT HAVE KNOWN YOU WERE USING

AI technology has been around for some time. Here are some examples that incorporate AI technology to filter and generate recommendations (books, films, music, products, etc.) and search results based on user preferences, interests, and history:

AI USE AT THE LIBRARY

How we use AI technology at the library:

- Writing a professional/impersonal email
- General lists
- Rules & regulations for programs
- Marketing - Canva
- Grant writing
- AI research
- Book orders – AI embedded in Amazon search and recommendations

*However, while we use AI technology, it does not lead us. We lead through our own work, communication and research.

For collection development:

We consult with/amongst staff, and with credible literary/library resources, such as:

- School & Library Journal
- NYT Book Review
- Publisher's Weekly
- Kirkus Reviews

As well as:

- Book Riot
- Goodreads
- Bookshop.org
- Publisher pages
- Indie book resources (i.e. Asterism Books, smaller publisher sites or accounts on social media)
- TikTok or Instagram accounts and trends (this helps us with marketing)
- Other librarians/libraries

*Amazon is a very helpful tool in its recommendations and "Teacher pics." But we cross-reference with other sources—like those above.
*And, of course, final purchases go through the Director.

CHAPTER 1. KEY TERMS

- AI (Artificial Intelligence) - Computer systems designed to perform tasks associated with human intelligence, such as pattern recognition or decision making.

- Algorithm – A sequence of step-by-step instructions for solving a problem or performing a task. Algorithms are what AI uses.

- Machine Learning - A field of computer science in which a system learns patterns or trends from underlying data.
  - Machine learning algorithms perform tasks like prediction or decision making.

- Augmented Intelligence – A type of AI that uses machine learning and predictive analytics of data sets not to replace human intelligence, but to enhance it.

- Large Language Model (LLM) - A type of generative AI model that works specifically with written language (both natural language and code).

*Sources:
https://aipedagogy.org/guide/key-terms/
https://www.ibm.com/think/topics/multimodal-ai
https://digitalreality.ieee.org/publications/what-is-augmented-intelligence/

CHAPTER 1. KEY TERMS

- Chatbot - A program that communicates with humans through text in a written interface, built on top of a large language model.
  - While many people refer to chatbots and LLMs interchangeably, technically the chatbot is the user interface built on top of an LLM. What you see and interact with on the screen is the chatbot.
    - Ex. ChatGPT (chatbot on top of an LLM)

- Multimodal AI - Multimodal AI refers to machine learning models capable of processing and integrating information from multiple modalities or types of data. These modalities can include text, images, audio, video and other forms of sensory input.
  - Dall-E was OpenAI's multimodal GPT model before ChatGPT eventually became multimodal.

- Generative AI (or GenAI) - A subfield of Artificial Intelligence, referring to models capable of generating content.
  - Texts, images, videos, music

- Hallucination - In the context of AI, a falsehood presented as truth by a large language model.
  - "Confabulation" is another term used.
  - Hallucinations/Confabulations can occur in text, as well as images, video, and audio outputs.
    - https://www.techtarget.com/WhatIs/definition/AI-hallucination

*Sources:
https://aipedagogy.org/guide/key-terms/
https://www.ibm.com/think/topics/multimodal-ai
https://digitalreality.ieee.org/publications/what-is-augmented-intelligence/

CHAPTER 1. KEY TERMS: COMPUTER VISION

- Computer vision = "a subfield of artificial intelligence that equips machines with the ability to process, analyze and interpret visual inputs such as images and videos (https://www.ibm.com/think/topics/computer-vision)."
- It is what allows machines to see and interpret the world. It's a point of view!
  - Tech used in CT Scan, or CAT Scan
  - Self-driving cars
  - Phone cameras
- Google Chrome AI
  - Ex. snap photo of a daffodil and input into search field of Chrome AI.
  - Includes info, references, instructions on how to take care of it. Neato!

*Understanding computer vision helps us understand how a model interprets the world based on the data input.

According to Kate Crawford, author of *Atlas of AI:* "It's common practice for the first steps of creating a computer vision system to scrape thousands—or even millions—of images from the internet, create and order them into a series of classifications, and use this as a foundation for how the system will perceive observable reality (Crawford 96)."

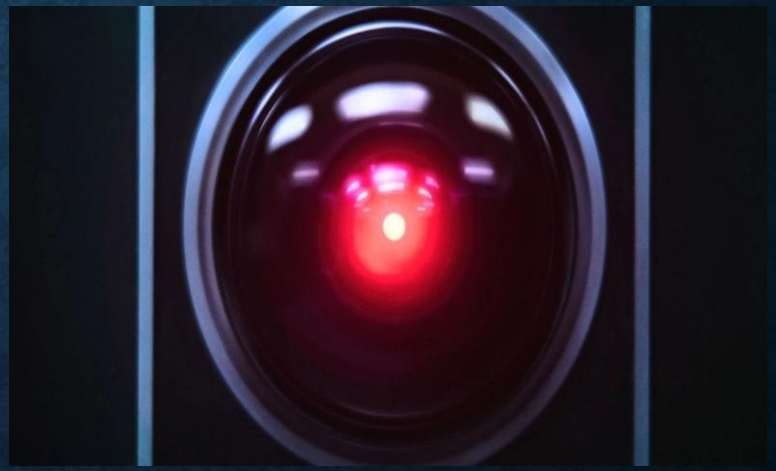


Image via 2001: A Space Odyssey, dir. Stanley Kubrick, MGM, Amazon

CHAPTER 2. A TUTORIAL

https://lib.arizona.edu/tutorials/multimedia-ai/#/lessons/fxc1a4796iahpv7eqbppkv3tfzx1gzav

CHAPTER 3. How ChatGPT Works

Rama Ramakrishnan, Professor of the Practice in Data Science and Applied Machine Learning at the MIT Sloan School of Management

CHAPTER 4. SOME EXAMPLES OF AI TOOLS

Grammarly – Editing, proofreading

Microsoft CoPilot – Chatbot, GenAI, prompts

Consensus – AI academic search engine

ChatGPT – Chatbot, GenAI, prompts

NotebookLM – Multi-purpose: GenAI, search/sources, notes/references compiler, creates flashcards, etc.

AI RESEARCH TOOLS

Per https://consensus.app/:
Tagline: "Consensus is the AI-powered academic search engine."

- Provides limited prompts without sign-in
- Free to create username
- Simple to use
- Ask question in prompt/request field and lists sources
  - Lists how many times a source has been referenced

Per https://scite.ai/assistant:
Tagline: "ChatGPT for Research."

- Free trial or paid versions only

Video available at:
https://www.youtube.com/watch?v=WNIkKLdJ3mE

AI RESEARCH TOOLS

Per https://www.researchrabbit.ai/:
Tagline: "Follow your curiosity. Keep your literature search quick, easy, and organized and dive down the rabbit hole of discovery."

- Free to create username.

Per https://elicit.com/:
Tagline: "AI for Scientific Research"

- Free to create username.

Video available at:
https://www.youtube.com/watch?v=WNIkKLdJ3mE

OTHER RESEARCH TOOLS TO CONSIDER – WITH EMBEDDED AI

1. PubMed
2. Google Scholar
3. JSTOR
4. Scribbr
5. IE University Resource Hub – alphabetized collection: https://library.ie.edu/resources/e-resources-and-databases

Images via A Goofy Movie, dir. Kevin Lima, Disney

REMEMBER:

AI is another technology (or, a "technology of technologies") that has come along.

- Be aware of entering personal info, and that AI can save history. This has changed over time, however. Check default settings and change as you'd like.
- Infuse AI tech with your task (summarizing, editing, research).
- Not all AI respond to prompts the same way.
- AI can be helpful with some prompts/tasks and weaker with others. But it must be directed by the user.
- Research has not changed much, so remember to check and verify sources as you normally would.
- Direct the AI. Don't rely on it to lead you.

Images via A Goofy Movie, dir. Kevin Lima, Disney

PART II. TECH & AI

INFRASTRUCTURE

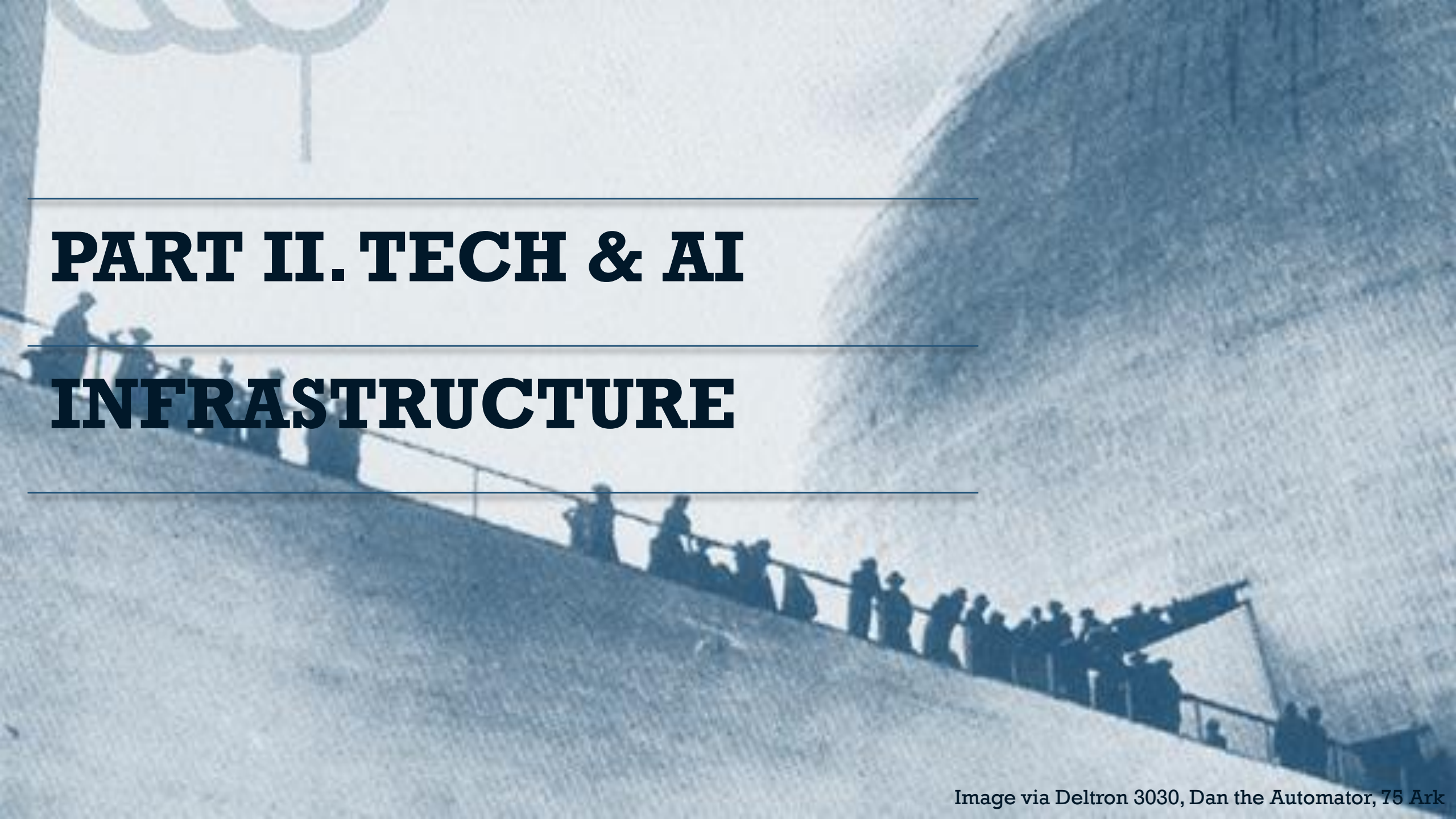
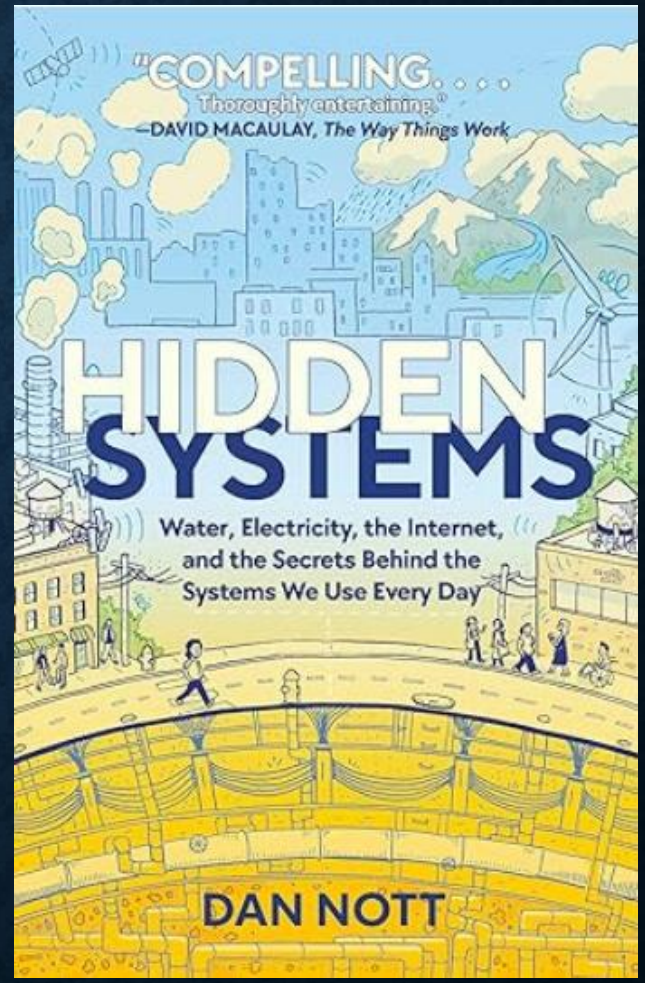


Image via Deltron 3030, Dan the Automator, 75 Ark

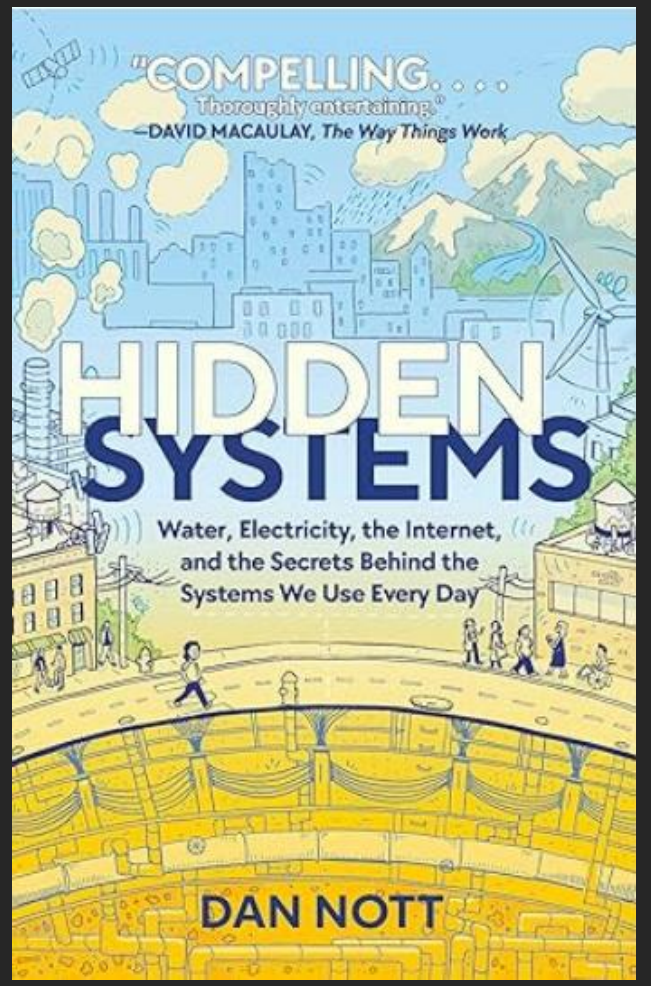
HISTORY OF A WATER SYSTEM

- 10,000 years ago, glaciers and ice sheets retreated and humans began to settle…
- From Sumerians to Egyptian and Nubian societies, these and many other peoples adapted to their region's water cycles.
- Architectural achievements helped link farms and cities to water.
- But as cities grew, the knowledge of water cycles and human connections to Nature decreased. Ideas and practices of sustainability were considered less important.
- In some places, fresh water became scarce, and then more expensive.
- Population increase and industrialization also caused more pollution.
- Civilizations would shrink, and even collapse…



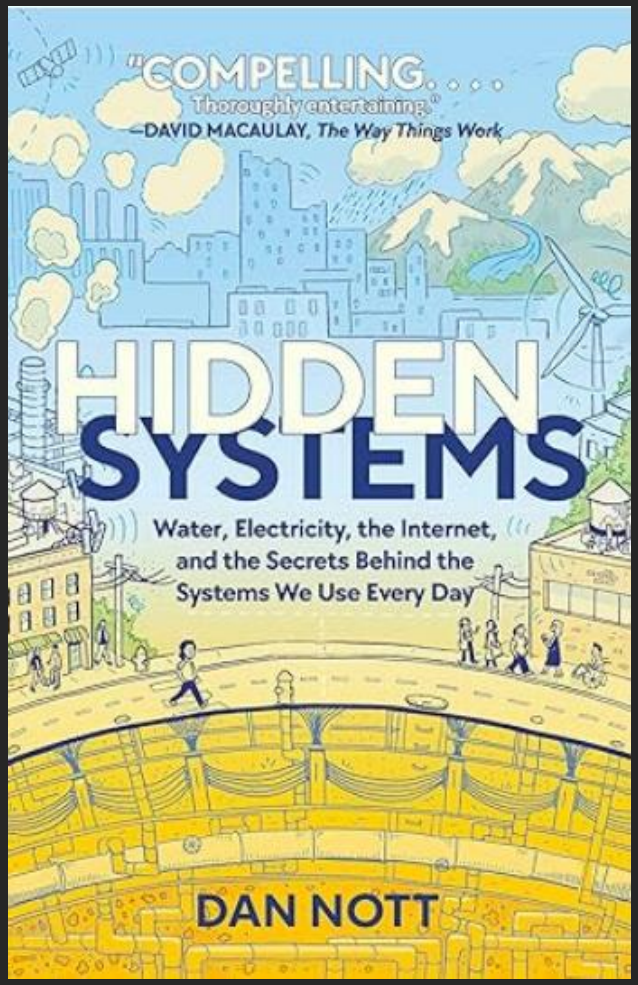
A NEW NETWORK, I.

- 1844: Samuel Morse sent the first telegram (from Washington D.C. to Baltimore).
- Not long after, British ships began laying ocean cables—connecting its colonial territories in a network dubbed the "All Red Line."
- This and America's first transpacific cable, among others, made up the world's first global communication system.



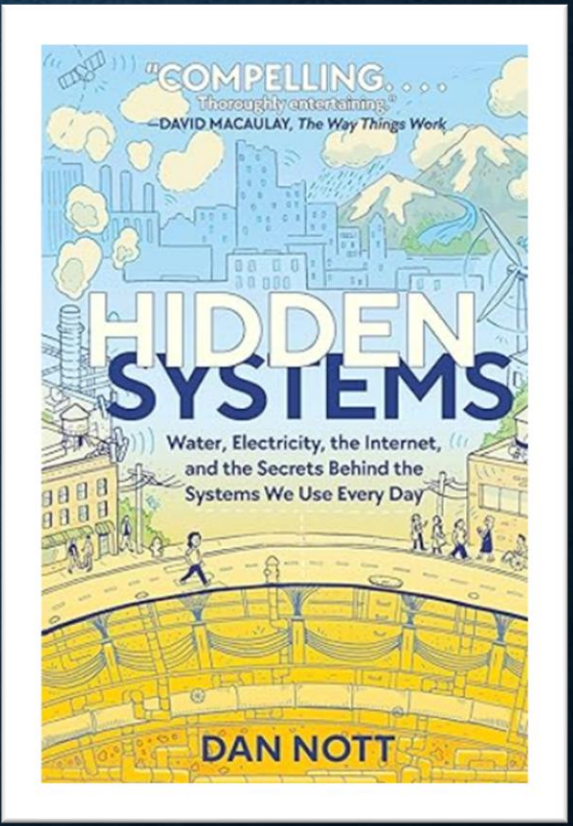
A NEW NETWORK, II.

- This global communication system was the result of:
  - the commercial undersea cable boom, and
  - U.S. and Great Britain imperialism.
- July 4, 1903: Theodore Roosevelt sent America's first messages around the world using this telegraph network.
- Internet cables follow those same routes today—with over 800,000 miles of undersea cables.



OUR MODERN FACTORIES

- During the 19th and 20th centuries, British and American industrialists started using water to power their many factories.
- Today, this is the case with data centers, which are like factories—yet require more electricity and water.
- Some are rented out by third party operators (these are known as "colocation" data centers) while others are owned outright by powerful entities like Meta, Alphabet, OpenAI, Oracle, Microsoft, and the American government. These are so large today, and full of so much equipment performing massive workloads, that they are referred to as "hyperscale" data centers.



Technology involves artifacts, both in its etymology, from the Greek tekhne, 'art' or 'skill,' and its central idea, the body of knowledge available to a culture for fashioning and using implements."

-Holmes Rolson III

Technology And/or Nature

DATA CENTERS

"Rules became mechanical before they could actually be executed by machines."

-Lorraine Daston, American historian of science
"Algorithms Before Computers (lecture)," 2017

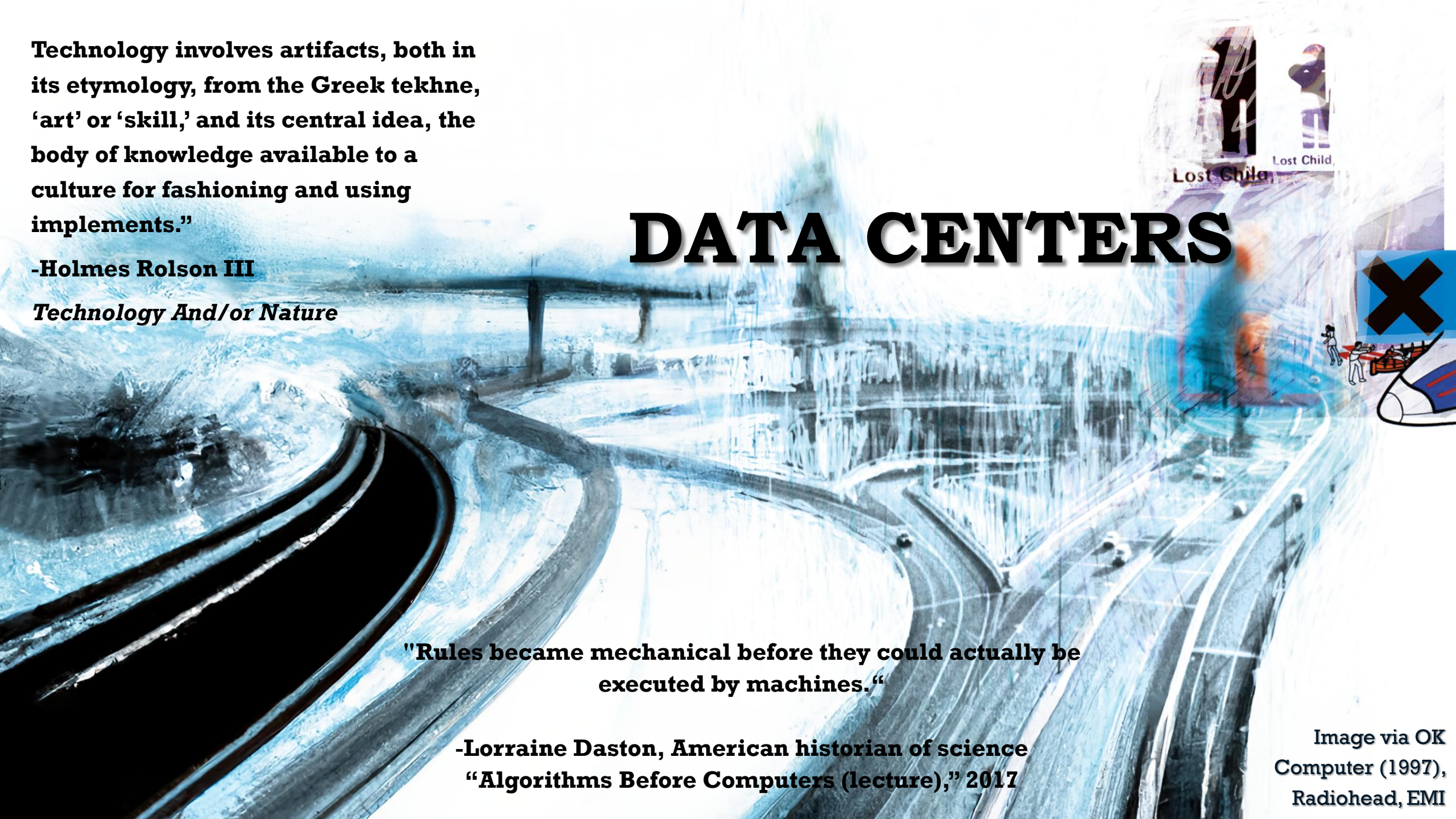
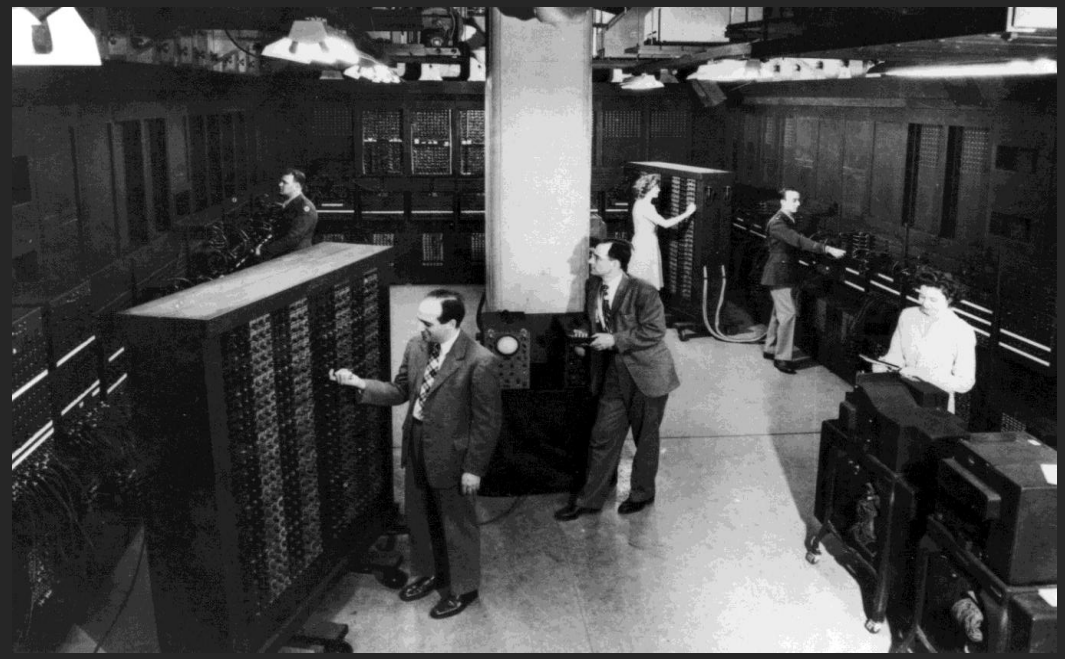


Image via OK Computer (1997), Radiohead, EMI

A BRIEF HISTORY OF DATA CENTERS

- **What is a data center?** "At its simplest, a data center is a physical facility that organizations use to house their critical applications and data (https://iopscience.iop.org/)."
- Governments, universities, and large corporations were the first to build and maintain these expensive machines, and the massive environments needed to run them in.
- The Electronic Numerical Integrator and Computer (ENIAC) was built by a group of six young women in Philadelphia as a secret WW2 project, at the time to be "the world's first general-purpose, programmable, all-electronic computer (https://eniacday.org/women-of-eniac)."
- The IBM 608 was an evolved version of its predecessors, costing $83,210 in 1957.
- 1960s: Early data centers were built inside office buildings.



Above: ENIAC, located at the Moore School of Electrical Engineering, University of Pennsylvania.

Right: Scanners (1981), dir. David Cronenberg.

Image via https://www.seas.upenn.edu/

Image via Scanners, dir. David Cronenberg, Canadian Film Development Corporation, et al.

A BRIEF HISTORY OF DATA CENTERS

- Computers decreased more in size, and thus, in price.
- By the 1990s, personal computing and networking had matured and spread to more office buildings, schools, and individual households.
- Meanwhile, on-site server rooms would require more power and space for email servers, databases, and storage.
- The 2000s would bring the purpose-built data center we see today (only they have increased in size and power usage)…

Above: Workers and the IBM 7094, early 1960s. It helped NASA in the Apollo and Gemini programs, as well as being used by the Air Force in an early missile defense system.

https://www.edn.com/ibm-delivers-7090-mainframe-computers-november-30-1959/

INSIDE A DATA CENTER

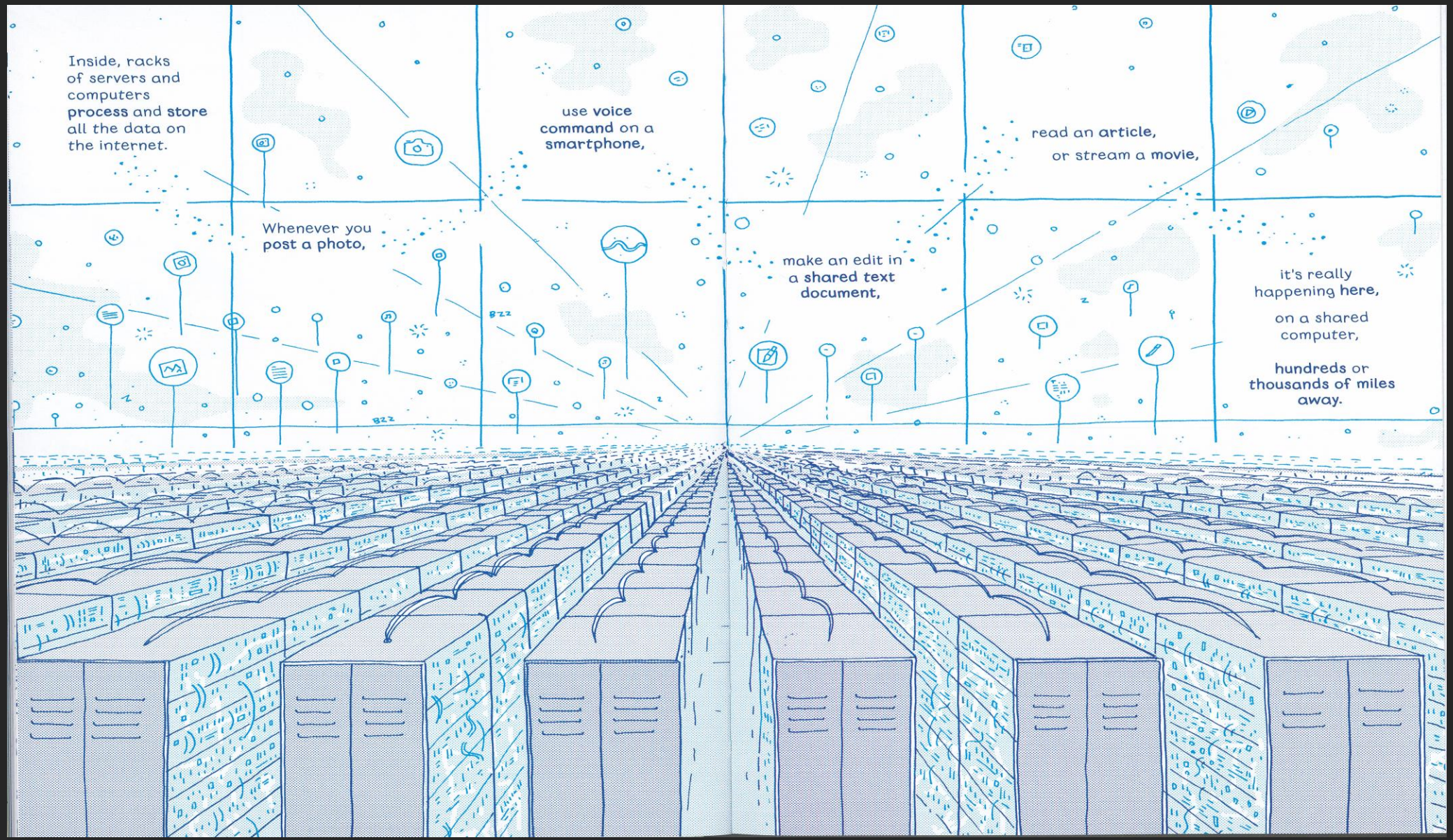


Image via Hidden Systems by Dan Nott, RH Kids Graphic

TYPES OF DATA CENTERS

HYPERSCALE

"Hyperscale data centers represent data storage on a gigantic scale."

Large companies usually own their own hyperscale centers.

COLOCATION

Colocation is where one company owns a hyperscale data center and "rents out its facilities, servers, bandwidth and/or space to interested businesses that presumably do not have their own data center facilities."

https://www.ibm.com/think/topics/hyperscale-vs-colocation

DATA CENTER COMPANIES

QTS is presently in discussions with Clinton, IA concerning construction of a data center there.

TOP 25 DATA CENTER COMPANIES IN THE U.S. BY ACTIVE IT CAPACITY:
https://www.abiresearch.com/blog/top-25-largest-data-center-companies-united-states

AI & THE WORLD

Image via pbi.org

A BRIEF HISTORY OF AI

- 1000s of years ago, early civilizations enacted social rituals to build structures. An example included the Agnicayana ritual, where Hindu devotees built a fire altar in the shape of a falcon.
- Early 1800s: Charles Babbage builds many prototypes for his Difference Engine, a steam-powered calculation machine.
- 1843: Charles Babbage and Ada Lovelace devise a diagram for an algorithm for the Analytical Engine.
- 1936: Alan Turing describes his modern computing machine in a paper while at Cambridge University. It becomes the principle of the modern computer.
- 1943: Walter Pitts and Warren McCulloch publish a paper on how the human brain can be understood as a computational system.
- 1940s: Norbert Wiener is studying the relationship between animals and machines. He calls his field of study *cybernetics* = the capacity of a technical, social, and living system to control itself via an exchange of information with the environment (Pasquinelli 245 ebook)."

Image via Canva

A BRIEF HISTORY OF AI

- 1950: Alan Turing devises the Turing Test, or Imitation Game, where a computer can fool a human into believing they are communicating with another human.
- 1956: John McCarthy coins the term "artificial intelligence" at a conference at Dartmouth College, where he and others discuss how machines can simulate human learning/intelligence.
- 1966: Joseph Weizenbaum, professor at MIT, creates ELIZA, the first "chatbot."
- 1980s-90s: Researchers focus on machine learning, where computers learn patterns from data.
- 2000s: The internet, GPUs, and multi-layered neural networks lead us into today…

Image via Canva

AI - MODERN USES

- Email
  - Microsoft CoPilot for Outlook
  - Superhuman
- Organization
  - MeetGeek – note taker, record, transcribe meetings
- Research
  - Consensus
- Grant writing
- Programs
- Marketing
  - Canva
- Risk analysis
- Sales prediction
- Security
  - Cloudflare
- Fraud detection
- Movie & music recommendations
- Teaching tools
  - Grammarly
- Robotics
  - Boston Dynamics
- Healthcare
  - Hearing aids (Hearing Care Services in DeWitt, Iowa)
- Detection of wildfires
- Weather prediction tools

*Assists with efficiency in workplaces and everyday tasks

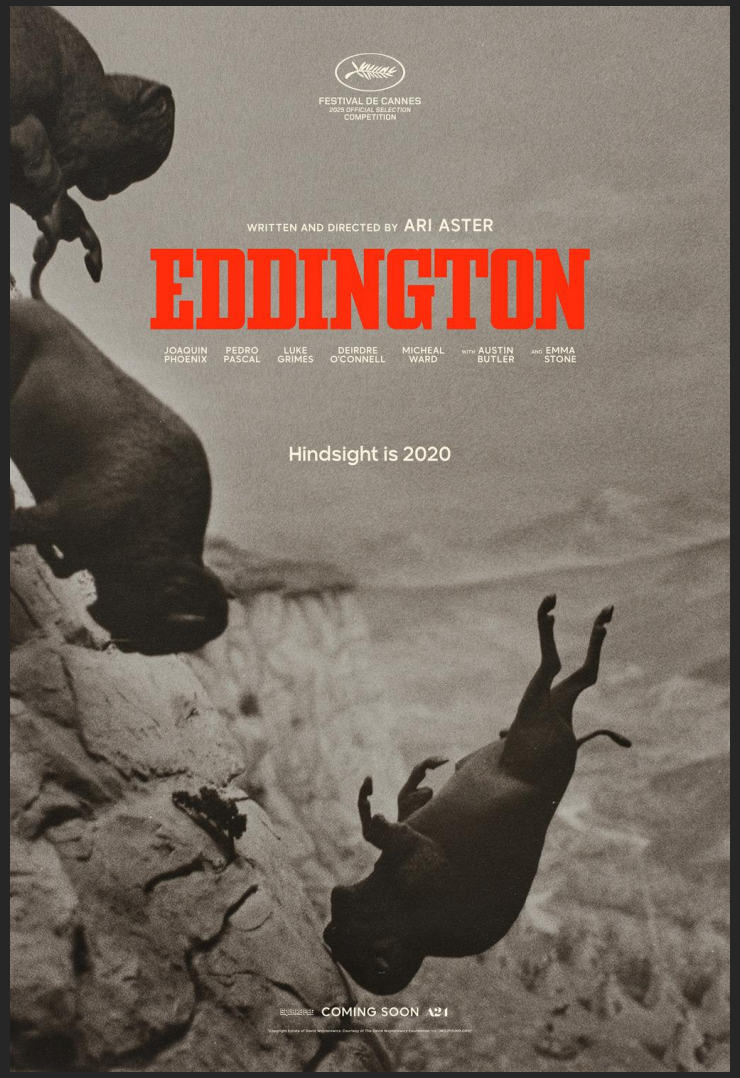
Image via Canva

AI GROWTH

Factors contributing to growth in the AI industry:

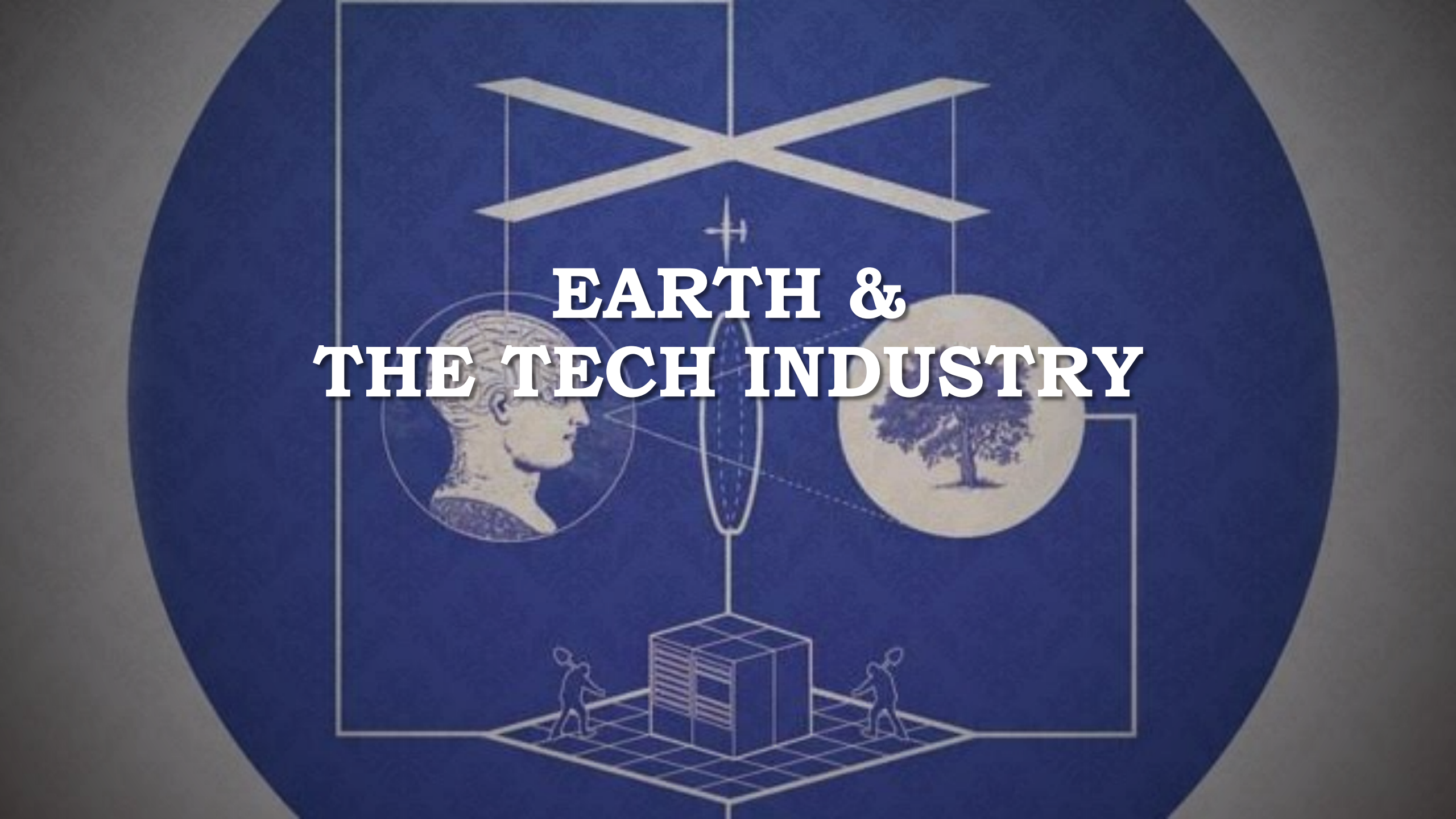
1. Availability of big data (we all have contributed)
2. Advancements in tech:
    - computing
    - cloud infrastructures
3. Growing demand for automation/optimization in multiple industries:
    - manufacturing
    - finance
    - transportation
4. Increased use of AI in consumer apps:
    - virtual assistants
    - chatbots
5. Growing investments/partnerships among:
    - tech companies
    - research institutions
    - governments

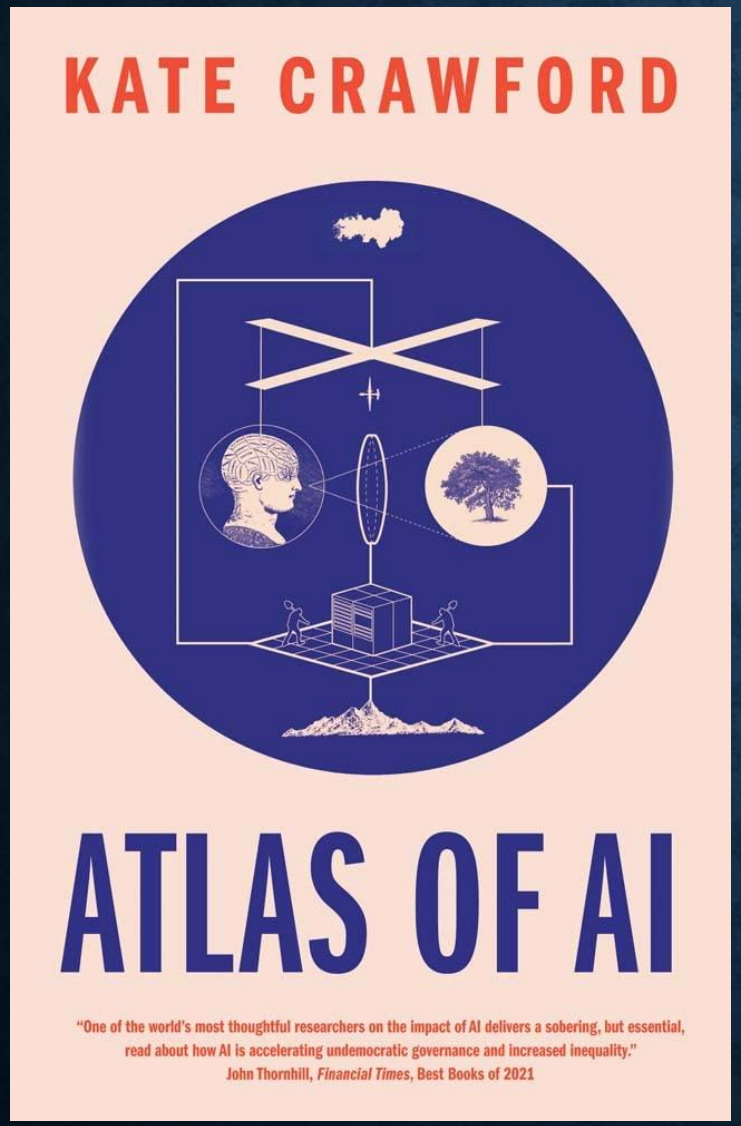
Image via Canva



- While AI technology can provide much in the way of task efficiency, it remains a technology we are still discovering much about.
- Along with this, there has been concern over Big Tech companies building in the U.S. and abroad…

Image via Eddington, dir. Ari Aster, Square Peg, 828 Productions, A24

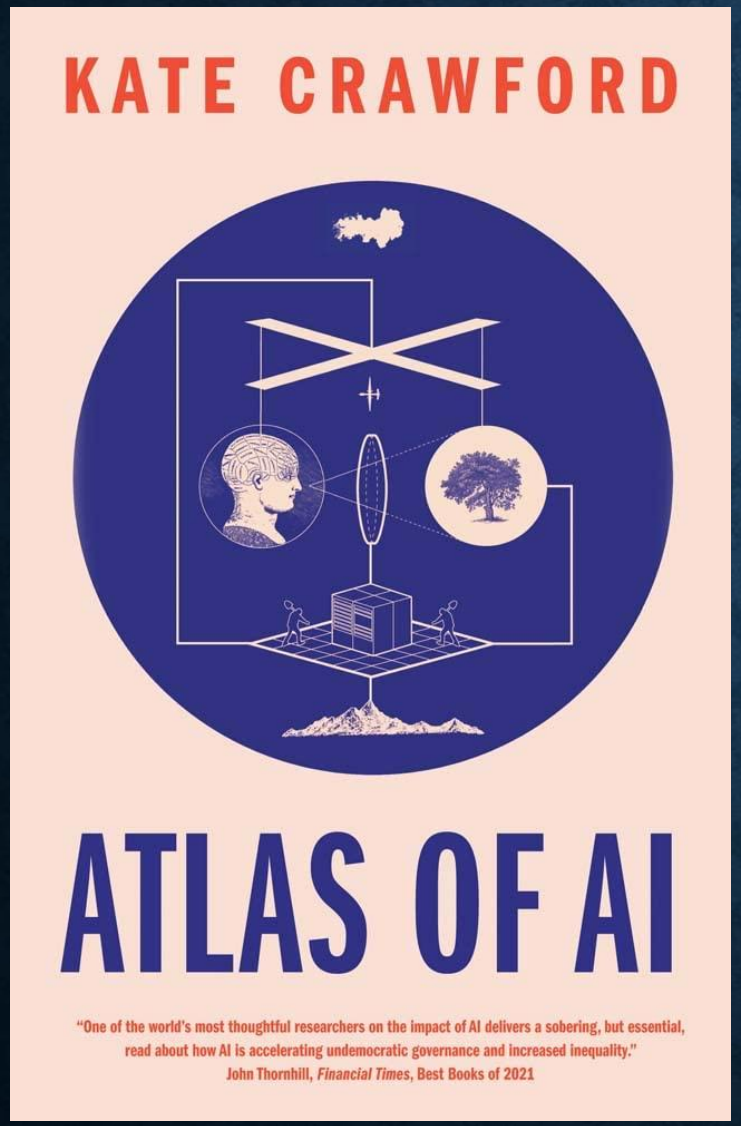

EARTH &
THE TECH INDUSTRY



TO CONSIDER:

Via Kate Crawford:

"Rechargeable lithium-ion batteries are essential for mobile devices and laptops, in-home digital assistants, and data center backup power. They undergird the internet and every commerce platform that runs on it, from banking to retail to stock market trades. Many aspects of modern life have been moved to "the cloud" with little consideration of these material costs. Our work and personal lives, our medical histories, our leisure time, our entertainment, our political interests—all of this takes place in the world of networked computing architectures that we tap into from devices we hold in one hand, with lithium at their core (Crawford 30)."



TO CONSIDER:

- "Each object in the extended network of an AI system, from network routers to batteries to data centers, is built using elements that required billions of years to form inside the earth (Crawford 31)."
  - Lithium mines of Silver Peak, Nevada (for Tesla batteries)
  - Black lake in Baotou, Inner Mongolia (where phones, flat TVs, electric car motors are made)
- Such mining of non-renewable resources from Deep Time, or Earth's geological history, "serves a split second of contemporary technological time" as products like the Amazon Echo or iPhone do not last longer than a few years.

LOCAL/STATE & DATA CENTERS

- Economic incentives:
  - Boost to local businesses and economy
  - Job creation
  - Low, or water free cooling systems
- Other factors to consider:
  - Amount of jobs may be higher at first, reducing post-construction stage.
  - Less jobs and maintenance in the center can reduce costs.
  - "Low" or "water-free" cooling systems may be outdated, used as slogans, or even outmatched by economic and tech company ambitions (more on this later).

Cedar Rapids data center campus, topping out ceremony, Oct. 21st, 2025

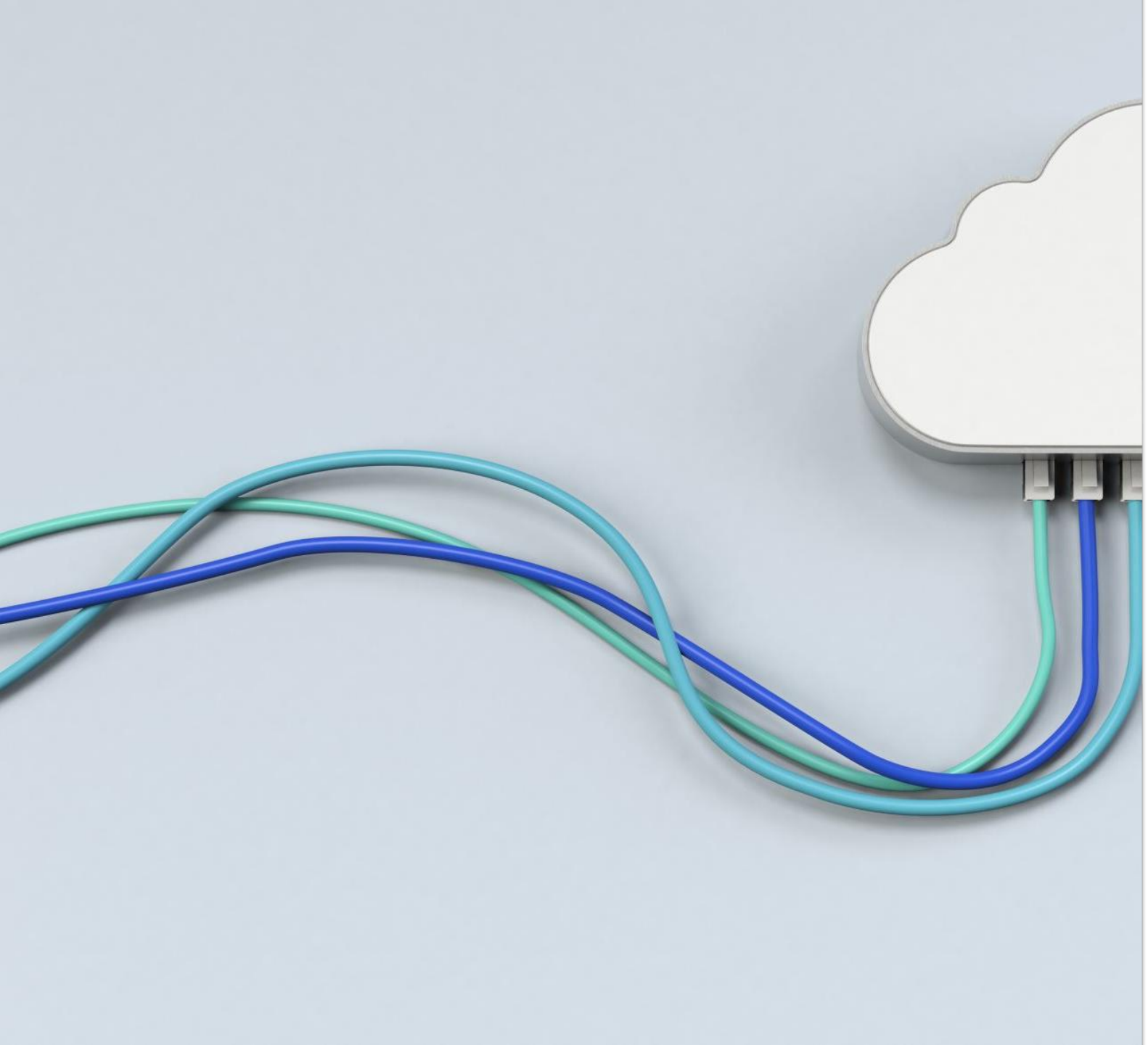
Image via KCRG Staff, kcrg.com

LOCAL/STATE: CEDAR RAPIDS, PALO, NORWALK

- Google is pursuing development of a data center in Palo, bypassing a data center-regulation ordinance by the Linn County board (an agreement with the city of Palo would no longer have to abide that ordinance).
- Norwalk's city board recently approved a data center development plan. Further discussions, community input, and plans are on the agenda, per the City of Norwalk website (source: https://www.norwalk.iowa.gov/news_detail_T5_R273.php)

Cedar Rapids data center campus, topping out ceremony, Oct. 21st, 2025

Image via KCRG Staff, kcrg.com

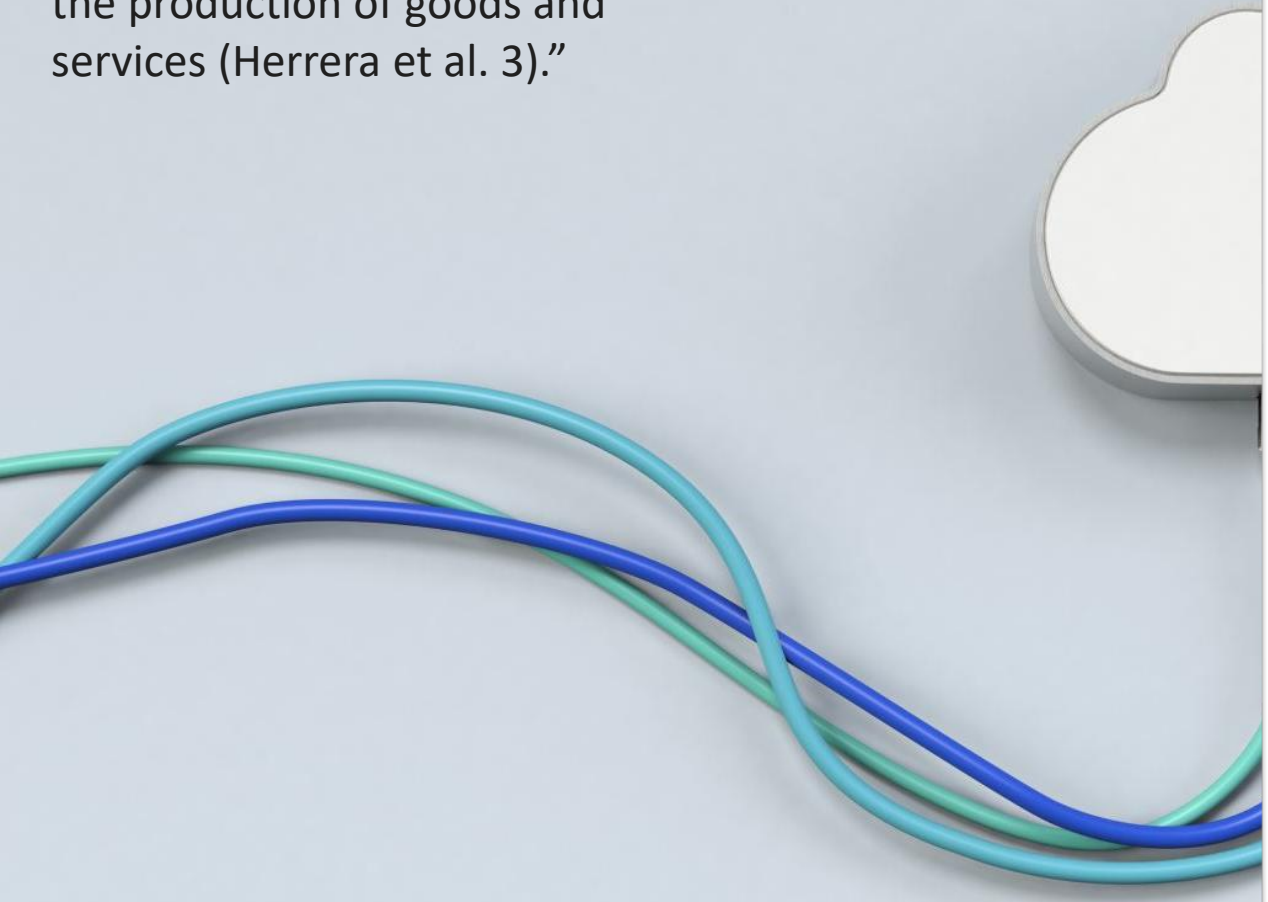


AI & WATER

Water footprint: "Total volume of freshwater consumed and rendered unavailable for reuse in the production of goods and services (Herrera et al. 3)."

(While we may attribute this to AI right now, it is common across all industries.)

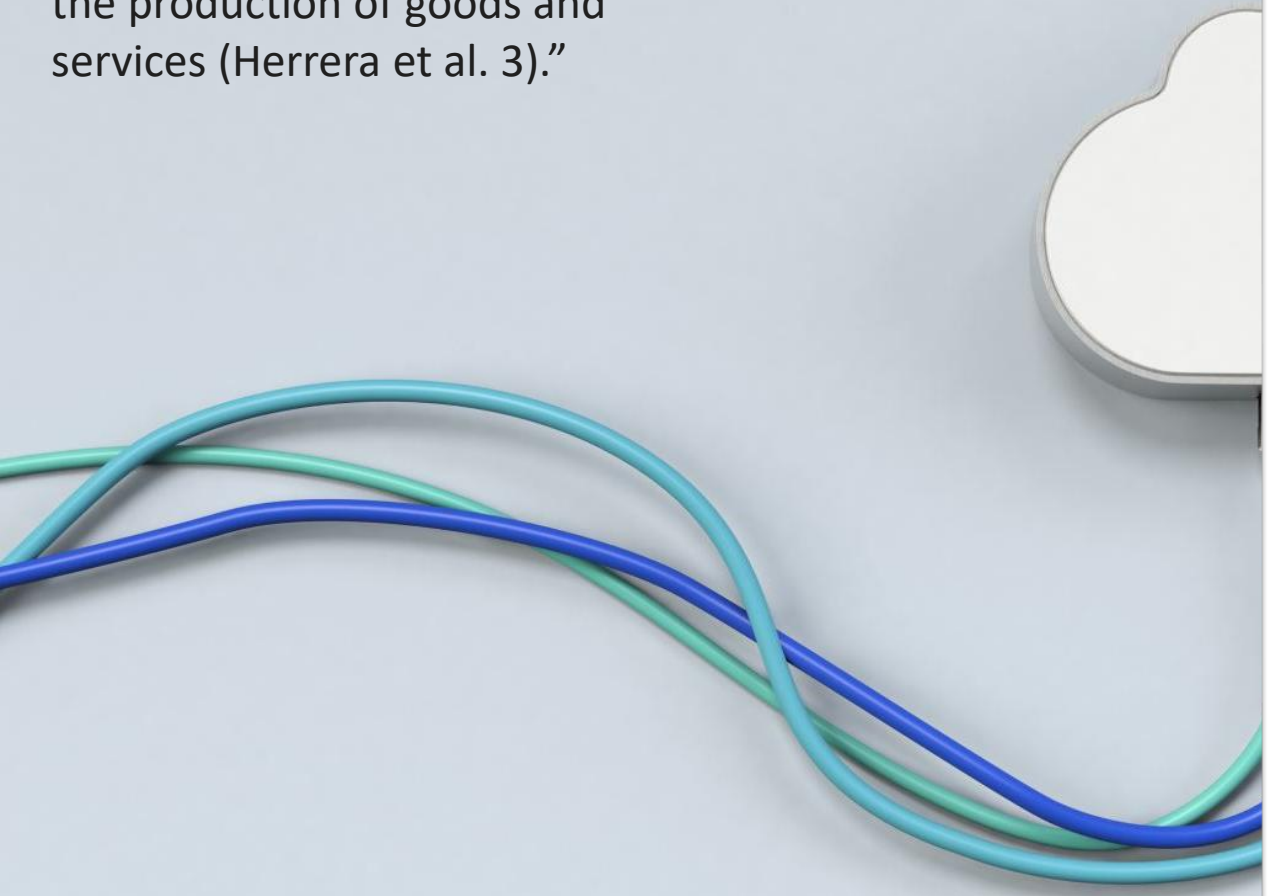
Water footprint: “Total volume of freshwater consumed and rendered unavailable for reuse in the production of goods and services (Herrera et al. 3).”



DIRECT VS. INDIRECT USE

- AI-powered data centers use more water and electricity than traditional data centers (used for cloud, email, and storage purposes).
- AI H20 use comes in 2 forms: Direct and Indirect use.

Water footprint: “Total volume of freshwater consumed and rendered unavailable for reuse in the production of goods and services (Herrera et al. 3).”



DIRECT VS. INDIRECT USE

- Direct use: On-site process of cooling through water evaporation.
  - Withdrawal = H20 taken from ground or surface source, temporarily or permanently.
  - Consumption = Withdrawn, or “consumed,” where H20 does not return to our planet’s sources.
- Indirect use: Off-site water usage for electricity to power data centers. This water is taken from rivers, aquifers, and ecosystems.
  - IEA (International Energy Agency) reports indirect use as 60% of all data center water consumption (though other reports vary)

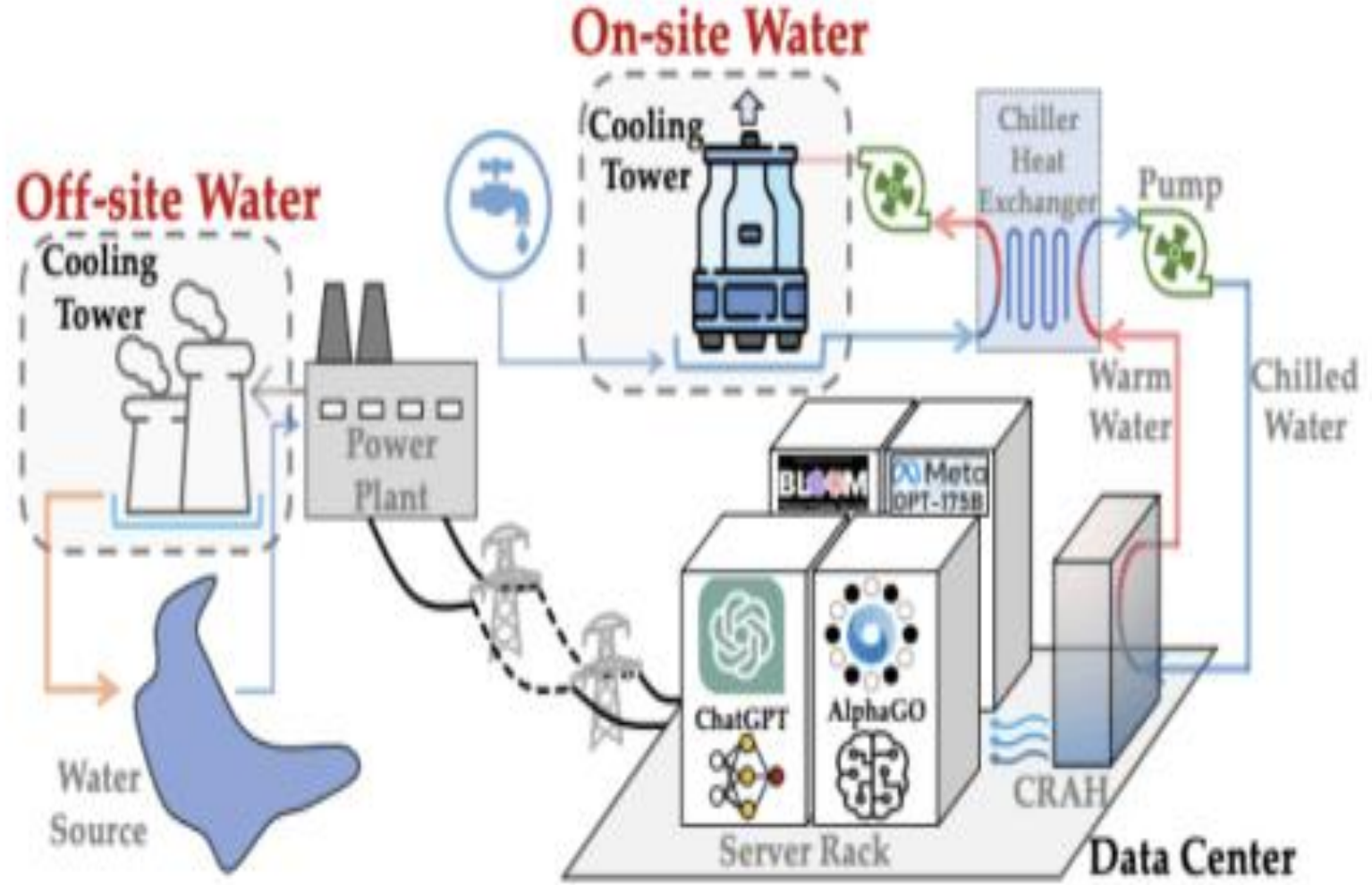


Image via https://arxiv.org/pdf/2304.03271

ChatGPT

SO…HOW MUCH WATER?

- "One paper estimated that in 2023, using GPT-3 to generate a single text output of 150 to 300 words consumed a total of 16.9 milliliters of water (or, around .5 oz.) in an average U.S. data center.
- Water use on-site differs from off-site…

ChatGPT

SO…HOW MUCH WATER?

- Reports have shown varying amounts of H20 usage for individual prompt sessions:
  - https://www.govtech.com/question-of-the-day/how-much-water-does-chatgpt-drink-for-every-20-questions-it-answers
  - https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/
- According to researcher Andy Masley: "If someone reads the statistic '50 ChatGPT searches use 500 mL of water' they might draw the incorrect conclusion that a bottle of water needs to flow through the data center per 50 searches. In reality, only 15% of that bottle flows through, so the data center only uses 500 mL of water per 300 searches."
  - https://blog.andymasley.com/p/individual-ai-use-is-not-bad-for?open=false#%C2%A7how-much-water-do-llms-use
- "Indirect (or off-site) water use still predominates (https://spectrum.ieee.org/ai-water-usage)."

ChatGPT

SO…HOW MUCH WATER? (NATIONAL SCALE)

- "According to a recent report by Lawrence Berkeley National Laboratory, the 2023 direct water consumption by data centers in the United States—home to about 40 percent of the world's data centers—is estimated at roughly 17.5 billion gallons.
- The same report projects that the U.S. data center direct water consumption could double or even quadruple the 2023 level by 2028."
- These numbers, however, are not certain.

AN UPDATED ENERGY REPORT, VIA IEA

- *Updated energy report for 2025: https://iea.blob.core.windows.net/assets/de9dea13-b07d-42c5-a398-d1b3ae17d866/EnergyandAI.pdf

SO…HOW MUCH WATER?

- "…Microsoft disclosed (in 2023) that its global water consumption spiked 34% from 2021 to 2022 (to nearly 1.7 billion gallons, or more than 2,500 Olympic-sized swimming pools), a sharp increase compared to previous years that outside researchers tie to its AI research (https://apnews.com/article/chatgpt-gpt4-iowa-ai-water-consumption-microsoft-f551fde98083d17a7e8d904f8be822c4)."
- Microsoft has reportedly enacted sustainability methods and water replenishing in vulnerable areas.

"Power generation is currently the largest source of carbon dioxide (CO_2) emissions in the world, but it is also the sector leading the transition to net zero emissions…"

-IEA 2024 Electricity Report, Analysis and Forecast to 2026

Image via Charlie Neibergall, AP News

ENERGY USE BY PROCESSOR/GPU (GRAPHICS PROCESSING UNIT)

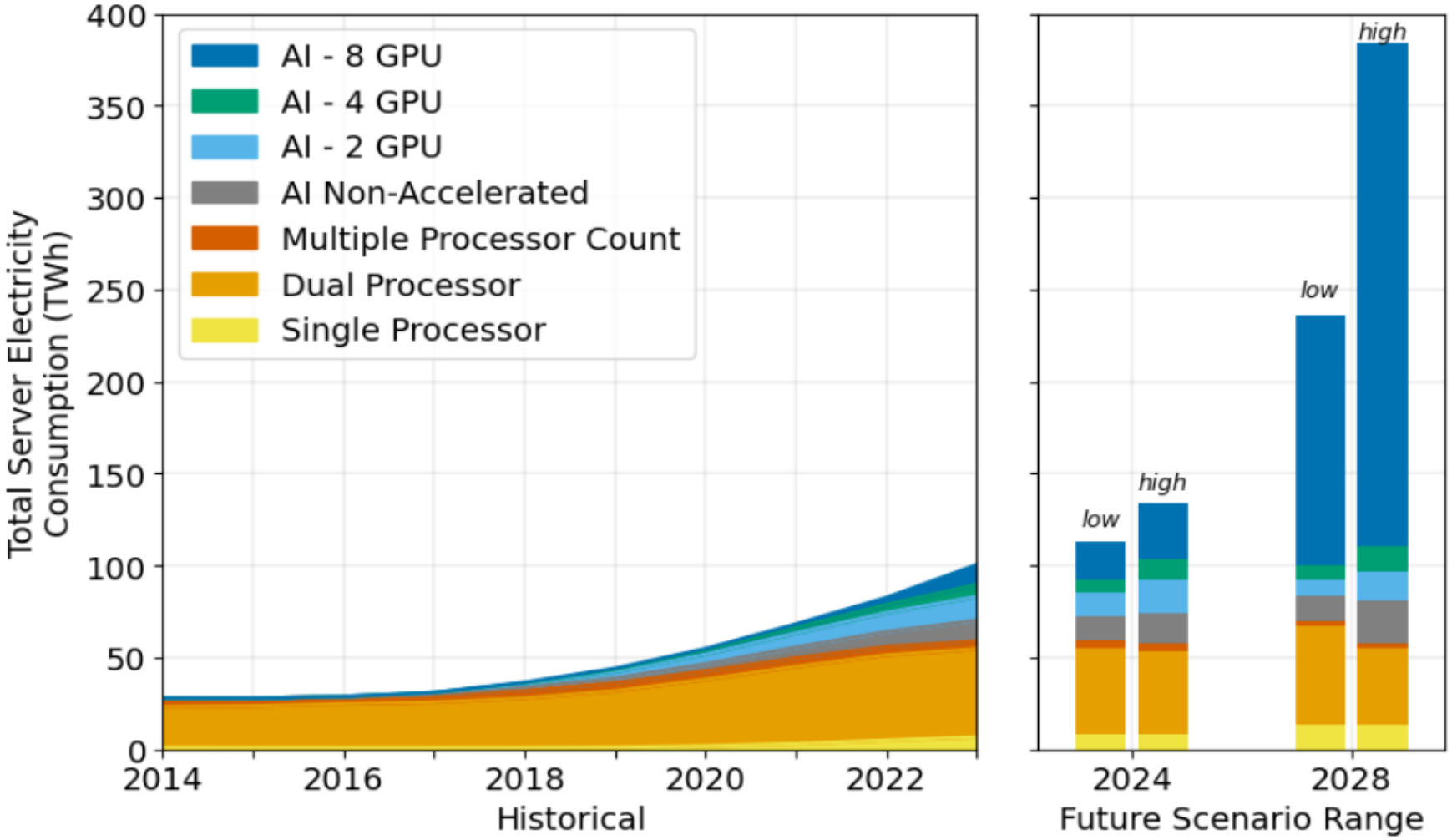


Figure 5.1. Server annual electricity usage by type.

As GPUs grow, so does electricity demand.

Image via 2024 United States Data Center Energy Usage Report, Berkeley Lab

ENERGY USE BY DATA CENTER TYPE

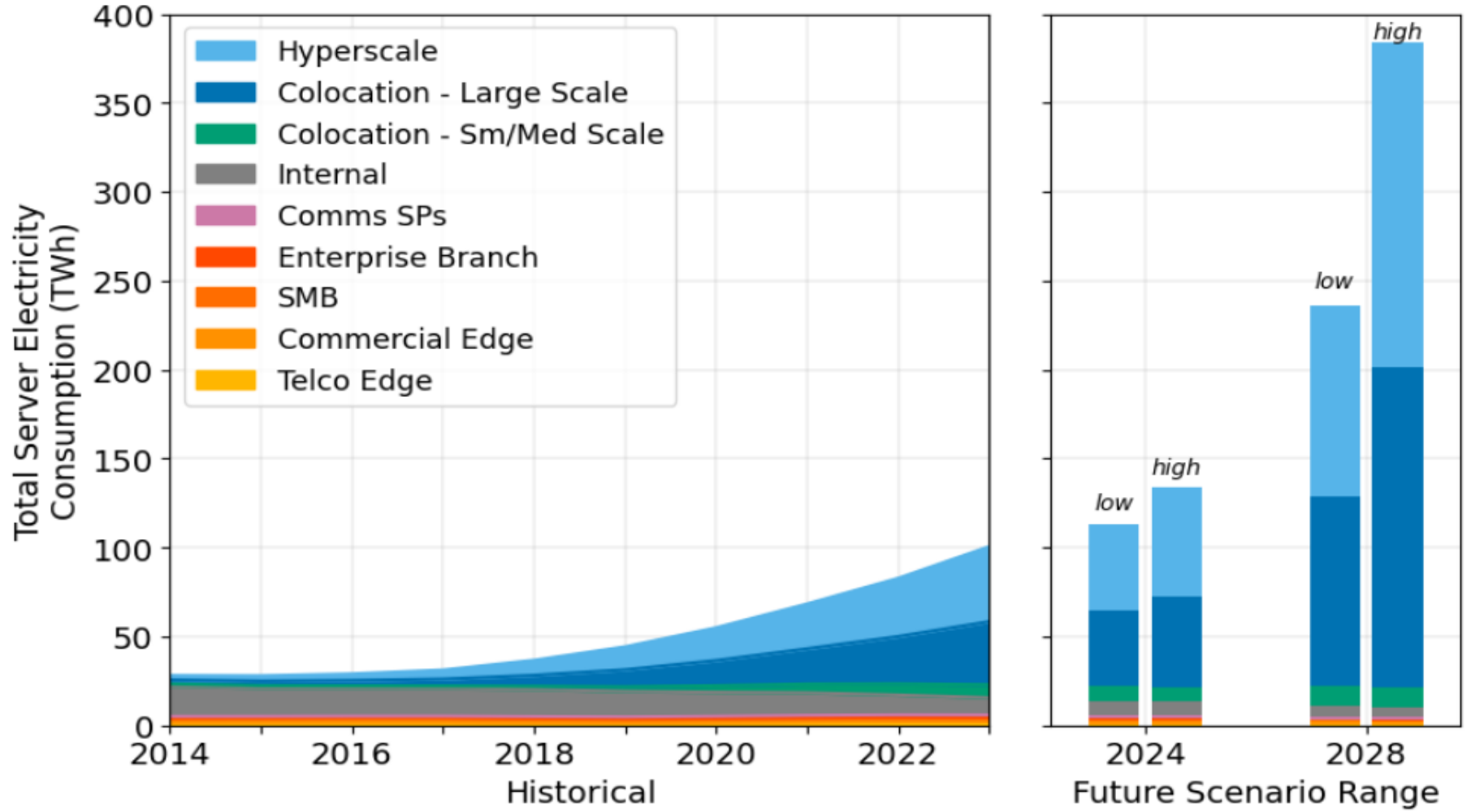


Figure 5.2. Server annual electricity use by space type.

"Hyperscale data centers represent data storage on a gigantic scale."

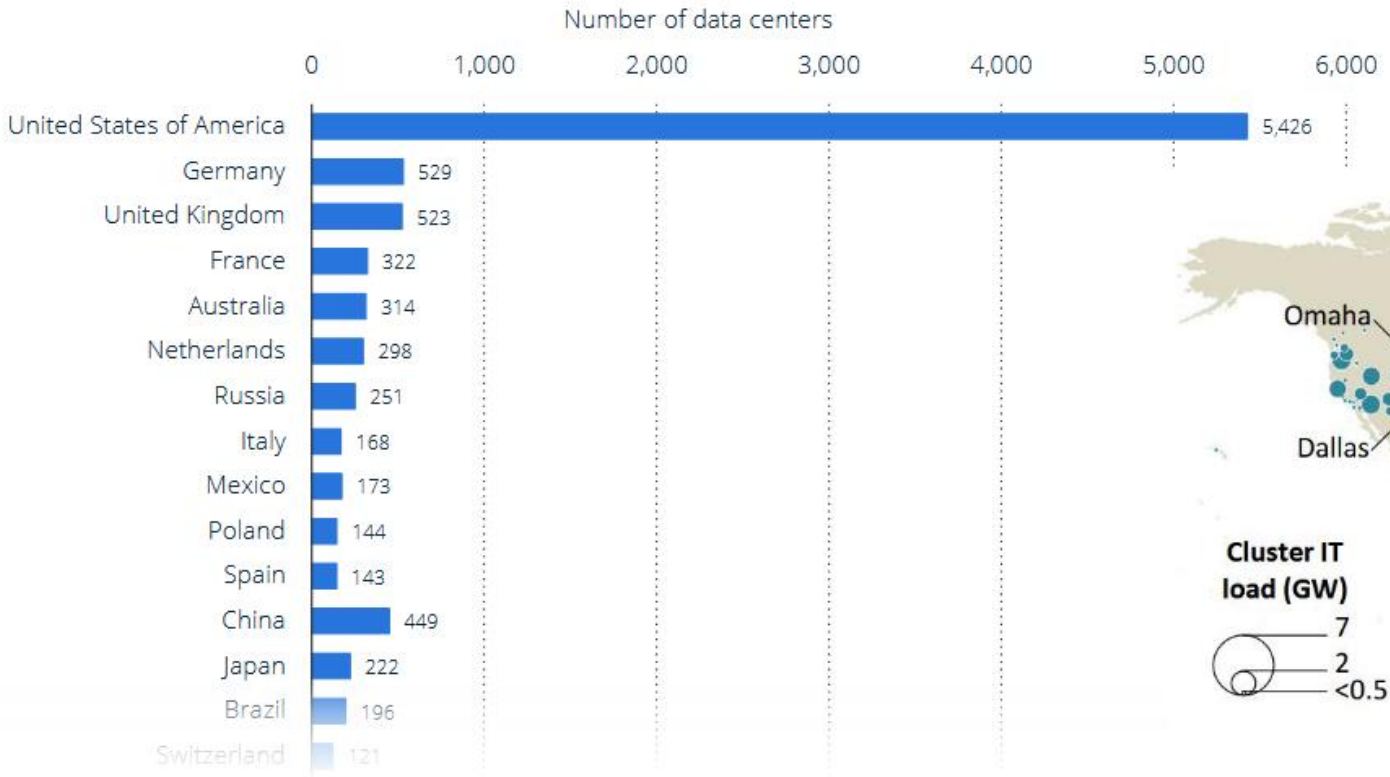
Large companies usually own their own hyperscale centers.

Colocation is where one company owns a hyperscale data center and "rents out its facilities, servers, bandwidth and/or space to interested businesses that presumably do not have their own data center facilities."

https://www.ibm.com/think/topics/hyperscale-vs-colocation

Image via 2024 United States Data Center Energy Usage Report, Berkeley Lab

The US dominates the global data center market.



Note(s): Worldwide; 2025
Further information regarding this statistic can be found on page 8.
Source(s): Cloudscene; ID 1228433 statista

Cropped Version
Double click to open excel file with complete data

Global map of large data center clusters, 2024

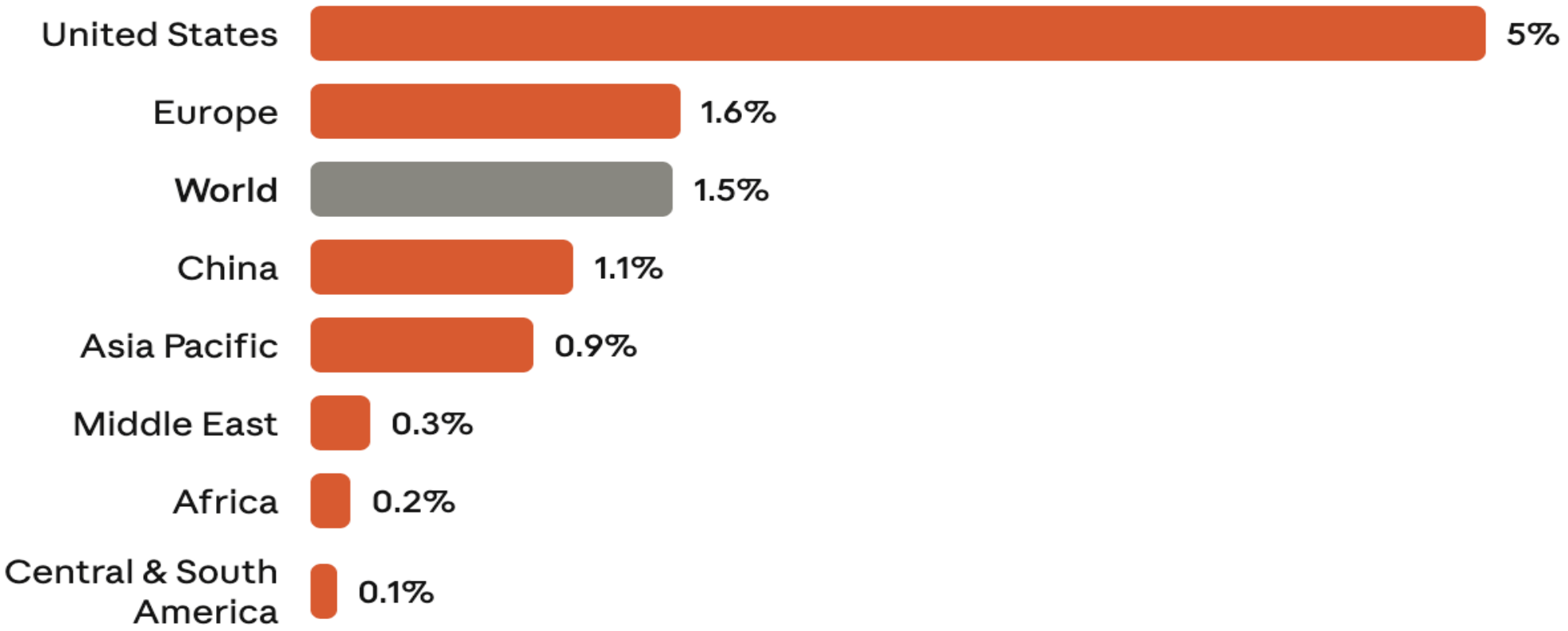
(IEA, 2025)

Data centres are often located in large clusters, potentially creating challenges for local electricity systems

https://www.eli.org/sites/default/files/files-general/Landon%20Marston%20Slides.pdf

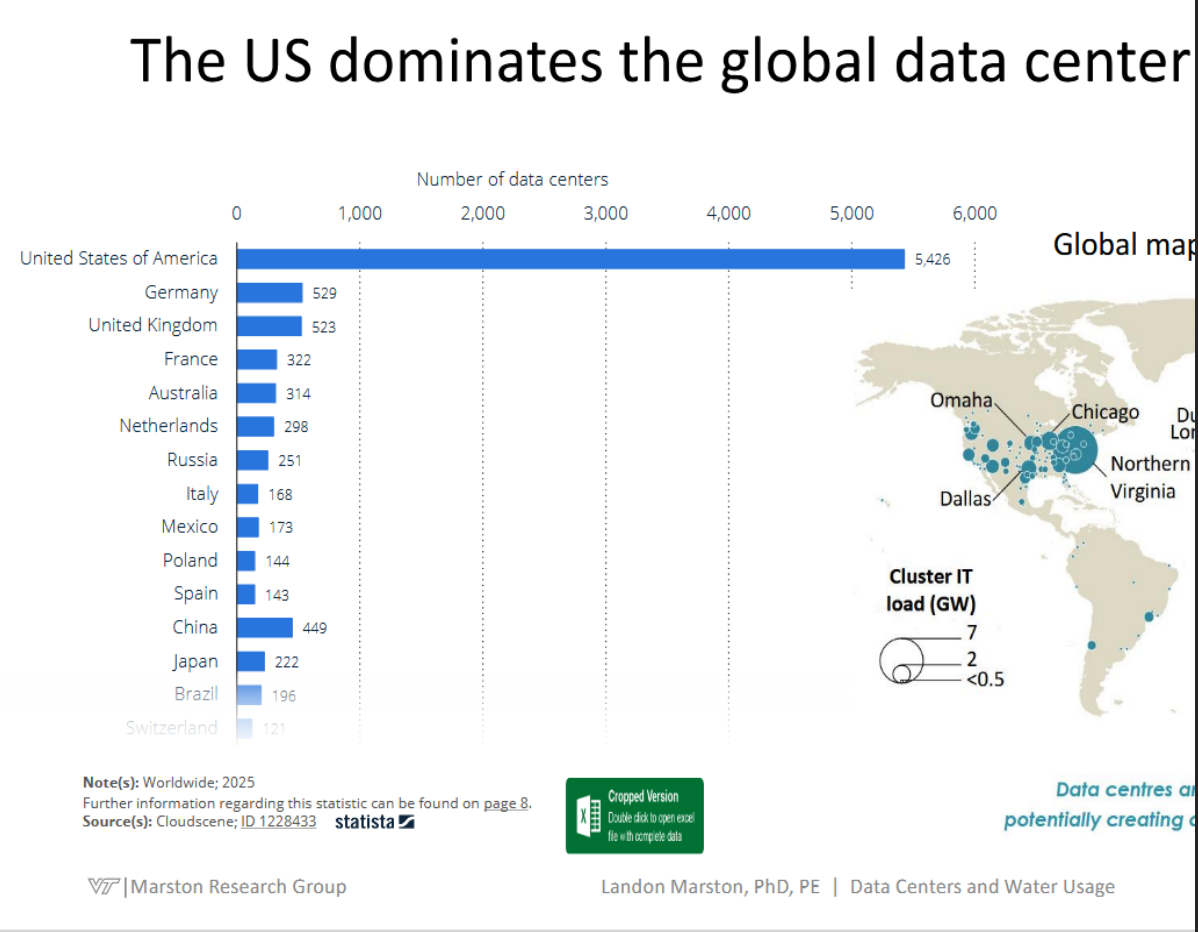
Share of electricity used by data centres, 2025

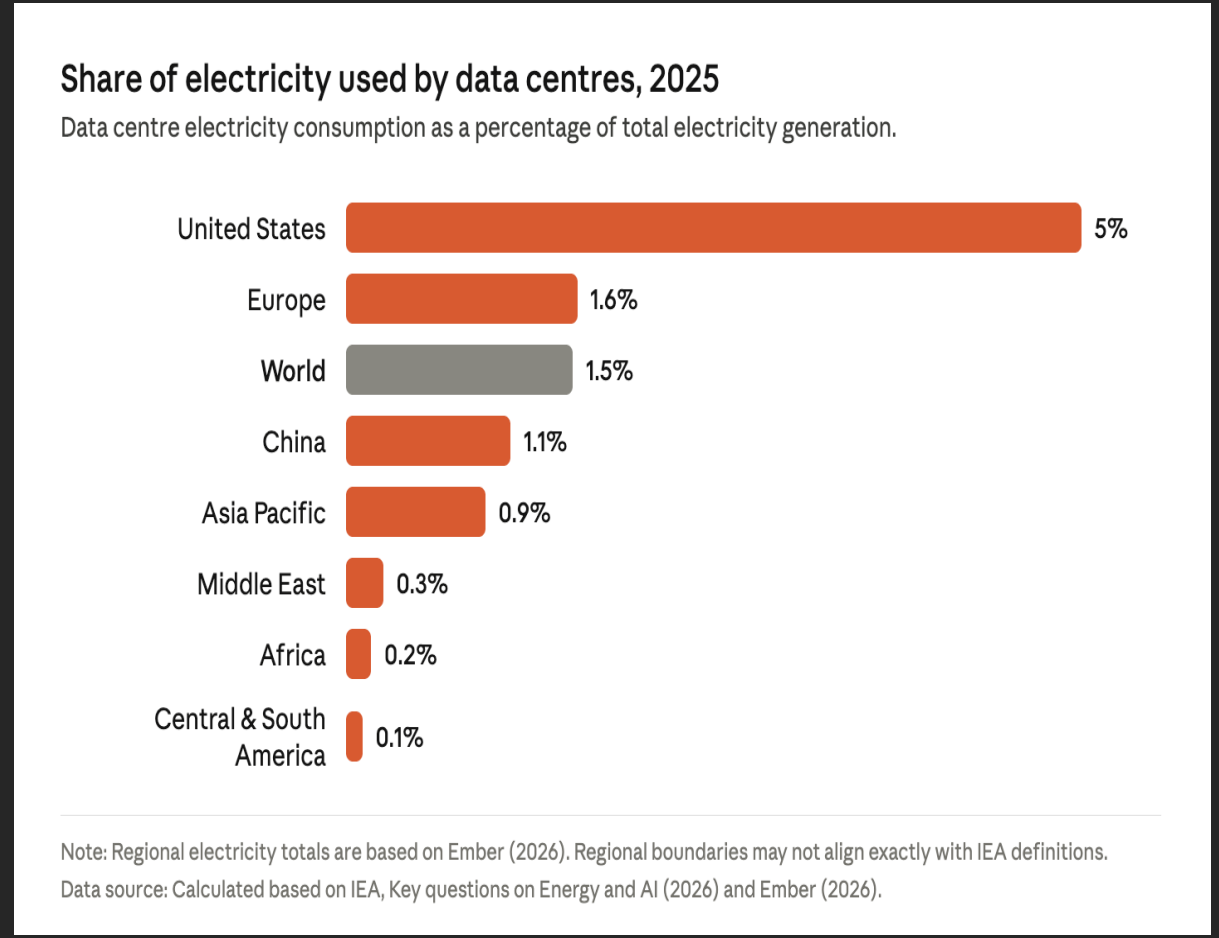
Data centre electricity consumption as a percentage of total electricity generation.



Note: Regional electricity totals are based on Ember (2026). Regional boundaries may not align exactly with IEA definitions.
Data source: Calculated based on IEA, Key questions on Energy and AI (2026) and Ember (2026).

https://hannahritchie.substack.com/p/ai-electricity-2025





"Beneath Europe's 1.6% figure, we have Ireland, where data centres account for more than 20% of its electricity consumption. Beneath the 5% US figure, there are a number of states where data centres make up more than 10% of demand, and in states such as Virginia, it's more than a quarter.

…Growing data center demand is "geographically concentrated, meaning the entire world's demand is being served by a small number of electricity grids."

https://hannahritchie.substack.com/p/ai-electricity-2025

CONCERNING THE NUCLEAR FACTOR

- Nuclear power, a source for data centers—which has been linked to "closed-loop" systems and "clean/alternative" energy—is prone to high water consumption and susceptibility to drought-related shutdowns and breakdowns in lower-rainfall areas.
- Many such plants exist near and along coasts all over the world. A process called de-salination converts salt water to fresh water for power use.
- More inland nuclear plants, functioning and not, exist as well.
    - Illinois recently lifted a decades-long moratorium on large nuclear power plants. In 2023, it partially lifted the moratorium to construct new smaller reactors.
- It is important to keep the past in mind, however, as the present can be prone to repeat such power narratives.

INDUSTRIAL AMBITIONS

- Though companies like Google or Microsoft have promised sustainability initiatives, "ambitions" could negate some progress.
- For example, OpenAI seeks to supply 250 gigawatts of computing power that would equate to more electricity than India and CO2 emissions than ExxonMobil.
- Meta also has mega facilities in construction. Its Hyperion campus in rural Louisiana is 3,650 acres, the size of 2,765 football fields.

Facebook data center, Altoona, IA

Image via Des Moines Register

ONE PART

- "From Amazon shopping and LMS usage to streaming and cloud storage, data centers already support an enormous portion of modern life.
- AI adds to that load, but it is one part of a much larger digital ecosystem."

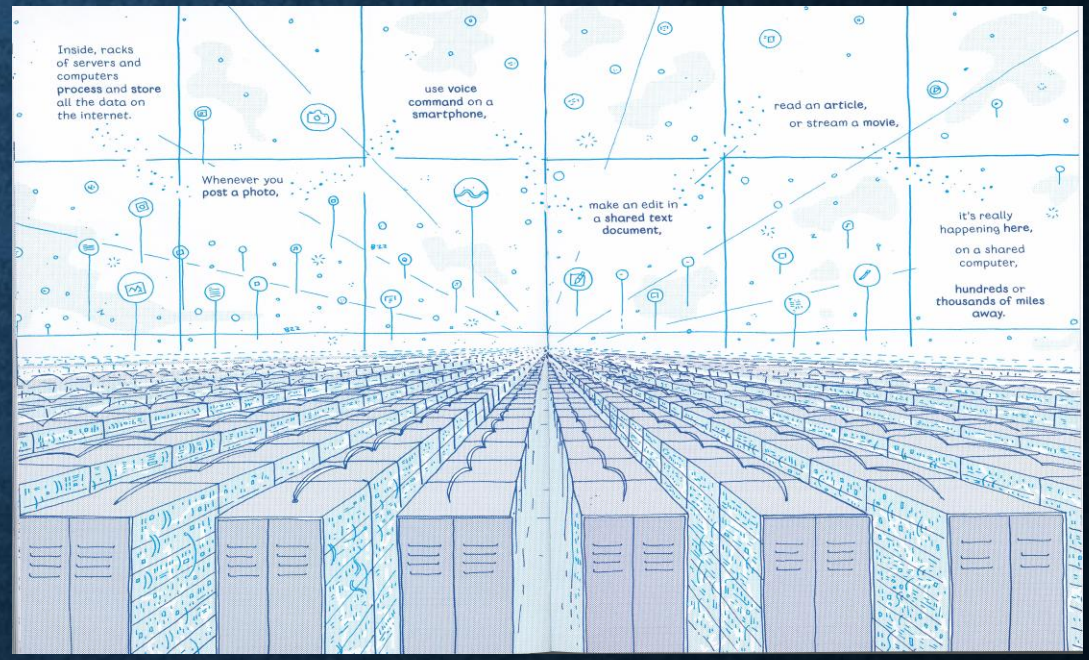
-Carrie Miller, Ph.D., Senior Researcher, Online Learning Consortium

Facebook data center,
Altoona, IA

Image via Des Moines Register

NOT JUST DATA CENTERS & AI…

- "It's important to remember that GenAI is only one of the many activities powered by data centers.
- "Understanding GenAI's footprint therefore means placing it in context, not isolating it from the rest of the digital services that share the same pipes, servers, and cooling systems.
- These services include:
  - video streaming, cloud storage, email, e-commerce, banking, logistics, navigation apps, electronic health records, social media, learning management systems (LMSs), videoconferencing, and everyday smartphone syncing and backups."



https://onlinelearningconsortium.org/olc-insights/2025/12/the-real-environmental-footprint-of-generative-ai/

A SUMMARY

- Mining the earth for tech infrastructure can be costly.
- Water usage and energy & electricity demands are also of concern, though they vary from local—to national and global scales.
    - https://hannahritchie.substack.com/p/ai-electricity-2025
- Energy forms present multiple uses and amount variations in on-site/off-site processes.
- Pollution and water usage across local, national and global industries are also important to consider:
        - Agriculture
        - Fossil fuel
        - War
- We live along a map of systems, where individual and collective production methods co-exist, intersect.
- Factors, including energy resources, land use, and other industries correspond.

UNCERTAIN FUTURE SCENARIOS

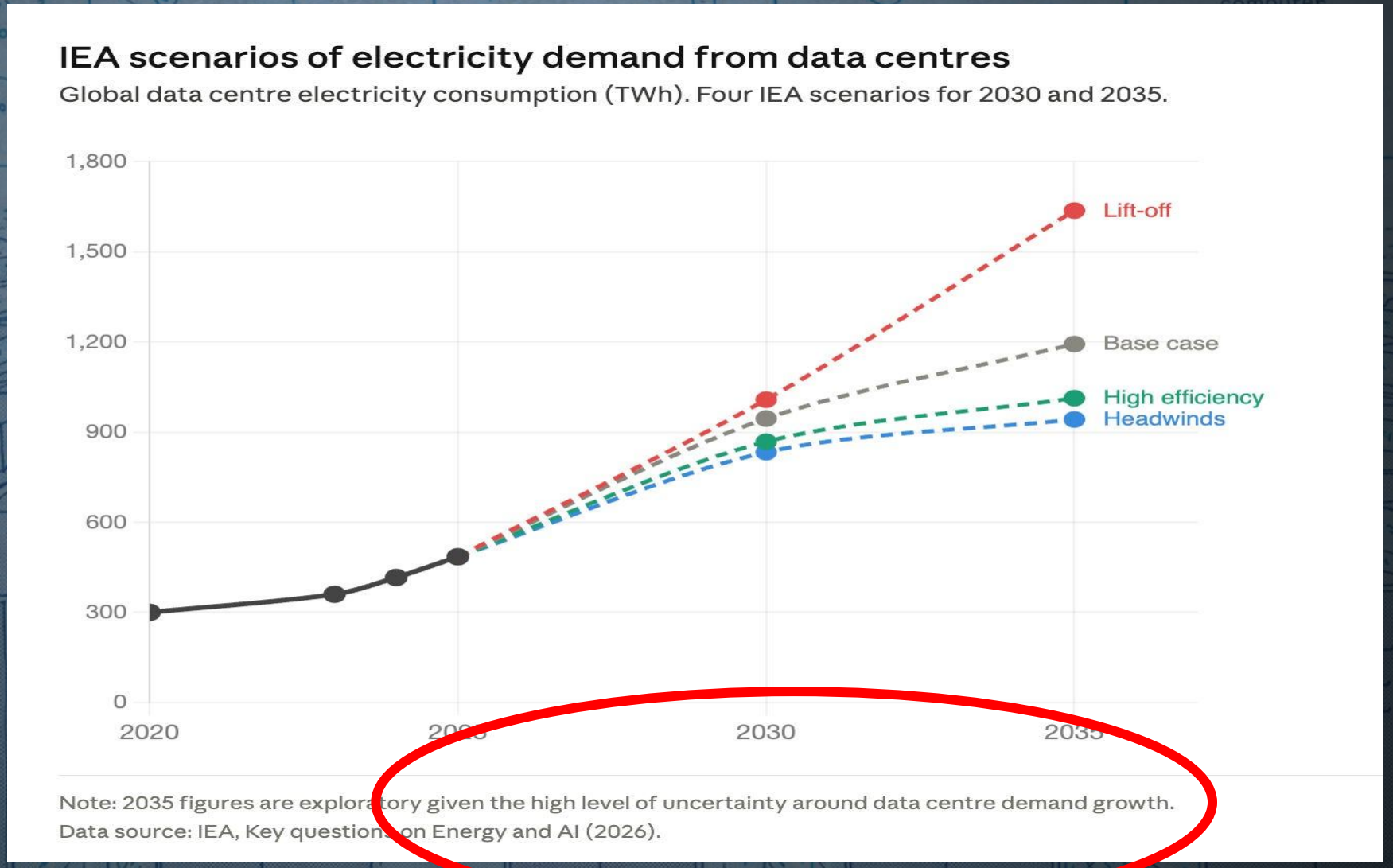


Image via https://hannahritchie.substack.com/p/ai-electricity-2025

CONCLUSION

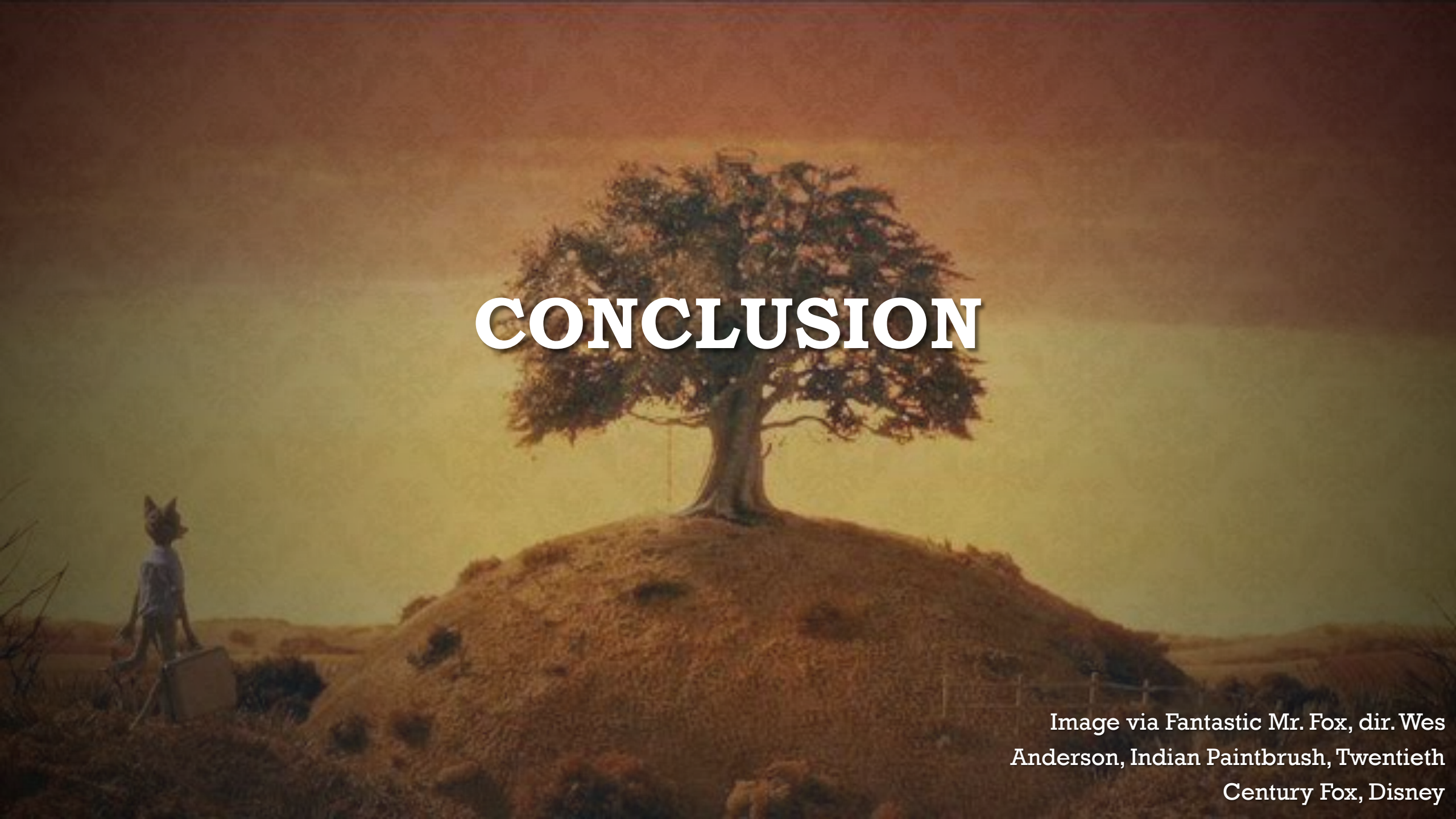


Image via Fantastic Mr. Fox, dir. Wes Anderson, Indian Paintbrush, Twentieth Century Fox, Disney

PROS & CONS

PROS

- Teaching tools
- Assistants/Efficiency tools:
  - Email
  - Organization
  - Research
  - Marketing
- Risk analysis
- Healthcare - Hearing aids (Hearing Care Services in DeWitt, Iowa)
- Robotics
- Detection of wildfires
- Weather prediction tools
  - Can assist with calculating/reducing greenhouse gas emissions

CONS

- Immoral/unethical use for deepfakes.
- Bias.
- Hallucination/confabulation.
- Marketed "efficiency" in some AI tools may, in fact, be more time-consuming for some tasks.
- Lack of oversight and transparency for Big Tech companies can result in privacy issues, unethical behavior, and over-dependency on tech.
- Old infrastructure and traditional methods of extraction are problematic for society and the environment.

Image via Canva

SUSTAINABLY SPEAKING…

Some sustainable practices communities can benefit from:

- "Closed-loop" systems, where no drinking source is used (however, this method would raise electricity demand, which would need to be offset by alternative means of energy source).
- Repurposing of waste and dirty water.
- Hybrid or full-alternative energy power systems to prevent less strain on grids.
- Reusing technology

Yannis Paschalidis, a Past Research Fellow at the Hariri Institute, provides a better way to integrate the data centers and energy grid through a "demand-response" model:

"The idea is to coordinate with the grid to reduce or increase consumption on-demand, depending on electricity supply and demand. This helps utilities better manage the grid and integrate more renewables into the production mix"

-Yannis Paschalidis

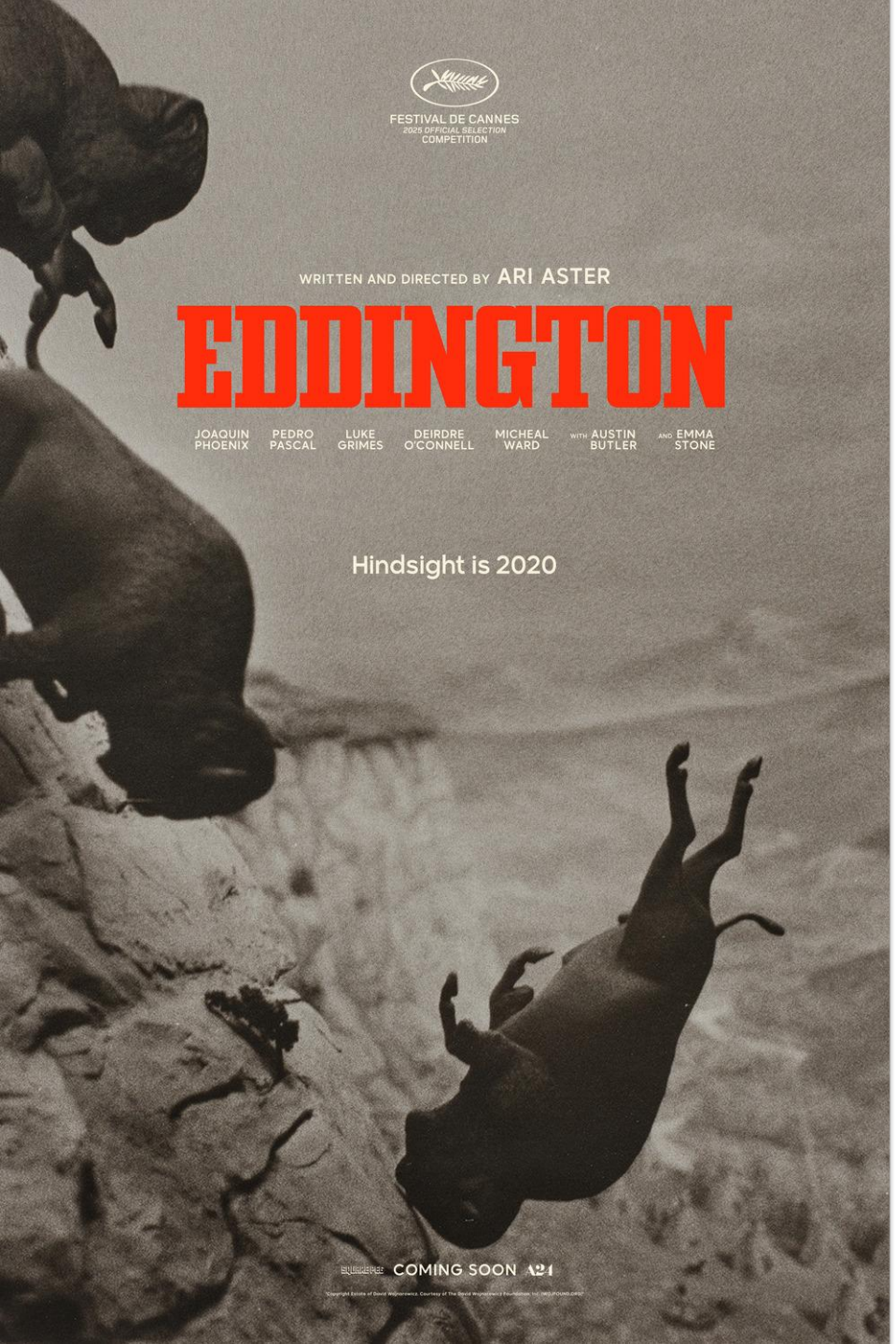
Consider data centers for sustainable grids: https://ieee-pes.org/wp-content/uploads/2026/02/ESM-Open-article-February-2026.pdf

TRUST & AWARENESS

- While sustainability helps connect us in understanding our own environmental impact, if it is implemented across all industries, the issues we may perceive to be AI's alone fade from view.
- Water use and environmental damages are not solely due to AI technology—but involve a vast system of systems spanning the world.
- Looking at AI can illuminate past and present issues, whether of its own industry or others:
  - Industrial extraction & pollution
  - Inequality and inequity
  - Factors contributing to climate change
- Building more compassionately, and using tech in such ways, is vital.

Prefiguration: "A strategy in which actions in the present prefigure future outcomes. In other words, the means employed today must be congruent with the desired ends, lest those ends be corrupted by the means."

-Alex Prichard
Anarchism, A Very Short Introduction



ONWARD…

- It is important to consider our own capabilities to learn and think. (Life-long learning! Yay!)
- Individual and collective behaviors regarding consumerism and the type of economy we have and need must be considered.
- Who/what is using the tech and how is it being used?
- More uses also develop out of our interactions with tech, advancing the human/tech relationship.

Thank you!

Contact info:

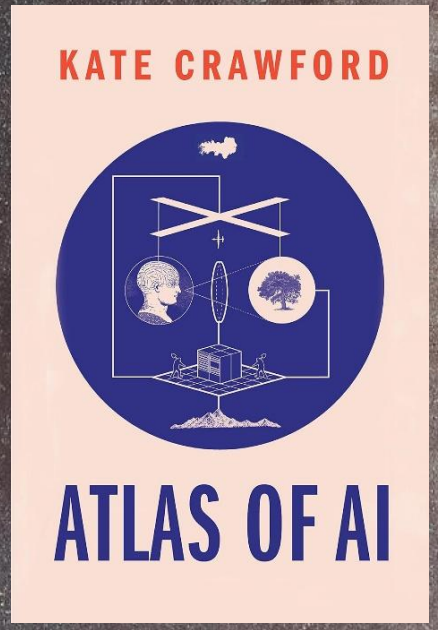
agehlsen@dewittlib.org

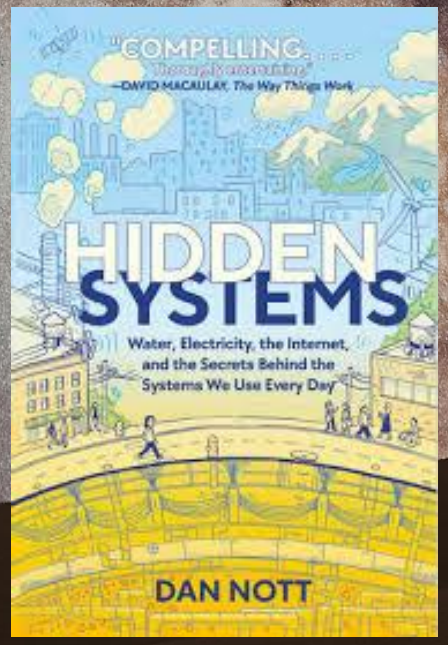
info@dewittlib.org

DeWitt Community Library

dewitt.lib.ia.us

SOURCES:





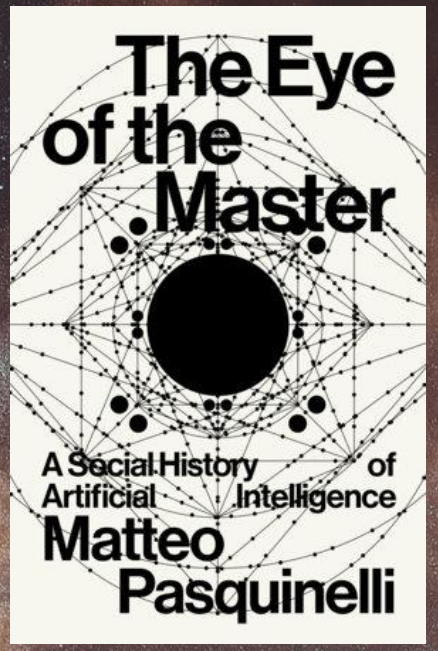


Image via Canva

SOURCES CONT'D (those not included in slides):

https://nicolehennig.com/category/ai/

https://www.ibm.com/think/topics/data-centers

https://www.ibm.com/think/topics/hyperscale-vs-colocation

https://www.computinghistory.org.uk/det/6028/In-1936-at-Cambridge-Alan-Turing-invented-the-principle-of-the-modern-computer/

https://www.scientificamerican.com/article/data-centers-run-on-clean-energy-now-welcome-on-publicly-owned-land/

https://repository.uclawsf.edu/cgi/viewcontent.cgi?article=1121&context=hastings_science_technology_law_journal

https://hsm.ox.ac.uk/imagining-ai

https://www.sciencedirect.com/science/article/pii/S0011916422005379

https://www.kcrg.com/2025/10/22/officials-hold-topping-out-ceremony-10-billion-cedar-rapids-data-center-campus/

Image via Canva

https://www.trgdatacenters.com/resource/history-of-data-centers/

https://www.catf.us/2025/10/illinois-fully-lifts-decades-long-nuclear-moratorium-important-step-toward-securing-clean-reliable-affordable-grid/

https://www.cell.com/patterns/fulltext/S2666-3899(25)00278-8?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2666389925002788%3Fshowall%3Dtrue

https://hai.stanford.edu/ai-index/2025-ai-index-report/public-opinion

https://hai.stanford.edu/ai-index/2025-ai-index-report/economy

https://news.un.org/en/story/2026/01/1166800

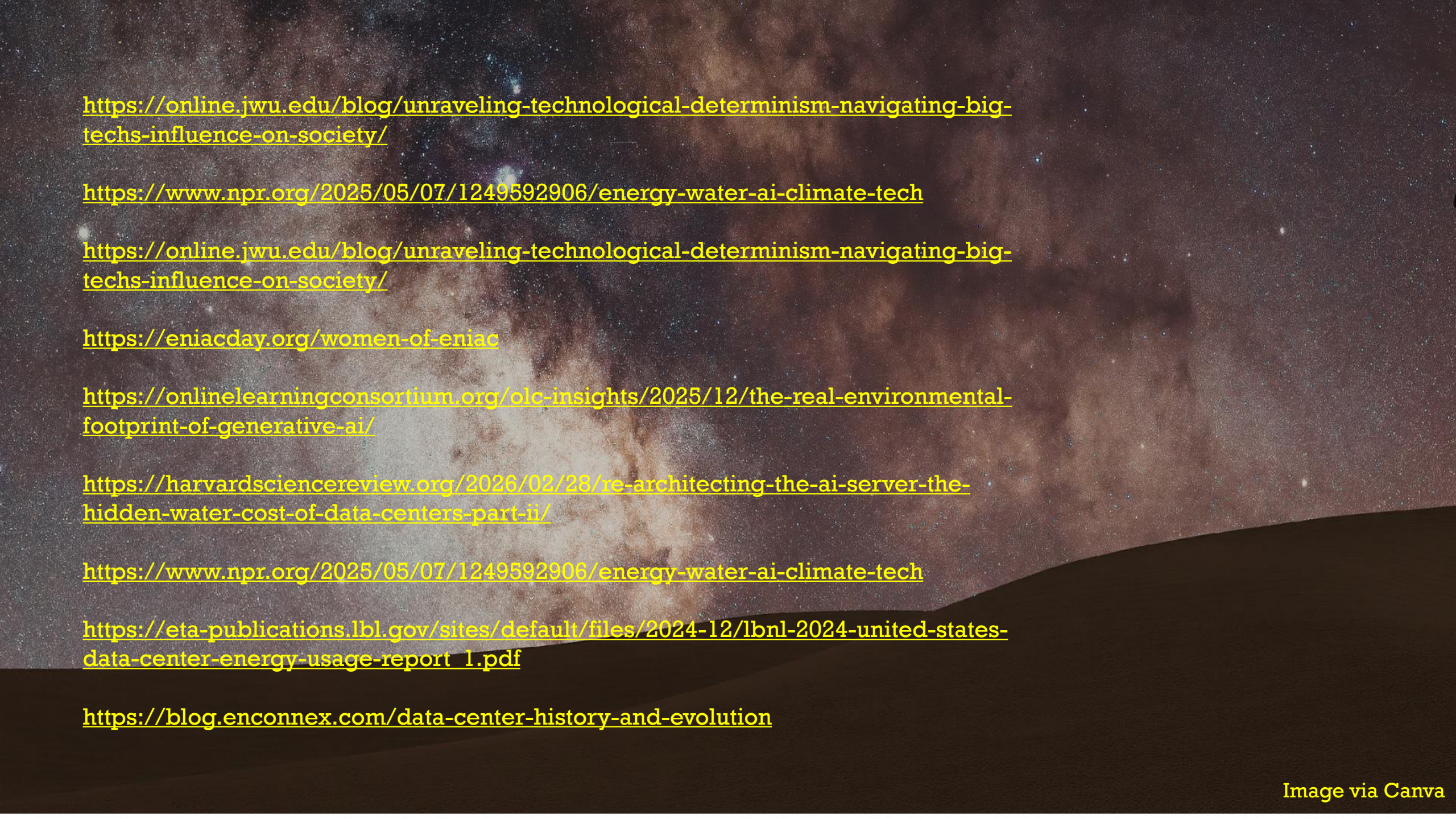
https://understandingyourai.org/history-of-ai/

https://www.bbc.co.uk/teach/articles/zh77cqt

https://www.cisco.com/site/us/en/learn/topics/computing/what-is-a-data-center.html#~related-topics

https://arxiv.org/pdf/2304.03271

Image via Canva



https://online.jwu.edu/blog/unraveling-technological-determinism-navigating-big-techs-influence-on-society/

https://www.npr.org/2025/05/07/1249592906/energy-water-ai-climate-tech

https://online.jwu.edu/blog/unraveling-technological-determinism-navigating-big-techs-influence-on-society/

https://eniacday.org/women-of-eniac

https://onlinelearningconsortium.org/olc-insights/2025/12/the-real-environmental-footprint-of-generative-ai/

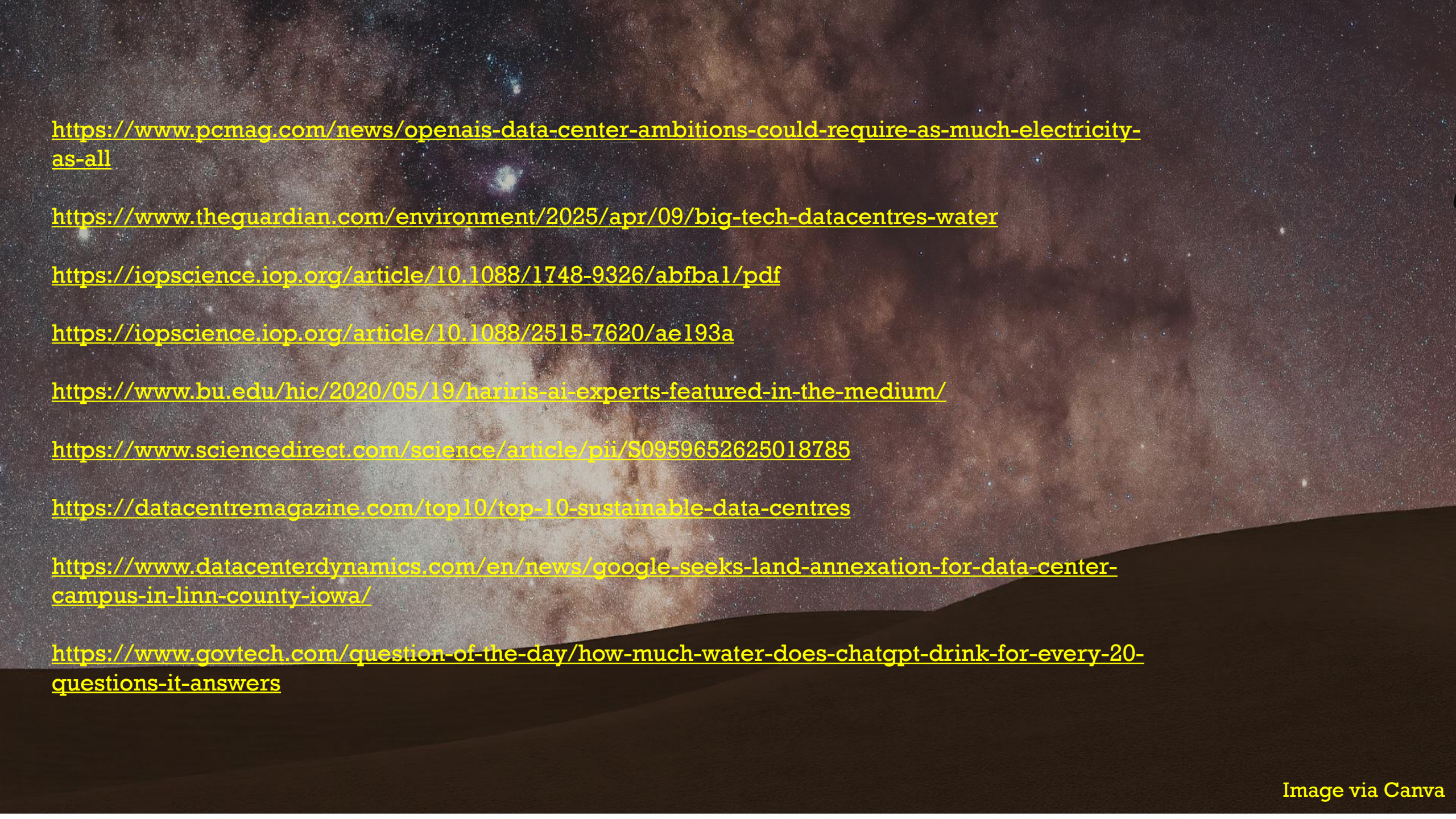
https://harvardsciencereview.org/2026/02/28/re-architecting-the-ai-server-the-hidden-water-cost-of-data-centers-part-ii/

https://www.npr.org/2025/05/07/1249592906/energy-water-ai-climate-tech

https://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report_1.pdf

https://blog.enconnex.com/data-center-history-and-evolution

Image via Canva



https://www.pcmag.com/news/openais-data-center-ambitions-could-require-as-much-electricity-as-all

https://www.theguardian.com/environment/2025/apr/09/big-tech-datacentres-water

https://iopscience.iop.org/article/10.1088/1748-9326/abfba1/pdf

https://iopscience.iop.org/article/10.1088/2515-7620/ae193a

https://www.bu.edu/hic/2020/05/19/hariris-ai-experts-featured-in-the-medium/

https://www.sciencedirect.com/science/article/pii/S0959652625018785

https://datacentremagazine.com/top10/top-10-sustainable-data-centres

https://www.datacenterdynamics.com/en/news/google-seeks-land-annexation-for-data-center-campus-in-linn-county-iowa/

https://www.govtech.com/question-of-the-day/how-much-water-does-chatgpt-drink-for-every-20-questions-it-answers

Image via Canva

https://arxiv.org/pdf/2505.09598

https://www.lcsun-news.com/story/news/2025/09/08/austin-based-company-plans-to-spend-165b-on-nm-data-center-campus/86043566007/

http://large.stanford.edu/courses/2017/ph241/styles2/

https://www.nature.com/articles/s41893-025-01681-y

https://collections.unu.edu/eserv/UNU:10445/Global_Water_Bankruptcy_Report_2026_.pdf

imdb.com

Rolson III, Holmes. "Technology and/or Nature." Ethics and the Environment, Vol. 22 (1), 2017. Pp. 41-62. mountainscholar.org, https://api.mountainscholar.org/server/api/core/bitstreams/afa6dc16-c52d-426e-bfbe-8d5bb207ff7e/content. Accessed Sept. 2024.

McKinnon, Catriona. "Climate Change: Against Despair." *Ethics and the Environment*, vol. 19, no. 1, 2014, pp. 31–48. *JSTOR*, https://doi.org/10.2979/ethicsenviro.19.1.31. Accessed Sept. 2024.

Image via Canva