



# NATURE, SOCIETY & "AI" REALITY

## AN INTRODUCTION TO AI TECHNOLOGY

A DIGITAL EXHIBIT  
WITH ANDREW GEHLSSEN

# TABLE OF CONTENTS:

PART I. AI KEY TERMS & TOOLS  
(INCLUDES USES & HOW AI WORKS)

PART II. AI INFRASTRUCTURE  
(PHYSICAL STRUCTURE, BIG TECH,  
SOCIAL/ENVIRONMENTAL IMPACTS)

SOURCES

# 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 – (1<sup>st</sup> 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.

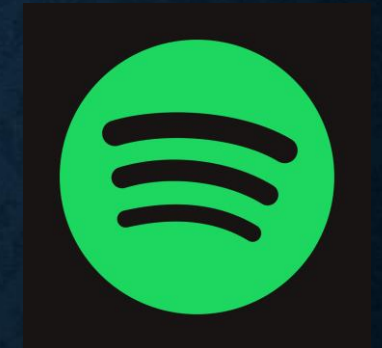
“The thought is the language, as Wittgenstein has put it. A technical vocabulary is merely a language within a language. A consideration of this technical vocabulary will be at the same time an attempt to discover the reality which the words disclose or conceal.”

-R.D. Laing  
*The Divided Self*



# ***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/>

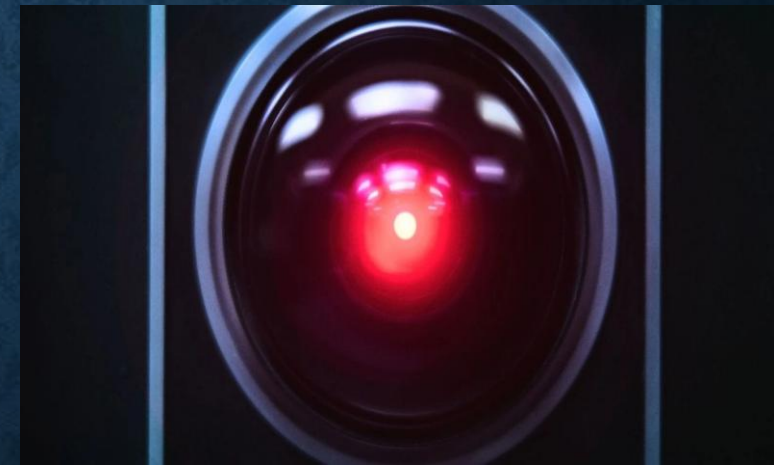
<https://www.ibm.com/think/topics/multimodal-ai>

<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.
  - 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!

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).”



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

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

# CHAPTER 2. A TUTORIAL

[HTTPS://LIB.ARIZONA.EDU/TUTORIALS/MULTIMEDIA-  
AI/#/LESSONS/FXC1A4796IAHPV7EQBPPKV3TFZ  
X1GZAV](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**

# 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>:

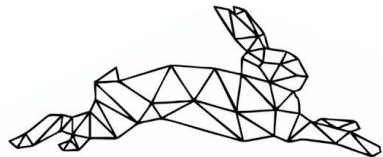
Tagline: "ChatGPT for Research."

- Free trial or paid versions only

Video available at:

<https://www.youtube.com/watch?v=WNikKLdJ3mE>

# AI RESEARCH TOOLS



[www.researchrabbit.ai](http://www.researchrabbit.ai)

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>



# 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.



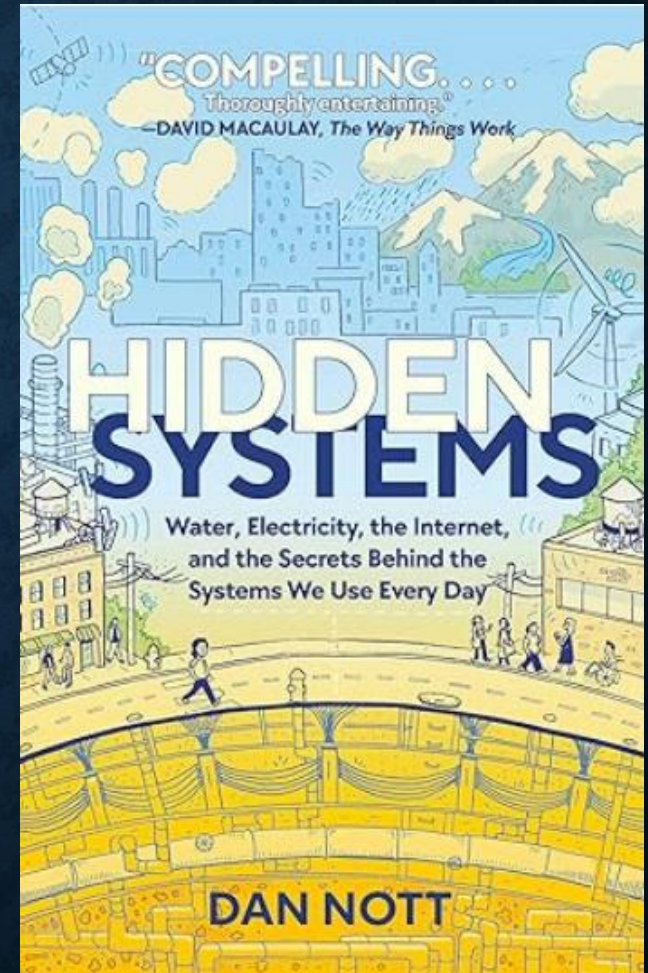


**PART II.**

**AI INFRASTRUCTURE**

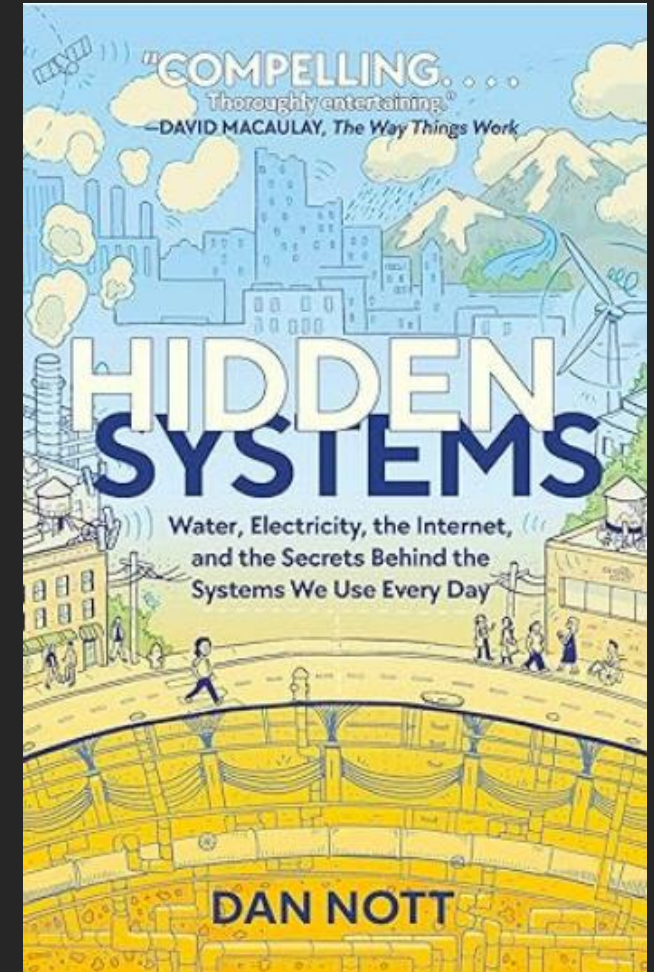
# HISTORY OF A WATER SYSTEM

- 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...



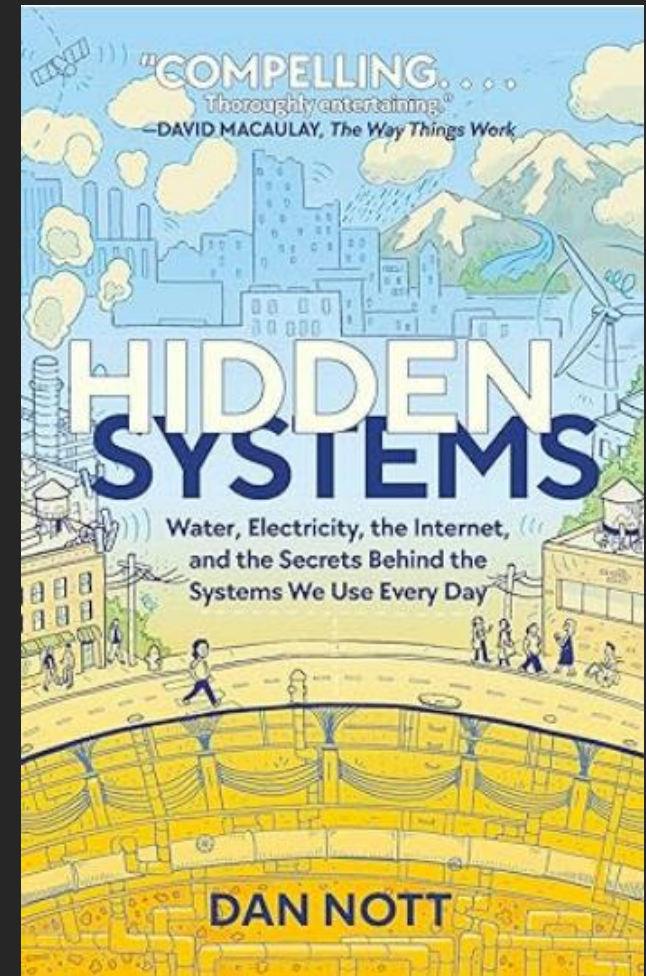
# A NEW NETWORK, I.

- 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.



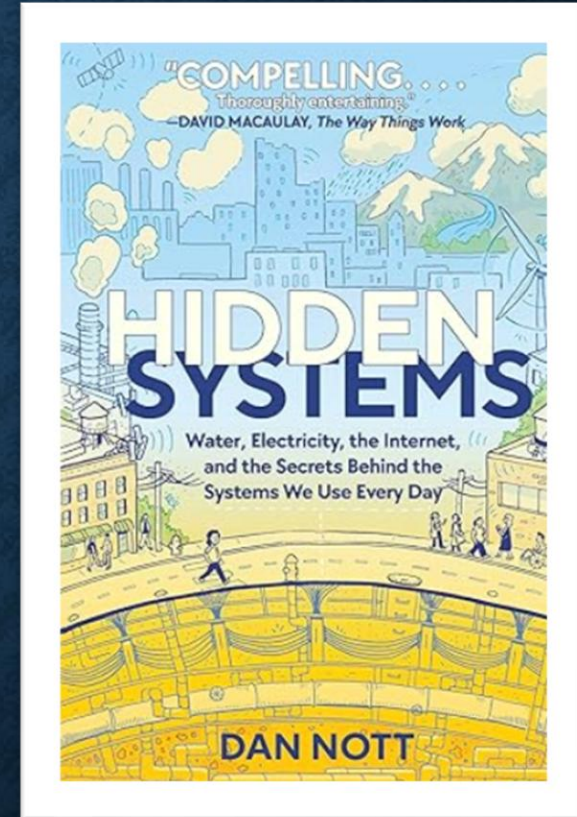
# A NEW NETWORK, II.

- 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 tekhnē, ‘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."**

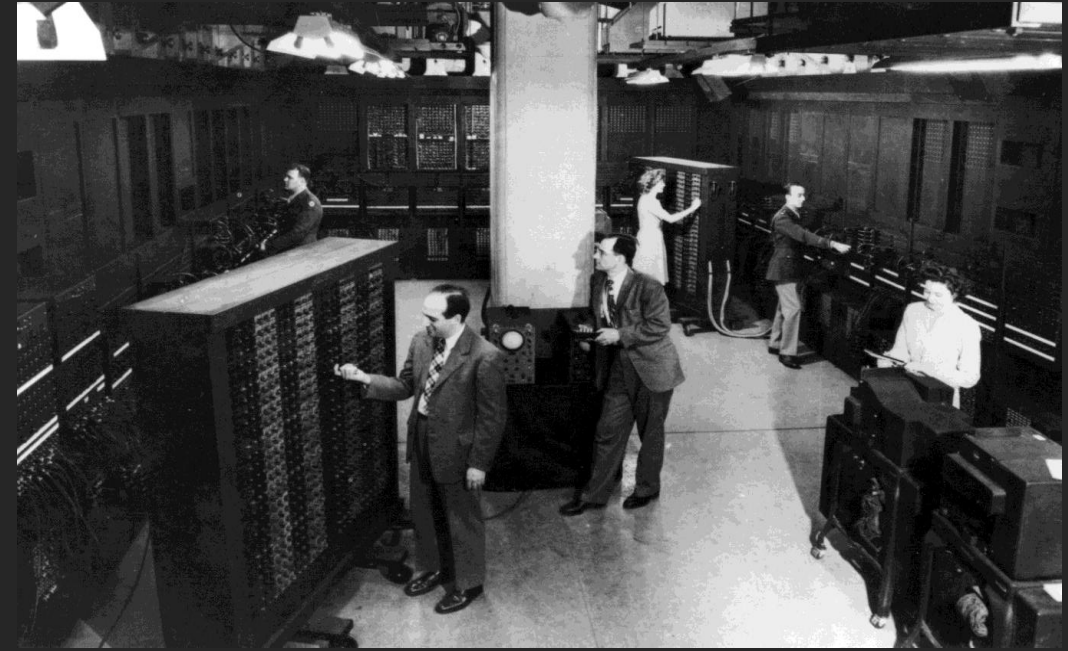
**-Lorraine Daston, American historian of science  
"Algorithms Before Computers (lecture)," 2017**

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.

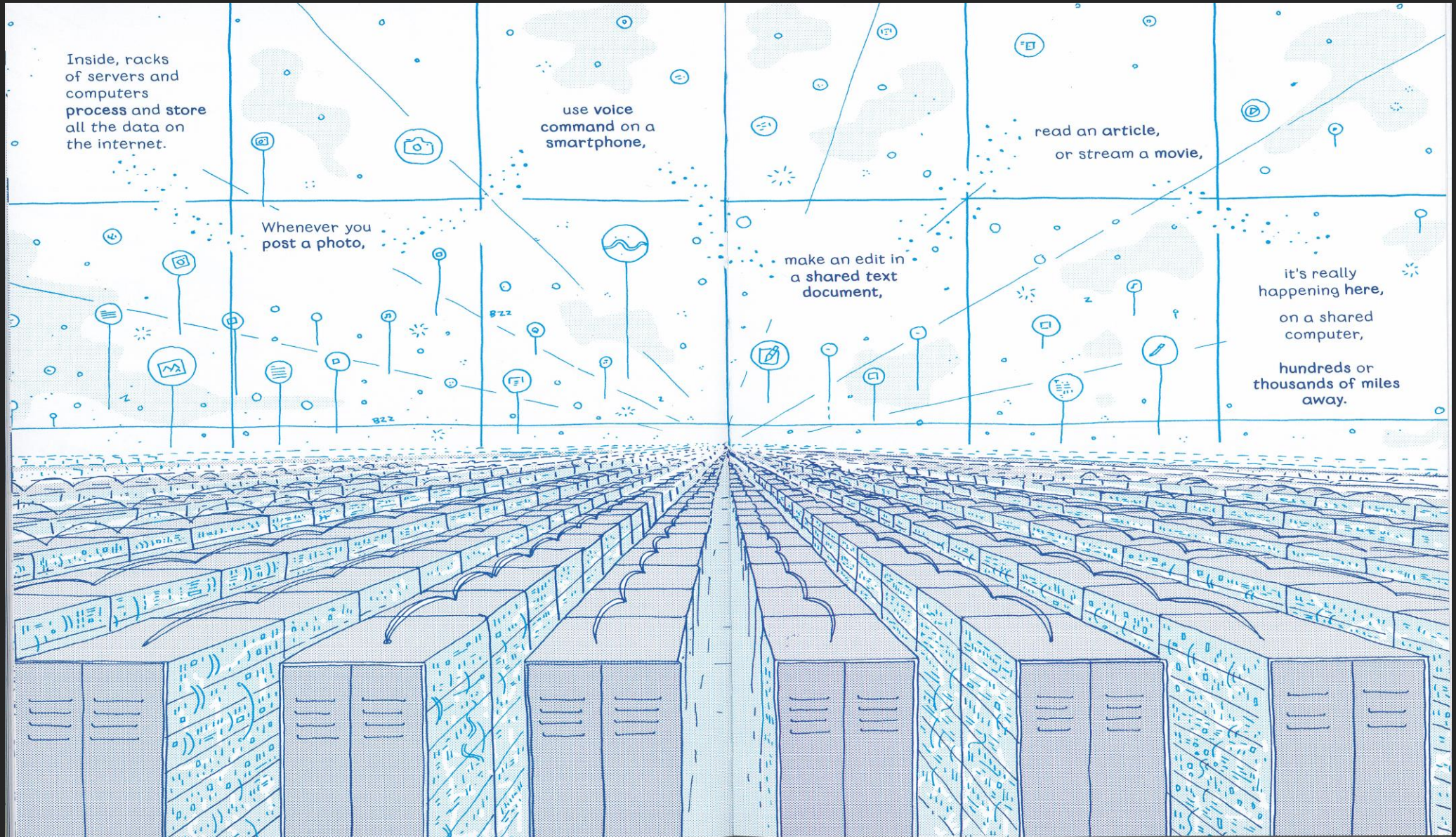
# ***A BRIEF HISTORY OF DATA CENTERS***

- 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.

# INSIDE A DATA CENTER



Inside, racks of servers and computers process and store all the data on the internet.

Whenever you post a photo,

use voice command on a smartphone,

read an article, or stream a movie,

make an edit in a shared text document,

it's really happening here, on a shared computer, hundreds or thousands of miles away.

Image via Hidden Systems by Dan Nott, RH Kids Graphic

# AI & THE ENVIRONMENT

# 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).”

# 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...

# 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**

# 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

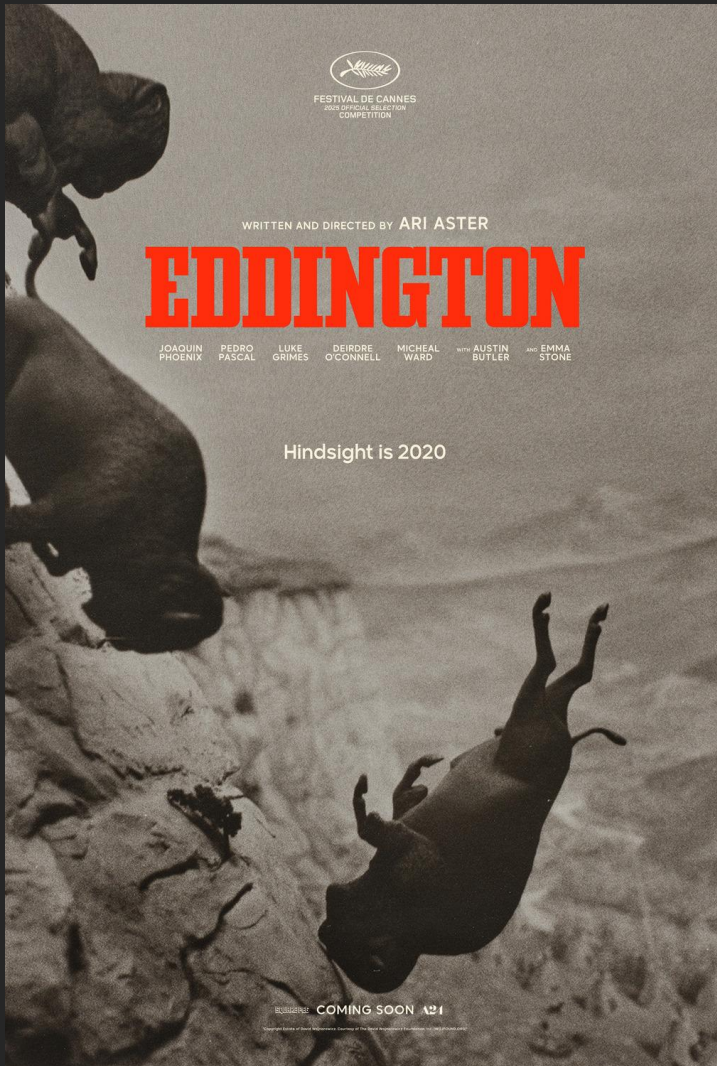
### 4. Increased use of AI in consumer apps:

- virtual assistants
- chatbots

### 5. Growing investments/partnerships among:

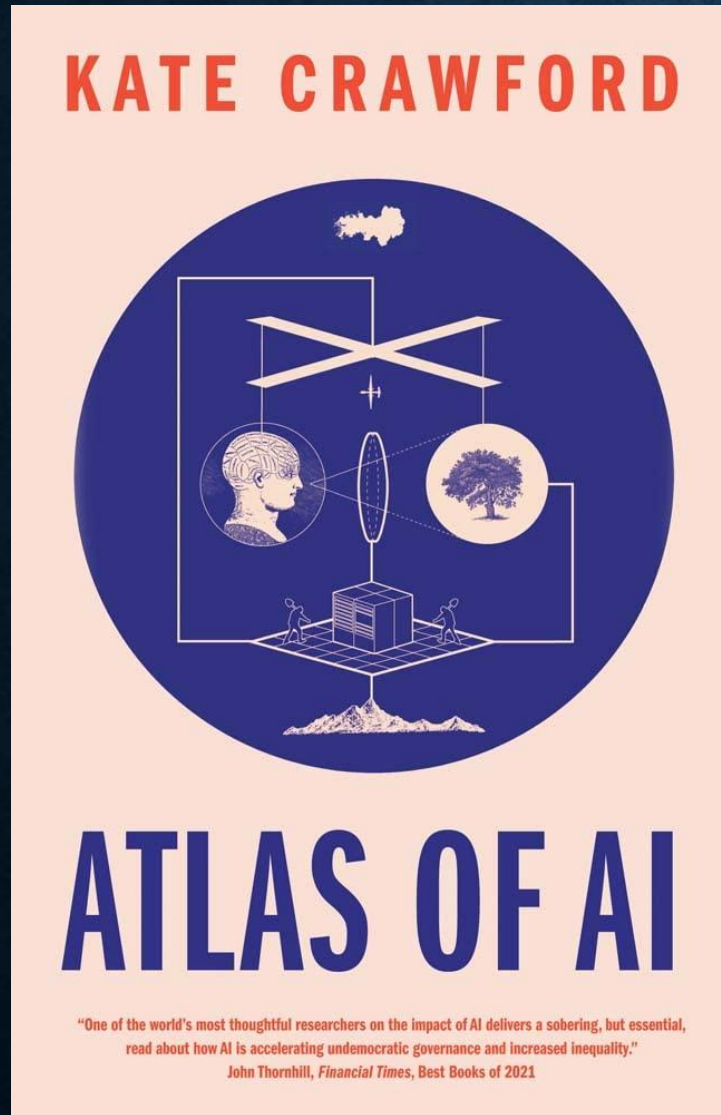
- tech companies
- research institutions
- governments





- 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...

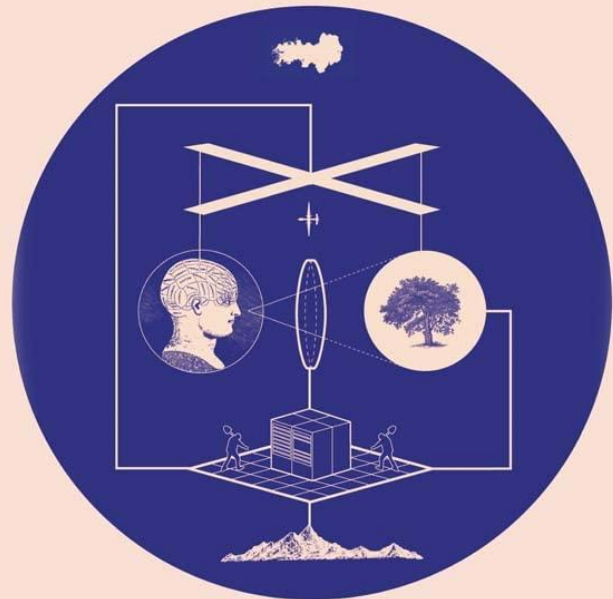
# TO CONSIDER: EARTH & THE TECH INDUSTRY



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).”

**KATE CRAWFORD**



# ATLAS OF AI

“One of the world’s most thoughtful researchers on the impact of AI delivers a sobering, but essential, read about how AI is accelerating undemocratic governance and increased inequality.”

John Thornhill, *Financial Times*, Best Books of 2021

## TO CONSIDER: EARTH & THE TECH INDUSTRY

- “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.

# TO CONSIDER: IDENTITY MINING & SURVEILLANCE

90

Data



Images from NIST Special Database 32—Multiple Encounter Dataset (MEDS). National Institute of Standards and Technology, U.S. Department of Commerce

“Surveillance technologies are not by themselves inherently good or bad. It’s really about what kinds of uses we put them to.”

-Dr. Helga Tawil-Souri, associate professor at New York University in the Department of Media, Culture and Communication and Middle East and Islamic Studies

“The mining of mug shots represents a shift from *image* to *infrastructure*, where the meaning or care that might be given to the image of an individual person, or the context behind a scene, is presumed to be erased at the moment it becomes part of an aggregate mass that will drive a broader system.”

-Kate Crawford, writer, researcher, author of *Atlas of AI*

# TO CONSIDER: IDENTITY MINING & SURVEILLANCE

# GLOBAL/NATIONAL SCALE

90

Data



Images from NIST Special Database 32—Multiple Encounter Dataset (MEDS). National Institute of Standards and Technology, U.S. Department of Commerce

- Gaza has served as a testing ground for Israeli surveillance tech for years where companies (like NSO Group, AnyVision) supply their “battled-tested” tech to law enforcement agencies, border control, and private security firms all around the world.
- Companies like Google and Amazon have partnered with governments where their AI tech is used to surveil and target citizens.
- ICE (U.S. Immigration and Customs Enforcement) uses such tech in the U.S.

In WW2, “the aerial targeting cycle – from collecting images to assembling target packages complete with intelligence reports – could take weeks or even months. But over the ensuing decades, the US military set about what it called “compressing the kill chain”– shortening the time between the identification of a target and use of force against it.”

-Jones, Kinsella

<https://theconversation.com/iran-war-shows-how-ai-speeds-up-military-kill-chains-278492>.”

# TO CONSIDER: IDENTITY MINING & SURVEILLANCE

## STATE/LOCAL

90

Data



Images from NIST Special Database 32—Multiple Encounter Dataset (MEDS). National Institute of Standards and Technology, U.S. Department of Commerce

- ALPR (Automated License Plate Reader) systems have received criticisms by communities in Iowa (resulting in the removal of Flock Safety cameras in Coralville in March).
- It is a surveillance camera system that records stills and videos of vehicles using AI to process a vehicle’s “fingerprint.”
- They have been installed across roadways, parking lots, and elsewhere in the state.

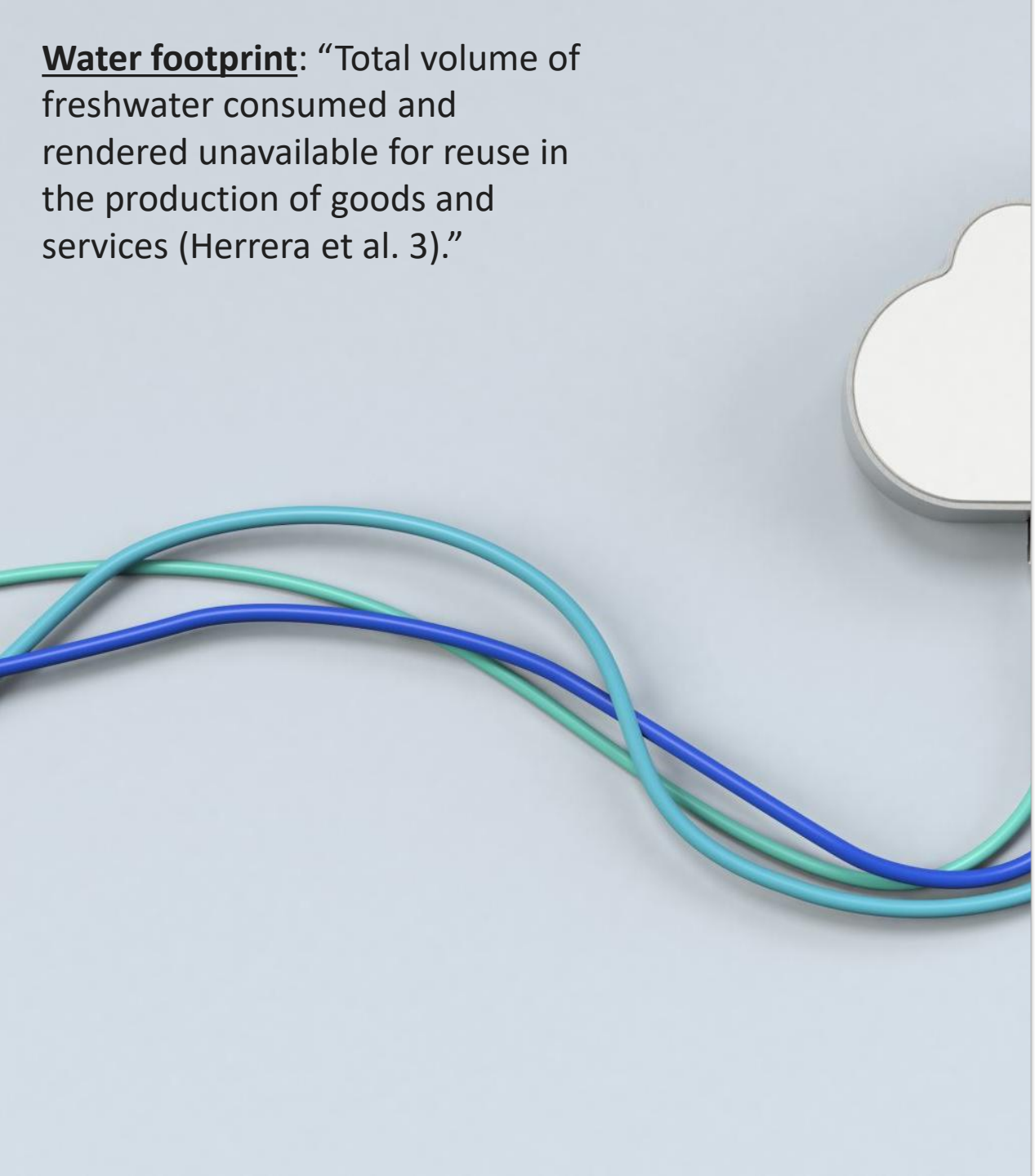
# LOCAL/STATE: CEDAR RAPIDS, PALO, NORWALK

- Economic incentives:
  - Job creation
  - Low, or water free cooling systems
- However:
  - While there are promotions of job creation, along with “low” or “water free cooling systems,” these may only be positive in the short-term—as jobs may only be for construction, and therefore, reduce afterwards.
  - low or water-free cooling systems may be outmatched by ambitions (more on this later).
- Google is currently 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](https://www.norwalk.iowa.gov/news_detail_T5_R273.php))



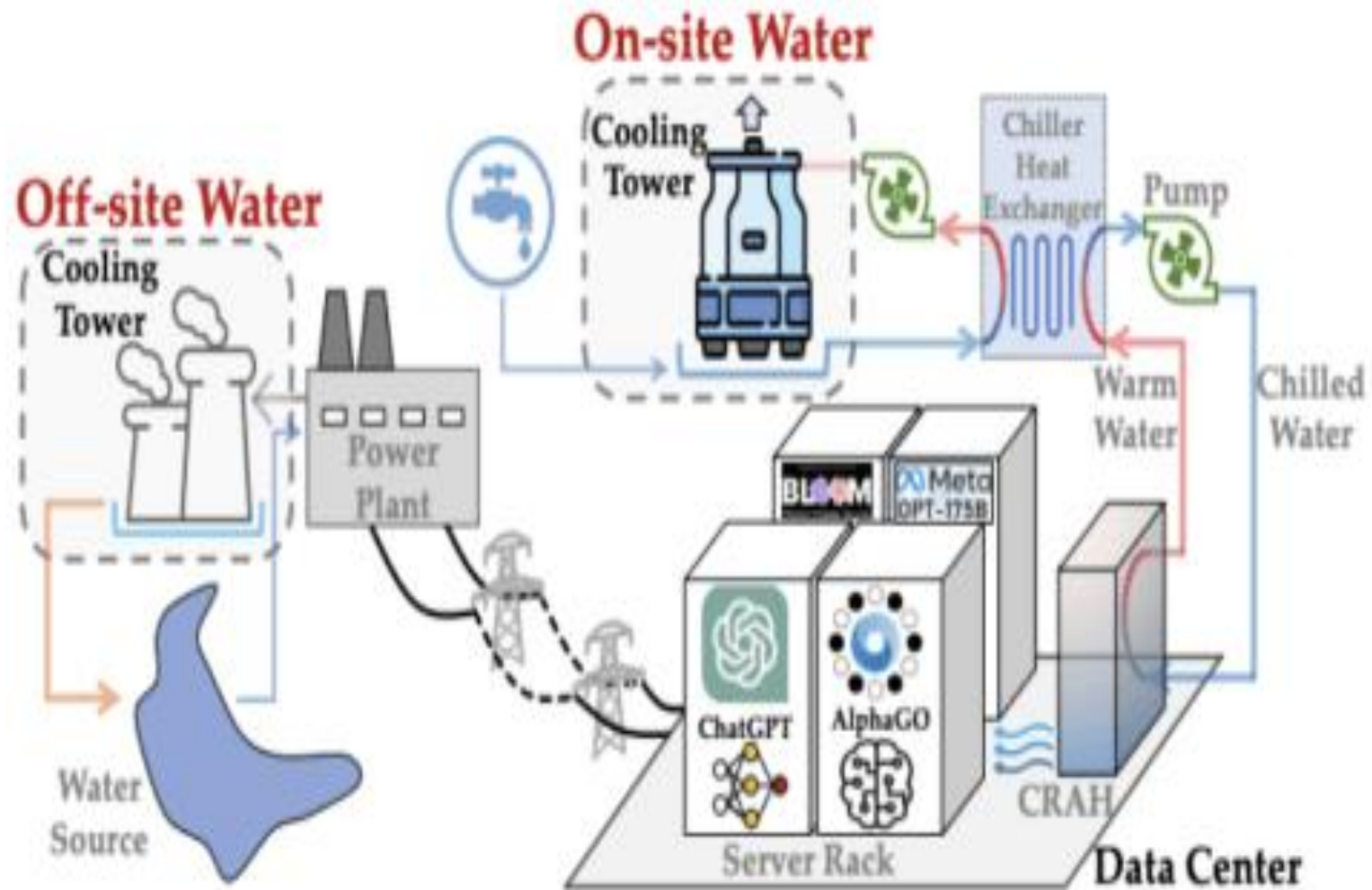
Cedar Rapids data center campus, topping out ceremony, Oct. 21<sup>st</sup>, 2025

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



## AI & WATER: CONCERNING DIRECT/INDIRECT USE

- AI-powered data centers use more water and electricity than traditional data centers (used for cloud, email, and storage purposes).
- AI H2O use comes in 2 forms, Direct and Indirect use:
  - Direct use: On-site process of cooling through water evaporation. Water is, in many cases, withdrawn from the same municipal source as businesses and households.
    - Withdrawal = H2O taken from ground or surface source, temporarily or permanently.
    - Consumption = Withdrawn, or “consumed,” where H2O 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)





# 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.
- It’s likely that efficiency gains in later models have reduced these numbers, but indirect water use still predominates (<https://spectrum.ieee.org/ai-water-usage>).”
- “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.”

# 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.

“In reality, the type and size of the model, the type of output you’re generating, and countless variables beyond your control—like which energy grid is connected to the data center your request is sent to and what time of day it’s processed—can make one query thousands of times more energy-intensive and emissions-producing than another.”

-O'Donnell, Crownhart  
*MIT Technology Review*



# SO...HOW MUCH WATER?

- According to a Nov. 2025 report (which included disclosed numbers by OpenAI), ChatGPT-4:
  - “exceeds the total electricity consumption of 35,000 U.S. residential households, 50 inpatient hospitals, and even 325 universities annually;
  - ...is responsible for evaporating an amount of freshwater equivalent to the annual drinking needs of almost 1.2 million people, or filling 500 Olympic-sized swimming pools;
  - has projected annual emissions of approximately 138,125 tons of CO<sub>2</sub>e (all greenhouse gas emissions), or the annual amount of 30,000 gasoline-powered cars.”



**“ChatGPT is now estimated to be the fifth-most visited website in the world, just after Instagram and ahead of X.”**

**-O'Donnell, Crownhart  
MIT Technology Review**

# ENERGY USE BY PROCESSOR/GPU (GRAPHICS PROCESSING UNIT)

As GPUs grow, so does electricity demand.

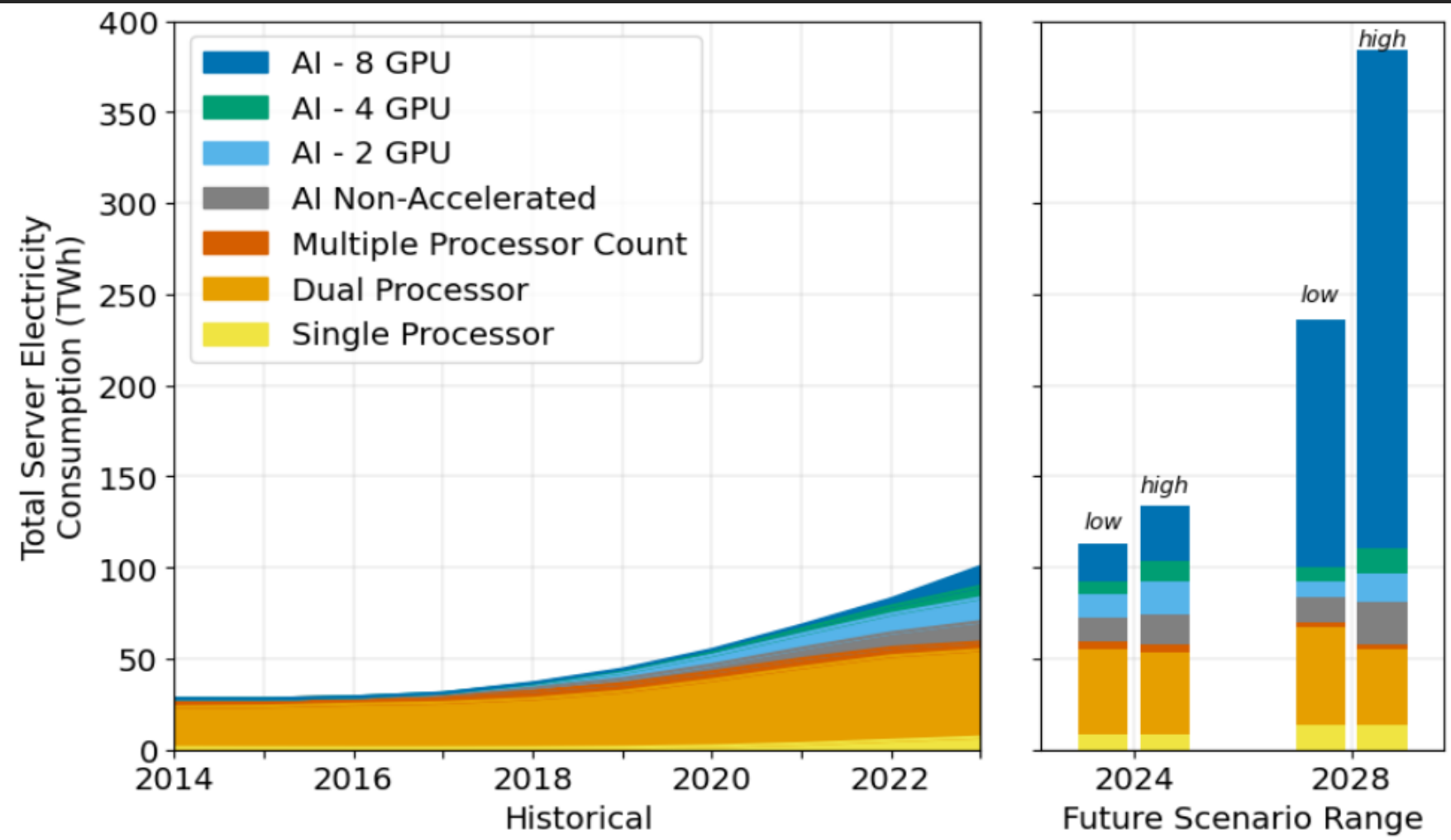


Figure 5.1. Server annual electricity usage by type.

“In 2017, AI began to change everything. Data centers started getting built with energy-intensive hardware designed for AI, which led them to double their electricity consumption by 2023.”

The [latest reports](#) show that 4.4% of all the energy in the US now goes toward data centers.”

-O’Donnell, Crownhart  
*MIT Technology Review*

# ENERGY USE BY DATA CENTER TYPE

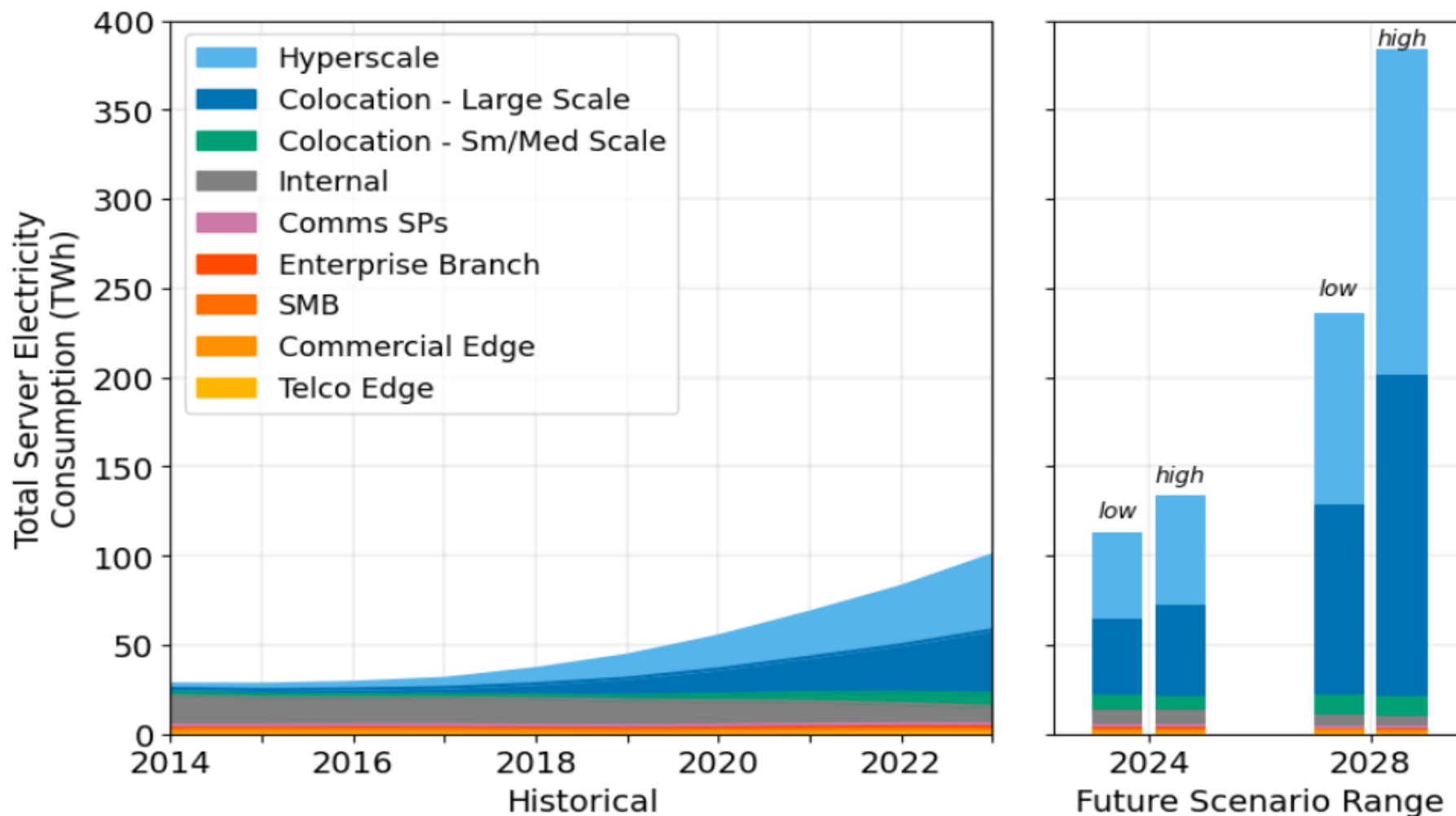


Figure 5.2. Server annual electricity use by space type.

“Hyperscale data centers represent data storage on a gigantic scale.”

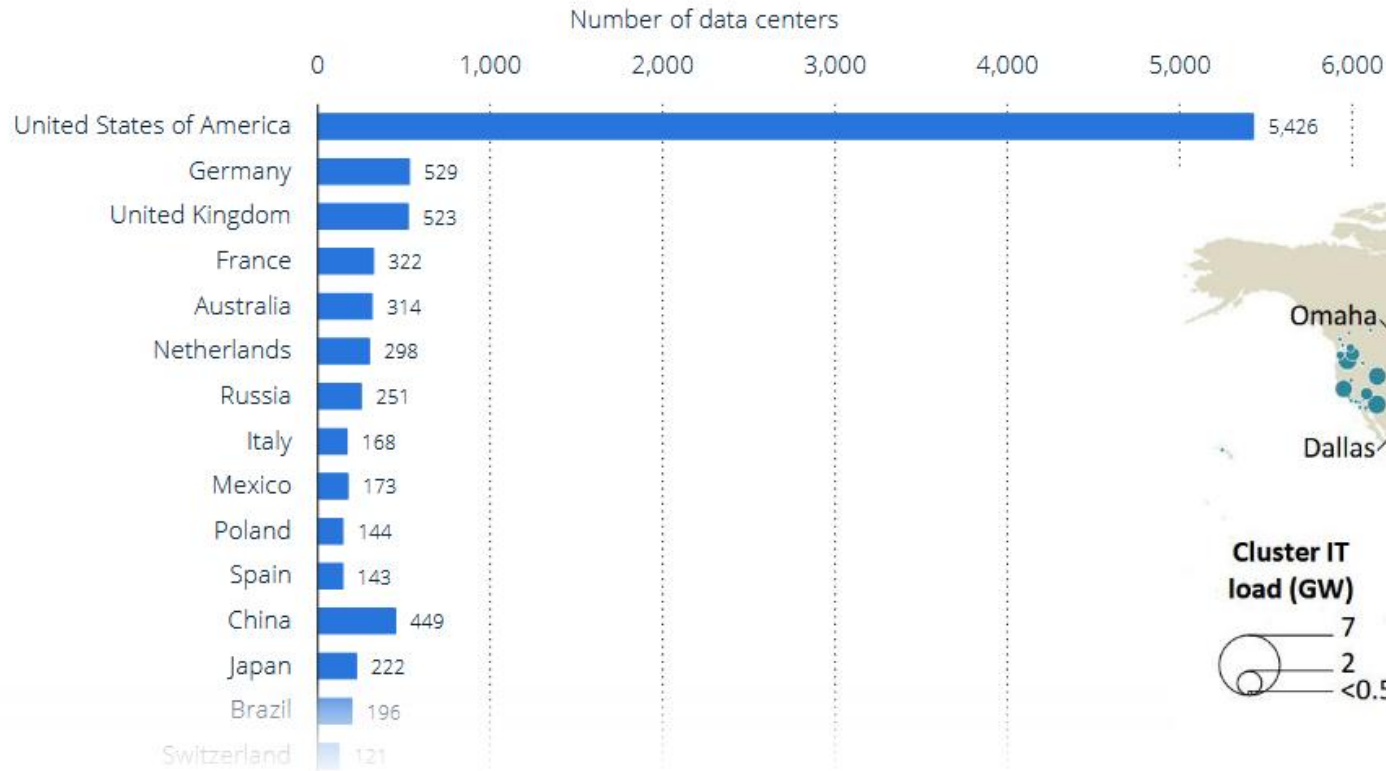
Large companies usually own their own hyperscale centers.

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.



Global map of large data center clusters, 2024



(IEA, 2025)

Note(s): Worldwide; 2025

Further information regarding this statistic can be found on page 8.

Source(s): Cloudscene; ID 1228433 statista



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

## TAKEAWAYS: REGULATIONS OF AMBITIONS

- Though companies like Google or Microsoft have promised sustainability initiatives, “ambitions” could negate these methods.
- 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.





# TAKEAWAYS: LOCAL TO GLOBAL

- “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
- AI may account for a lower percentage of water use by an individual person, as well as on a global scale than it does domestically right now—but studies reveal more water, and electricity, will be used in the future (if our present dependence on fossil fuels and old structures/traditions continues).
- Local communities nearest to a facility are impacted more.
- Lack of sustainability focus and Big Tech regulation would only lead to more strain on our local environments, and worldwide as a whole.

Facebook data center,  
Altoona, IA

Image via Des Moines Register

# TAKEAWAYS: MINDING THE GLOBE

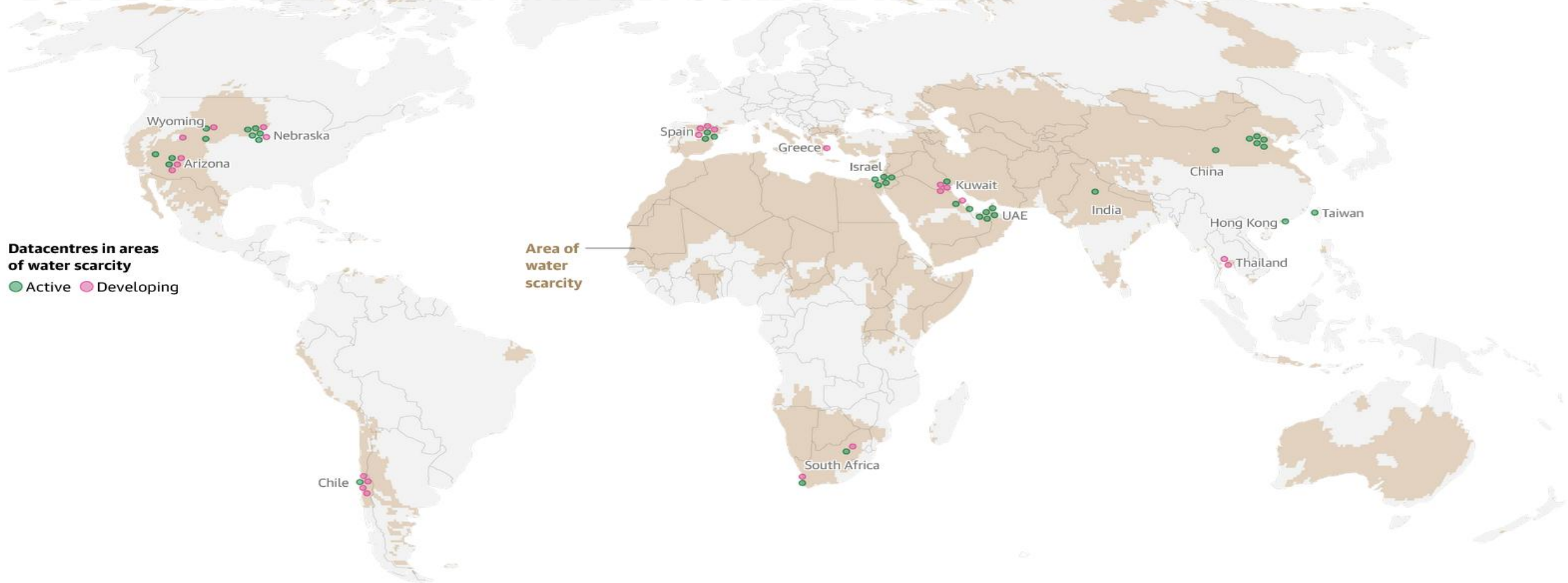
- Many geographic locations already are feeling intense repercussions—particularly arid, water-scarce regions in the global South, Spain, and Southwestern U.S.
- These locations are ideal because large inland areas have low humidity (and are distanced from salt water). This means less risk for metal corrosion/damages in data centers.
- Some environments are living our possible futures right now:
  - “Nearly three-quarters of the world’s population live in countries classified as water-insecure or critically water-insecure (<https://news.un.org/en/story/2026/01/1166800>).”

Concerning “[Global Water Bankruptcy: Living Beyond Our Hydrological Means in the Post-Crisis Era](#):

“...many regions are living beyond their hydrological means, and many critical water systems are already bankrupt.”

-[Kaveh Madani](#), Director of the UN University’s Institute for Water

# DATA CENTER MAP IN WATER-SCARCE AREAS



Guardian graphic. Note: Locations are approximate.

Datacentres' locations are often industry secrets. But by using local news reports and industry sources Baxtel and Data Center Map, SourceMaterial compiled a map of 632 datacentres - either active or under development - owned by Amazon, Microsoft and Google.

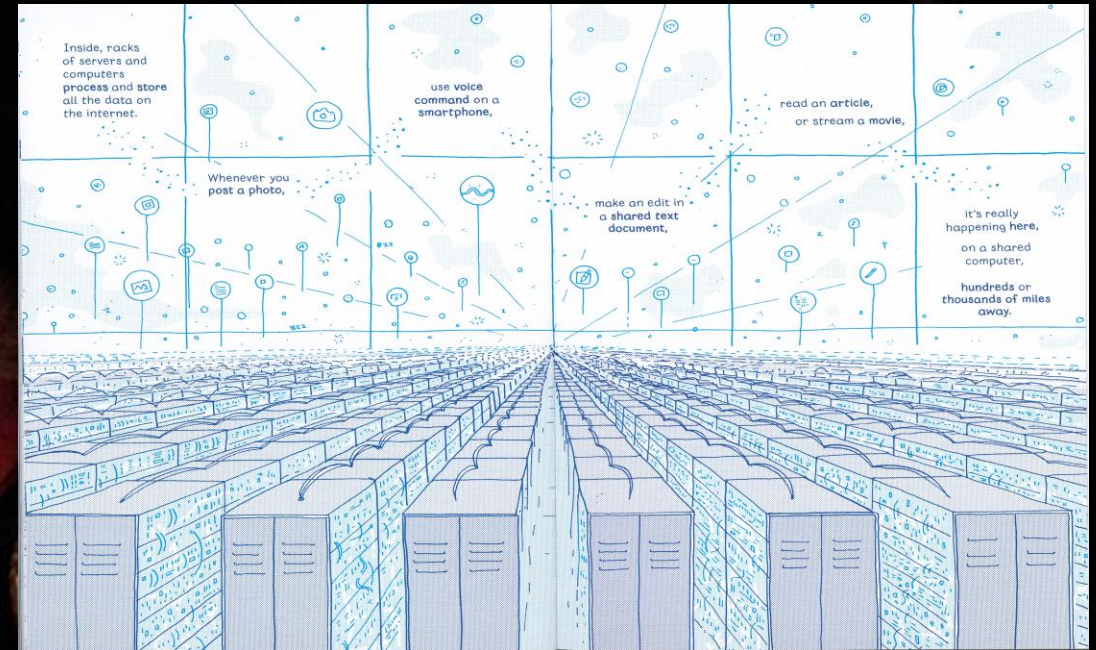
It shows that those companies' plans involve a 78% increase in the number of datacentres they own worldwide as cloud computing and AI cause a surge in the world's demand for storage, with construction planned in North America, South America, Europe, Asia, Africa and Australia.

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

# TAKEAWAYS: IT IS 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/>



**\*IT ISN'T JUST DATA CENTERS AND AI USE (THOUGH THESE ADD TO STRESSOR ISSUES), BUT THE ENTIRE INTERNET INFRASTRUCTURE & ITS SERVICES, AS WELL AS OTHER INDUSTRIES—LIKE AGRICULTURE, FOSSIL FUELS, AND WAR.**

Image via Hardware, dir. Richard Stanley, Palace Pictures, Wicked Films, British Screen Productions

A still from the animated film 'Fantastic Mr. Fox' showing a fox standing on a hill with a large tree in the background. The scene is set in a rural, hilly landscape with a warm, golden light. The fox is on the left, looking towards the right. A large, leafy tree stands on a prominent hill in the center. The sky is a mix of orange and yellow, suggesting a sunset or sunrise. The overall mood is serene and nostalgic.

# RESPONSIBLE ENGAGEMENT

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

# TECHNOLOGICAL DETERMINISM & SOCIAL CONSTRUCTIVISM

- Technological determinism: “posits that *because* of technology, people, culture, and economics will grow and evolve as a consequence.”
- Social constructivism: “social construction of technology suggests that tech changes are the result of cultural impacts on society—where people create technology to induce change, not the other way around (online. jwu.edu).”
- It is not one or the other—but both. We influence technology, and technology influences our own uses of it. This cultivates new ideas, uses, and advances human culture in our relationship with Nature.

“The machine’s danger to society is not from the machine itself but from what [hu]man makes of it.”

-Norbert Wiener

“Cultural techniques—such as writing, reading, painting, counting, making music—are always older than the concepts that are generated from them.”

-Thomas Macho,  
culture historian



# 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 day is prone to repeat its power narratives.



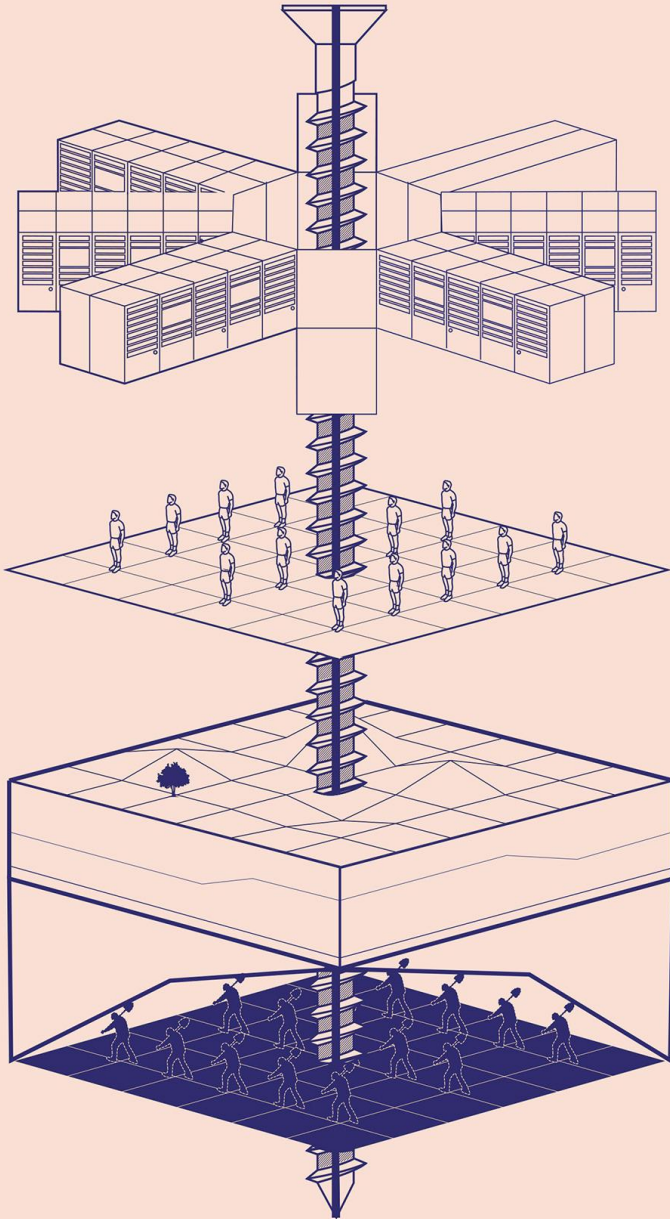
# INVERT OUTDATED CONSTRUCTION

Historical geographer Gray Brechin researched San Francisco's construction, detailing the toils of gold and silver miners in Nevada and California in the 1800s.

According to Brechin in Kate Crawford's book *Atlas of AI*:

"The pulley systems that carried miners down into the mine shafts were adapted and turned upside down to transport people in elevators to the top of the city's high-rises," creating inverted mineshafts, which, as time went on and more of San Francisco was built, it was easy to forget where it all came from.

By looking to the past, today, and thinking about the future, we can embrace a new infrastructural movement.



# 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 (solar panels being installed on city buildings).
- Localized power networks/sources.
- Regulation for large companies.
- Safer and more private use of AI for all.
- Collective approaches to tech use over consumerist use.
- Designate alternative energy use. For ex., some data centers can run strictly on solar or wind during periods of the day.
- Consider data centers for sustainable grids: <https://ieeepes.org/wp-content/uploads/2026/02/ESM-Open-article-February-2026.pdf>

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**

Articles on H2O use and sustainable practices:

<https://spectrum.ieee.org/ai-water-usage>  
<https://dl.acm.org/doi/10.1145/3724499>

# PROS & CONS

## PROS

- Teaching tools
- Assistants/Efficiency tools:
  - Email
  - Organization
  - Research
  - Grant writing
  - Programs
  - 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

- Promised “efficiency” in some AI tools may in fact be more time consuming for some tasks.
- Environmental damages, which are a result of:
  - immense dataset processing from AI
  - old infrastructural model over-reliant on H2O and fossil fuels (combined w/ stress caused by other data center services and other industries worldwide, like war and agriculture)
  - Damage to local ecosystems and surrounding communities
- Lack of regulation, oversight & transparency for Big Tech companies
- Influence of Big Tech where a [pre]determined utility of AI technology becomes the norm
  - consumerist habits
- Immoral/unethical use:
  - Deepfakes
- Bias
- Hallucination/confabulation

# ***THE POWER OF COLLECTIVE REALITY***

New tech and updates happen frequently—with links to positives and negatives. But Nature, and humanity's uses of technology, are not pre-determined. We influence tech, and tech influences us.

## **TO CONSIDER:**

- Transparency in AI use.
- Cite oneself when using AI as a research assistant.
- Is tech being used ethically?
- How can we change the positives of tech use to benefit all?
- Do words like “clean, alternative,” and “conservation” lose their collective meanings?
- What are truly alternative sustainable methods for physical infrastructures in our own communities?

**Thank you!**

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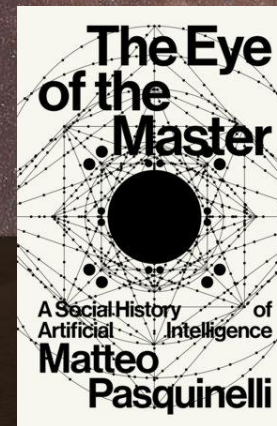
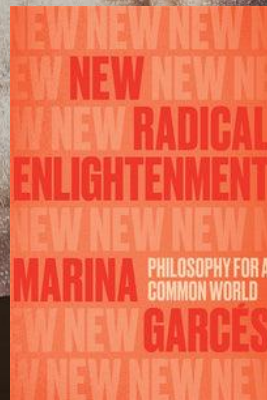
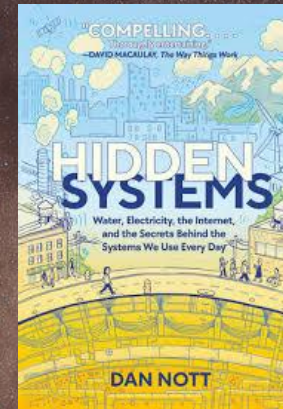
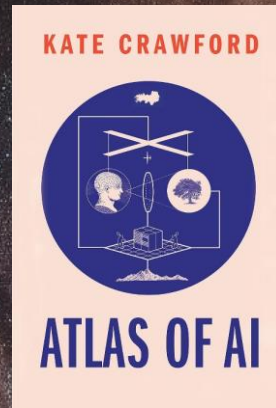
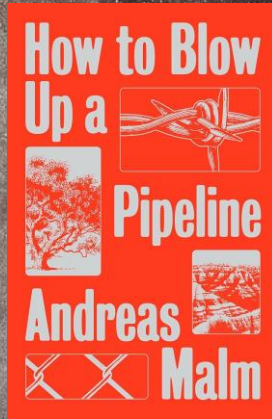


dewitt.lib.ia.us



Image via Mad Max: Fury Road, dir. George Miller, Warner Bros. Discovery, Paramount Global

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