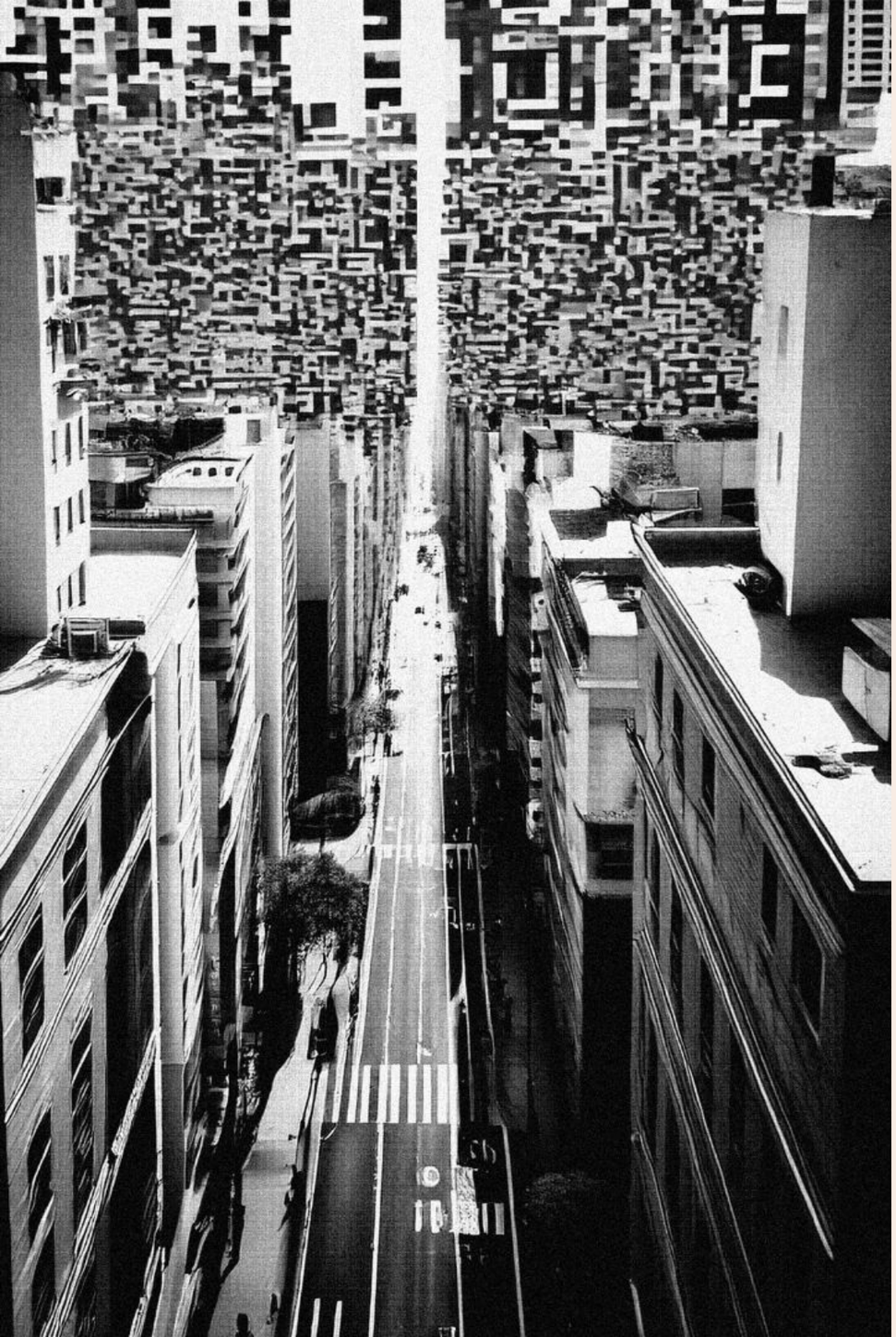


More to Ethics: The Environmental + Human Impacts of AI

Nina Bamberg - Director of Curriculum & Instruction at Pedagogy Ventures

Jay Pier - Product Growth at Pedagogy Ventures

Nathaniel Burola - AI for Good Researcher/Founder of the AI & Environment Resource Hub

What We'll Cover

1 **Human Impacts of AI Development**

What are some ethical concerns in a global AI divide?

2 **Environmental Impacts of AI (Negatives/Positives)**

What is the environmental cost of AI?/ What are some AI for Good applications?

3 **Key Takeaways**

What are some considerations for ethical AI development?

4 **Why/How to Teach About These Impacts**

Why should we and how should we teach about these environmental/human impacts?

Why Are We Having This Conversation?

1 In The News...

- The environmental impact of AI technologies has been making headlines over the last year.

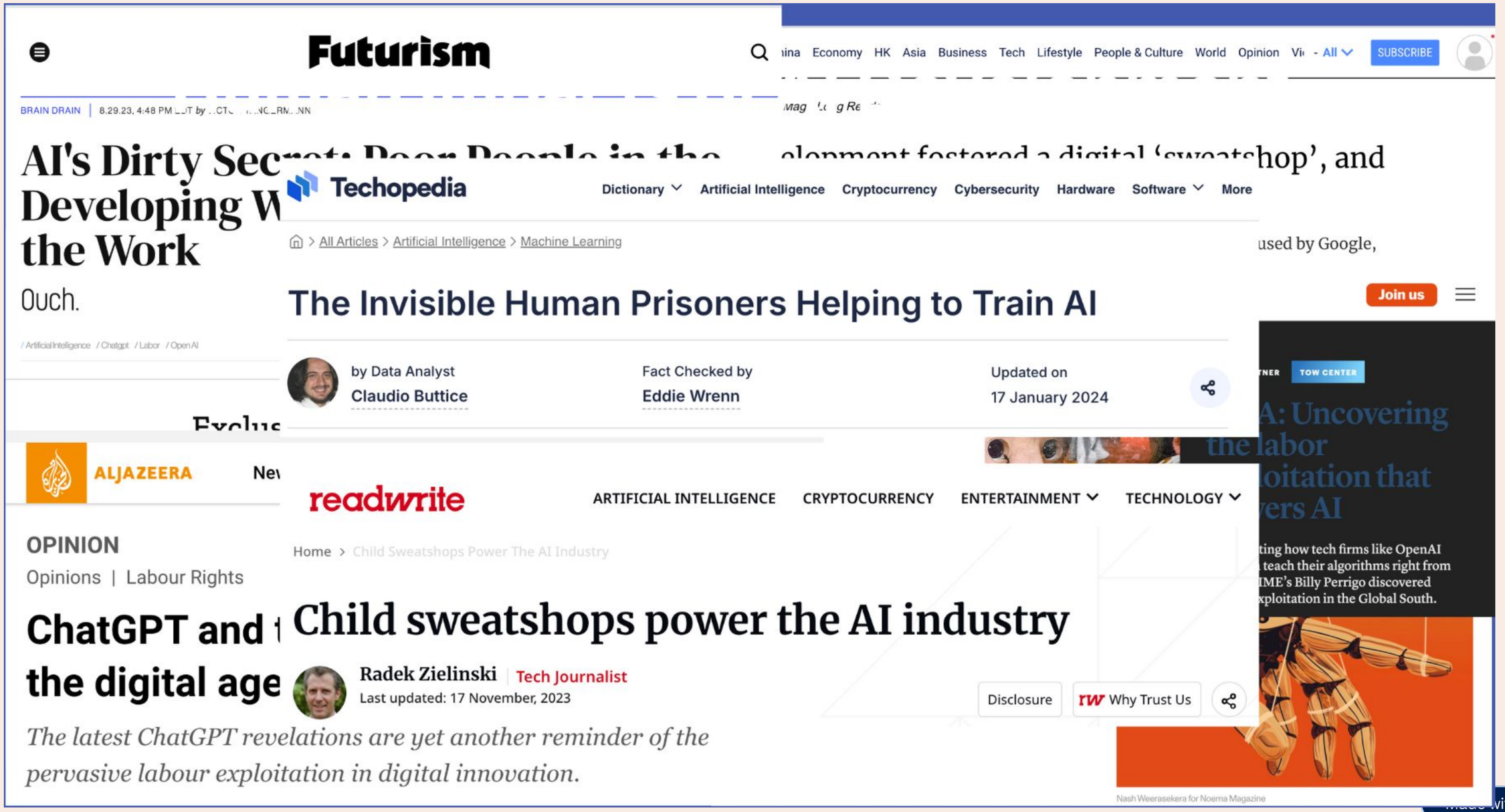
2 Where is the Training?

- Most conversations about AI ethics center around the potential negative impacts of its use, but ignore the impact of its development and training

3 The Educational World

- We want to help those in the education world make well-informed decisions about the use of AI in the classroom and beyond and equip students with the knowledge and skills to do the same.

Human Impacts of AI Development



Human Impacts of AI Development: Case Study

Over 2 million people in the Philippines work in the “AI underbelly” (Business and Human Rights). These workers and others in developing nations face conditions such as:

1. *Low pay*
    a. AI Trainers make as little as $1.50USD/hour in Nairobi (TIME)
    b. AI Trainers make as little as $0.50USD/hour in the Philippines

2. *Inconsistencies/delays of payment*
    a. “Of 36 current and former freelance workers interviewed, all but two said they’ve had payments from the platform delayed, reduced or canceled after completing tasks.”

3. *Canceled Contracts*
    a. “We were told that they [Sama] didn’t want to expose their employees to such [dangerous] content again,” one Sama employee on the text-labeling projects said. “We replied that for us, it was a way to provide for our families.”

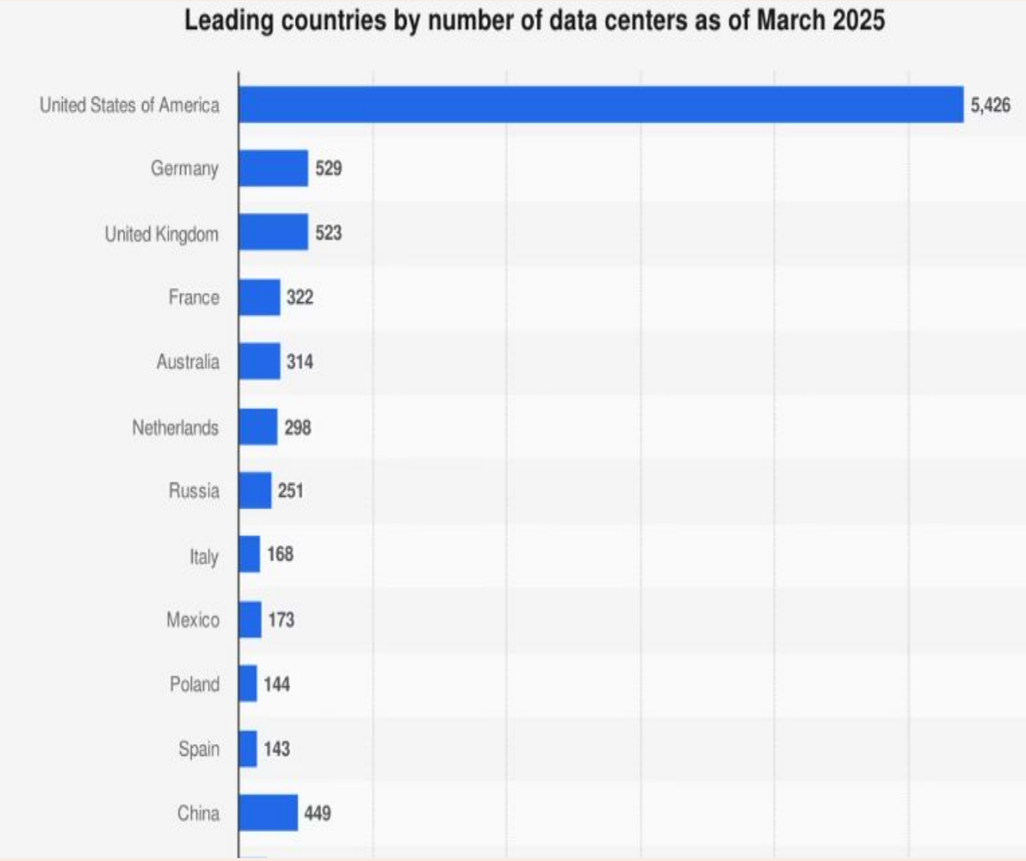
Human Impacts of AI Development: Case Study

4. *Disturbing/Violent Content*

a. “Children as young as 13 are exposed to disturbing content like hate speech, violent images and pornography while moderating platforms. Experts warn this can cause lasting psychological damage. “It’s digital slavery,” said one 18-year-old who joined at 15 in Pakistan. He continues working grueling overnight shifts, earning just $100 a month.”

b. One AI trainer said “he would view up to 700 text passages a day, many depicting graphic sexual violence. He recalls he started avoiding people after having read texts about rapists and found himself projecting paranoid narratives on to people around him.”

Human Impacts of AI Development: Data Centers



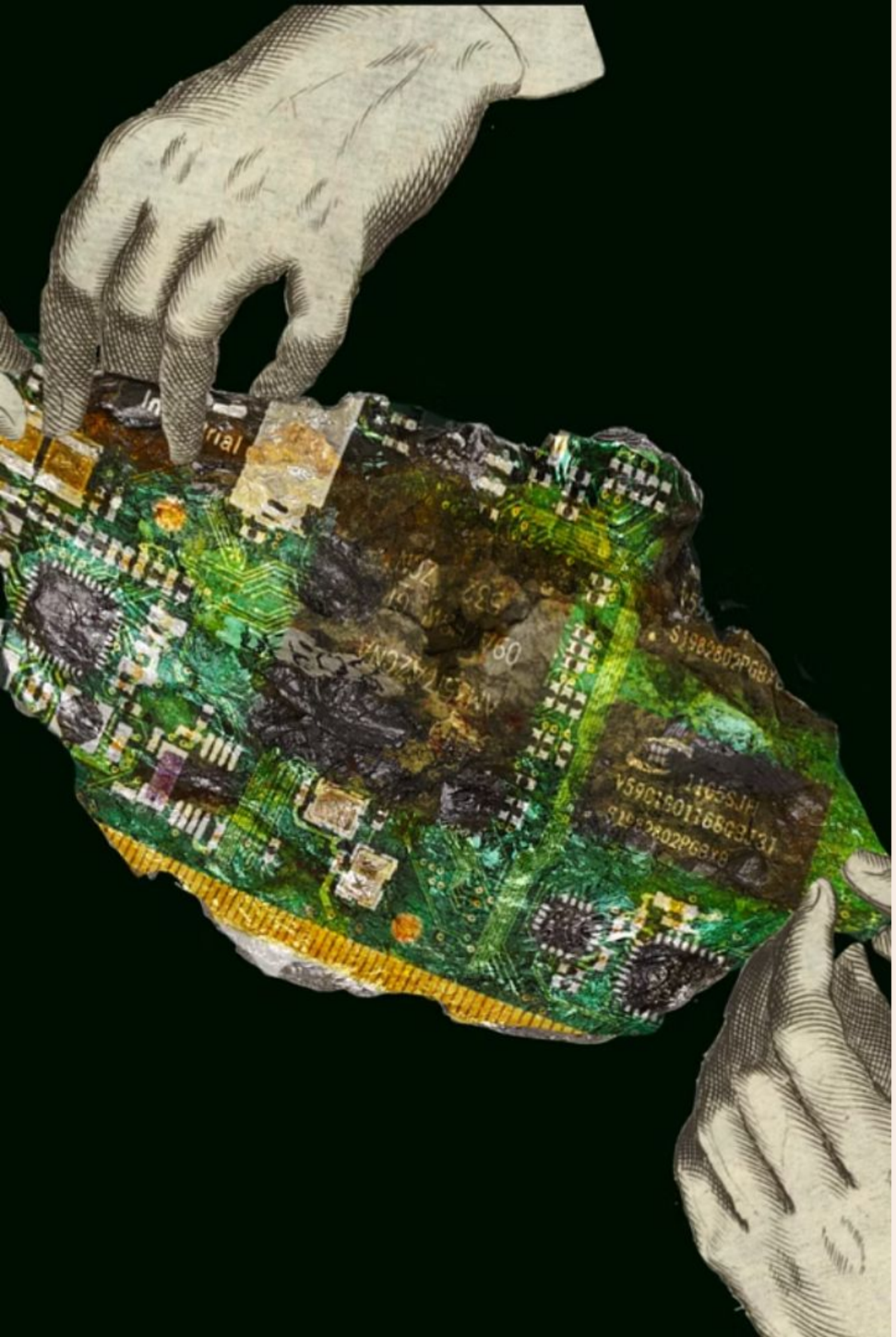
Graph Source: Statista, 2025.

- As of March 2025, these are the data center world rankings:

1. USA: 5,426 data centers.
2. Germany: 529 data centers.
3. China: 449 data centers.

- Carbon intensity of training AI models will vary depending on power grid development, amount of renewable energy sources, and fossil fuel usage (Source: Power sector carbon intensity worldwide by country 2023, Statista, 2023).
  - India: 713 gCO_2/kWh (coal-based)
  - Norway: 30 gCO_2/kWh (hydropower)

- Carbon burdens and pollution impacts are unequally distributed raising health equity concerns.



Environmental Impacts of AI (Negatives)

Life Cycle Analysis

From chip design to disposal.

Energy Demands

Training + inference at scale.

Rare Earth Minerals

Mining impact + embodied carbon.

Water Consumption

Cooling systems + humidification.

Carbon Emissions

Data centers running 24/7.

Air Quality Issues

Air pollution from data centers.

Case Study: xAI's "Colossus" Facility

xAI "Colossus" Supercomputer

Powered by 35 methane gas-burning generators; despite only being approved for 15?

South Memphis, Tennessee

Local communities nearby to the Colossus facility.

Environmental Concerns

1️⃣ Nitrogen dioxide emissions from the air pollution of the methane gas generators (linked to increased lung damage).

2️⃣ Increased public utility costs that may be passed onto the residents (more power and water consumed through legal loopholes).

3️⃣ Environmental justice issues (a report from ProPublica found that the cancer rate in this area of Memphis is four times higher than the national average).

Article link:

https://interestingengineering.com/culture/elon-musk-xai-unauthorized-gas-turbines-memphis/ https://futurism.com/elon-musk-memphis-illegal-generators

Elon Musk's xAI criticize over unauthorized gas turbines at Memphis facility

The Colossus supercomputer facility, a key part of xAI's operat allegedly operating 35 gas turbine generators, more than doub the 15 permitted.

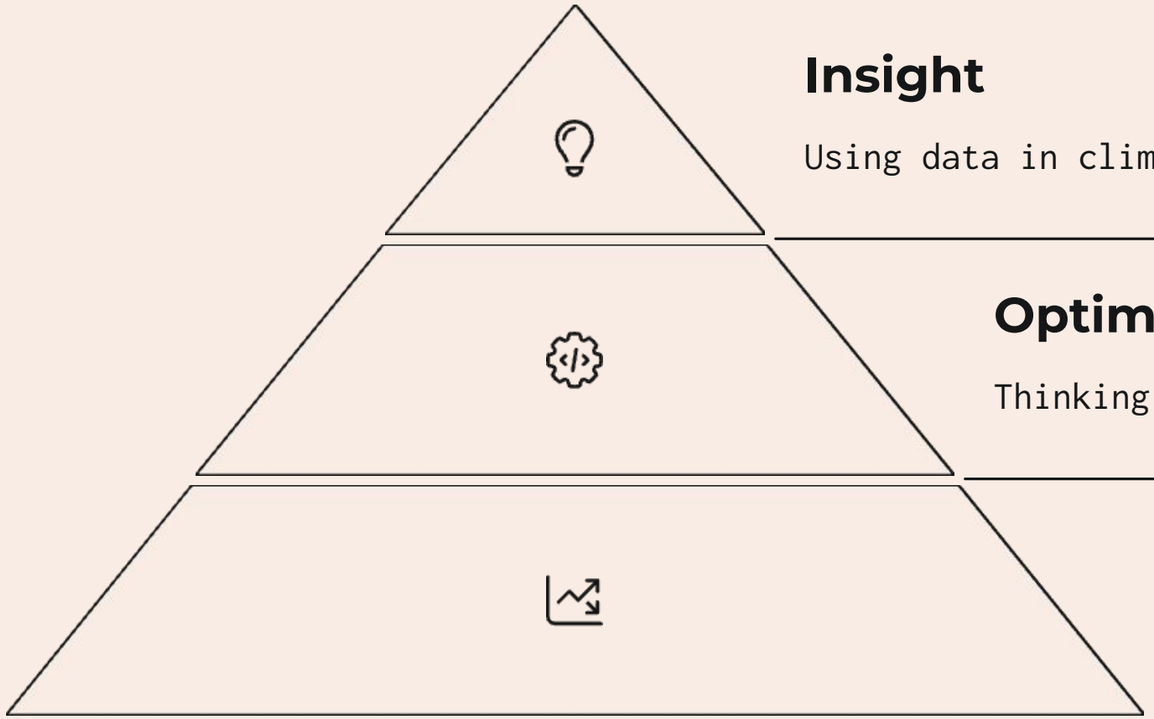
Updated: Apr 15, 2025 01:47 AM EST

Bojan Stojkovski

7 days a

Can AI Be a Climate Ally?

It is important to remember that AI **IS NOT** a silver bullet for climate change. It is capable of AI for Good applications, however, at the same time there is a lot of impacts that we need to assess.



Insight

Using data in climate solutions to make critical decisions.

Optimization

Thinking about resource efficiency at scale.

Prediction

Forecasting environmental changes and patterns.

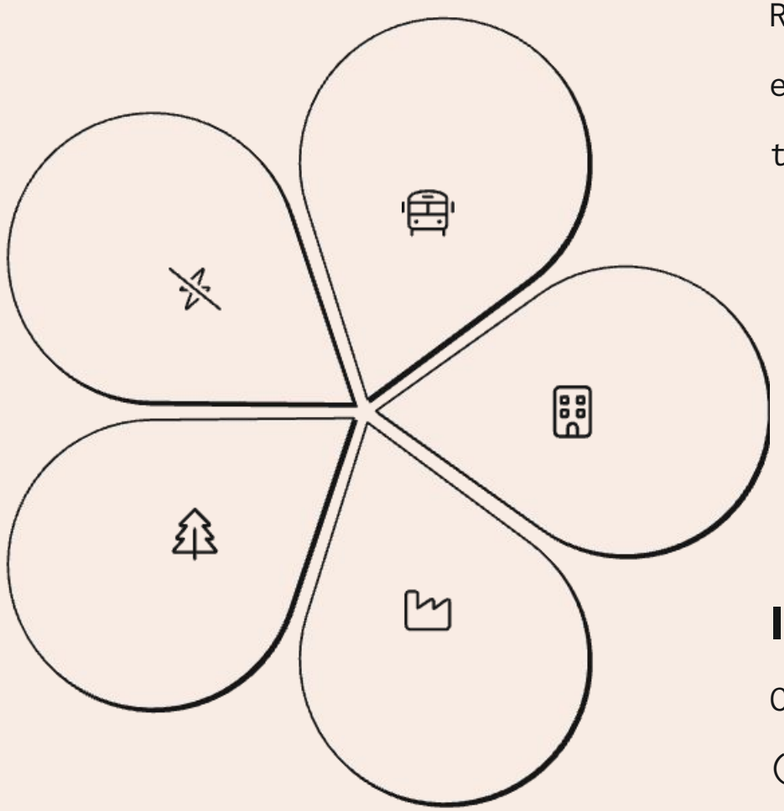
Environmental Impacts of AI (Positives)

Energy

Peak demand forecasting in heatwaves (GridBeyond: AI-powered demand response and energy management).

Forestry

Predictive deforestation mapping (Komaza: Preventing deforestation in Africa combining operations with intelligence).



Transportation

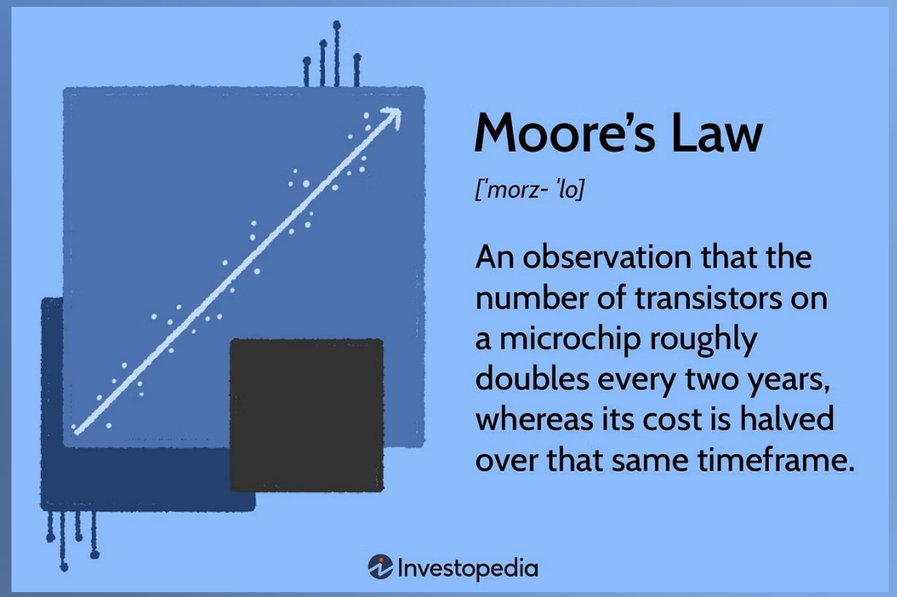
Route planning for self-driving cars and electric buses (Continental: Smart transportation and mobility innovation).

Buildings

Agentic AI for optimized heating and cooling in buildings (Nantum AI: Integrated energy platform that empowers buildings with insights.)

Industry

Cleaner steel, aluminium production (Electra: Decarbonizing iron and steelmaking with lower cost, scalable solutions.)



Is AI Tech Becoming More Efficient?

Chip Efficiency

Efficiency of AI-related computer chips doubles every 2.5-3 years.

Hardware Design Improvements

Energy efficiency gains with chips (Google’s AI Compute Carbon Intensity (CCI), measured in gCO2e per ExaFLOP).

Transparency Tools

Hugging Face's AI Energy Score tool developed in tandem with Salesforce, IBM, and other organizations.

Image Credit: https://www.investopedia.com/terms/m/mooreslaw.asp

Complex Tradeoffs Ahead

Efficiency ≠ Sustainability (Jevon's Paradox)

Net zero effect with increasing consumer base and energy efficiency gains.

Fossil Fuel Applications

AI being used to enhance oil/gas operations globally.

Incomplete Emissions Tracking

Best available environmental data we have are estimates.

Is AI a Net Positive/Negative for the Planet?

Uncertain Impact

Environmental benefits vs. harms unresolved.

Urgent Development

AI advancing faster than ethical frameworks.

AI Alignment

Business interests need to align with social good.

Image Credit: Hanna Barakat & Archival Images of AI + AIxDESIGN / https://betterimagesofai.org / https://creativecommons.org/licenses/by/4.0/

Call To Action: Submitting Resources

Scan the QR code to gain access to the AI & Environment Resource Hub website.

Scroll down to the bottom to submit resources through the Google Form.

Why and How to Teach About the Human and Environmental Impacts

1. Why

- In order to be informed consumers, both teachers and students must understand the full scope of ethical concerns associated with the technology.
- It's essential that we teach students to be discerning users of AI, knowing when and when not to use AI.
- Today's students will need the knowledge and skills to effectively advocate for safe and ethical AI use regardless of their future academic and career paths.

2. How

- Real-world learning connections using activities like case studies and simulations.
- Integrating robust AI literacy and digital citizenship topics across existing curricula.
  a. Projects like speeches, debates, and video/podcast assignments.
  b. Research.
- AI-development projects.
  a. Students can be tasked with AI-powered programs that help tackle global issues that they care about .

Questions?

Image Credit: Kathryn Conrad / https://betterimagesofai.org / https://creativecommons.org/licenses/by/4.0/