Considerations for AI in Research and Evaluation

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REvaluation Conference, Vienna
December 6, 2024

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The MERL Tech Initiative

monitoring, evaluation, research, learning, and tech

- Transdisciplinary learning and practice community
- Democratizing “MERL Tech” and Emerging AI
- Ethical approaches to digital data and MERL
- Field building and public goods
- Advising funders and implementers

NLP Community of Practice

Hosted by The MERL Tech Initiative

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Artificial Intelligence 101

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AI is everywhere!

Different types of AI

Decision-making AI

Makes decisions, categorizes and sorts, follows a set of rules

Generative AI

Learns and mimics patterns in existing data to create new outputs

How Generative AI (GenAI) works

Large language models (LLMs) are trained on enormous sets of data.

They 'learn' grammar, syntax, and semantics, allowing them to predict the most likely next word in a sentence.

The best thing about AI is its ability to

learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%

Then they go on to build full sentences and paragraphs.

{The best thing about AI is its ability to,
The best thing about AI is its ability to learn,
The best thing about AI is its ability to learn from,
The best thing about AI is its ability to learn from experience,
The best thing about AI is its ability to learn from experience.,
The best thing about AI is its ability to learn from experience. It,
The best thing about AI is its ability to learn from experience. It's,
The best thing about AI is its ability to learn from experience. It's not}

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Randomness makes them sound “creative”

Program the AI to randomly select “non-top” words.

More random choices make the text seem more creative, human-like.

{ The best thing about AI is its ability to,
The best thing about AI is its ability to create,
The best thing about AI is its ability to create worlds,
The best thing about AI is its ability to create worlds that,
The best thing about AI is its ability to create worlds that are,
The best thing about AI is its ability to create worlds that are both,
The best thing about AI is its ability to create worlds that are both exciting,
The best thing about AI is its ability to create worlds that are both exciting, }

The best thing about AI is its ability to learn. I've always liked the

The best thing about AI is its ability to really come into your world and just

The best thing about AI is its ability to examine human behavior and the way it

The best thing about AI is its ability to do a great job of teaching us

The best thing about AI is its ability to create real tasks, but you can

This example has “randomness” corresponding to “temperature” 0.8

https://writings.stephenwolfram.com/2023/02/what-is-chatgpt-doing-and-why-does-it-work/

Stochastic parrots

Stochastic: having a random probability distribution or pattern that may be analyzed statistically but may not be predicted precisely.

LLMs as Stochastic Parrots: LLMs, though able to generate plausible language, do not understand the meaning of the language they process.

(Bender, Gebru, McMillan-Major, Shmitchell 2021)

https://dl.acm.org/doi/10.1145/3442188.3445922

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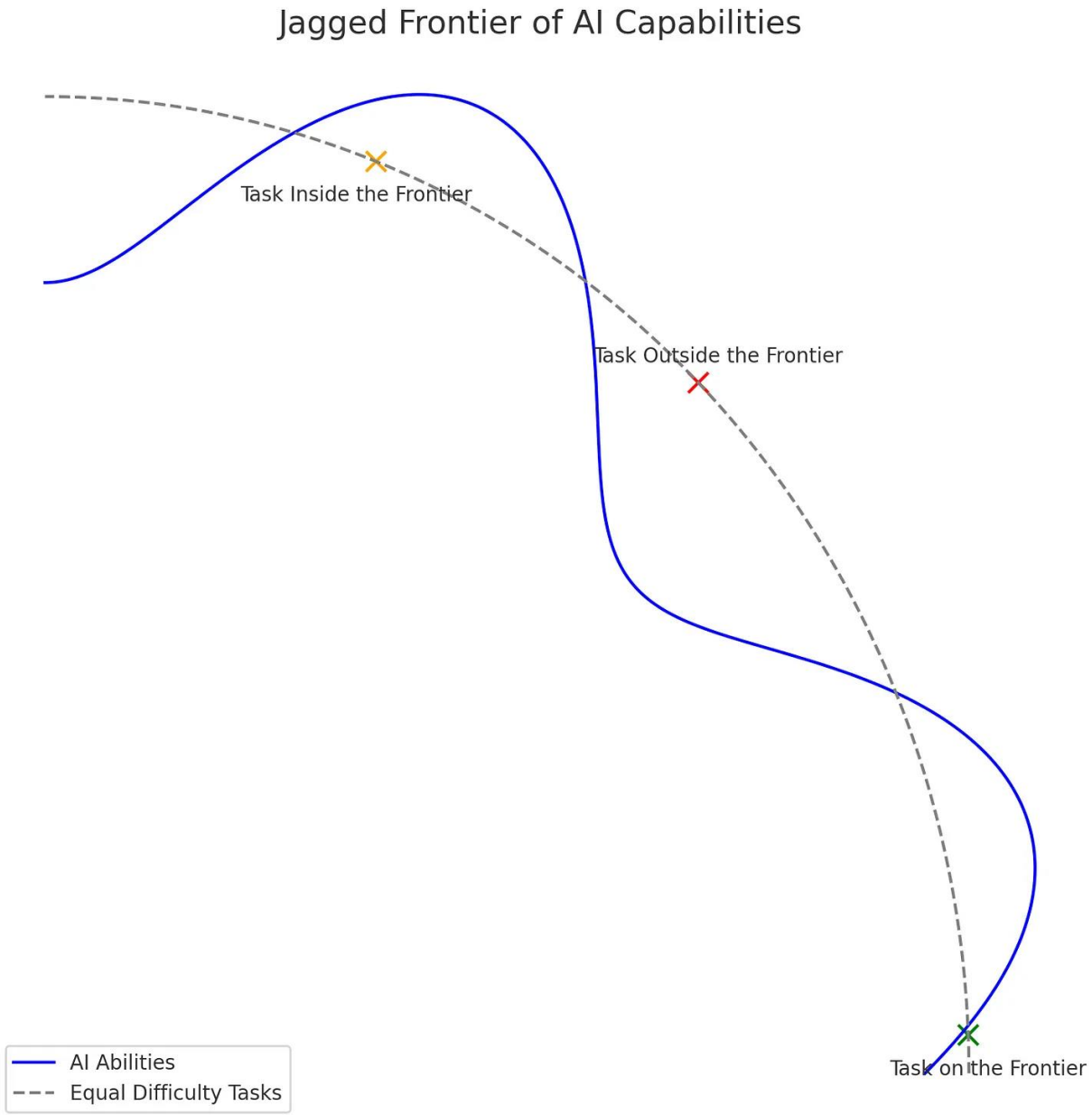
What is GenAI good at?



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GenAI adoption in the 'MERL' Sector

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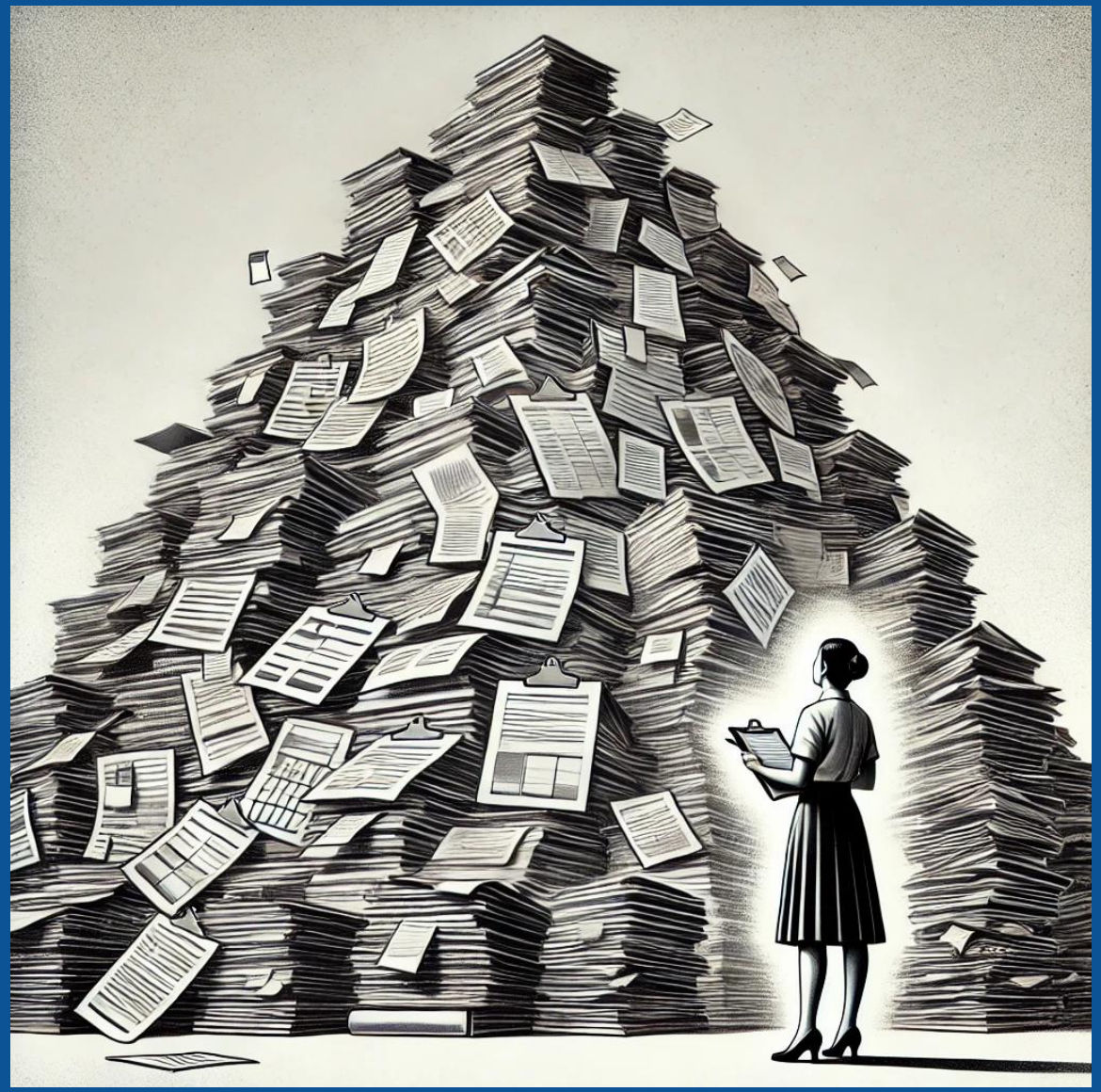
Growing use of GenAI among MERL practitioners

- Ad hoc use of generic, commercial GenAI tools
- AI embedded in enterprise systems
- Low code and no-code GPT experimentation
- Specific GenAI software for research and evaluation
- Bespoke AI systems (at large agencies)

Doing what we've always done... but better (?)



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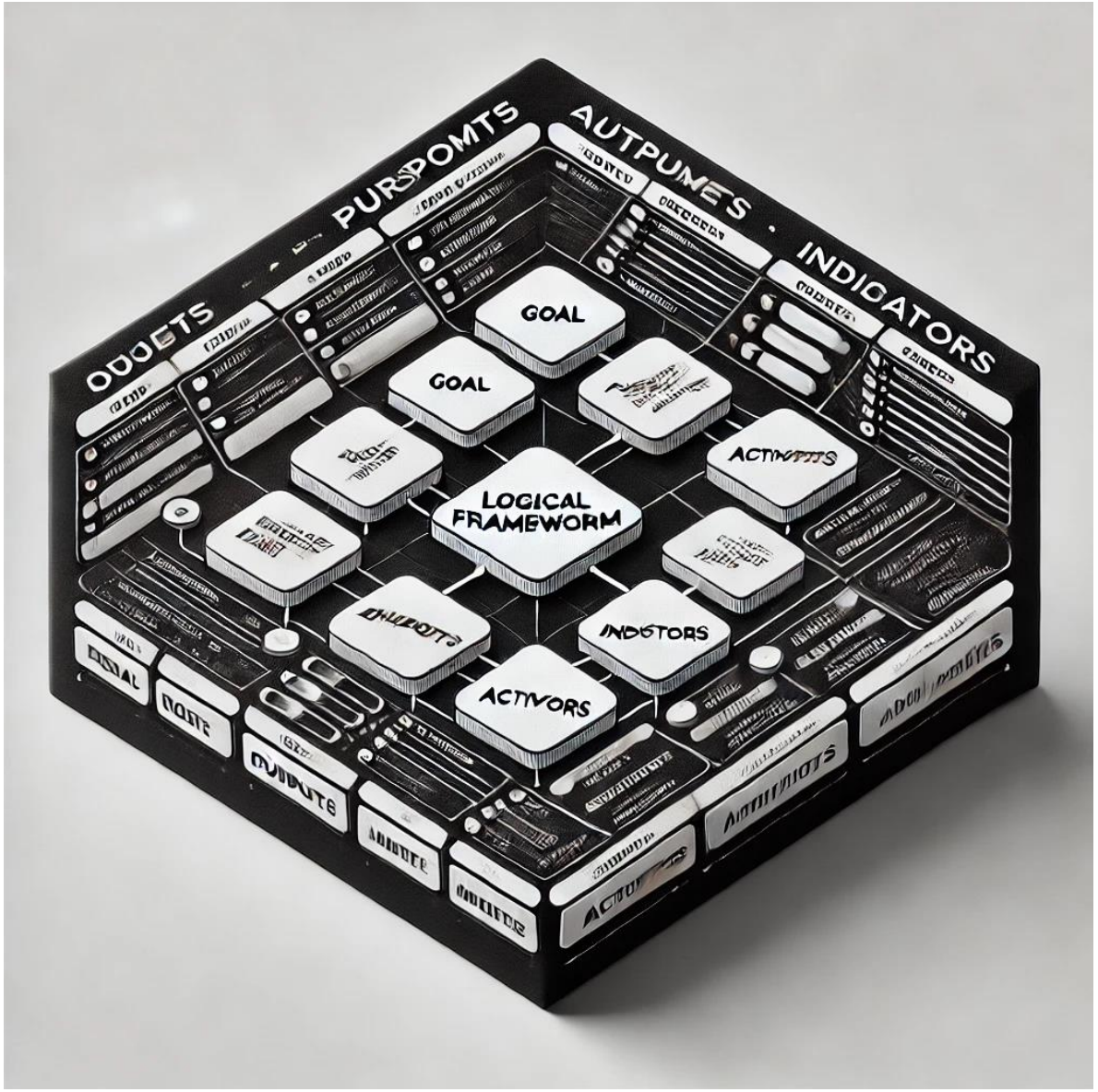
Research + Evaluation Design



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Data collection

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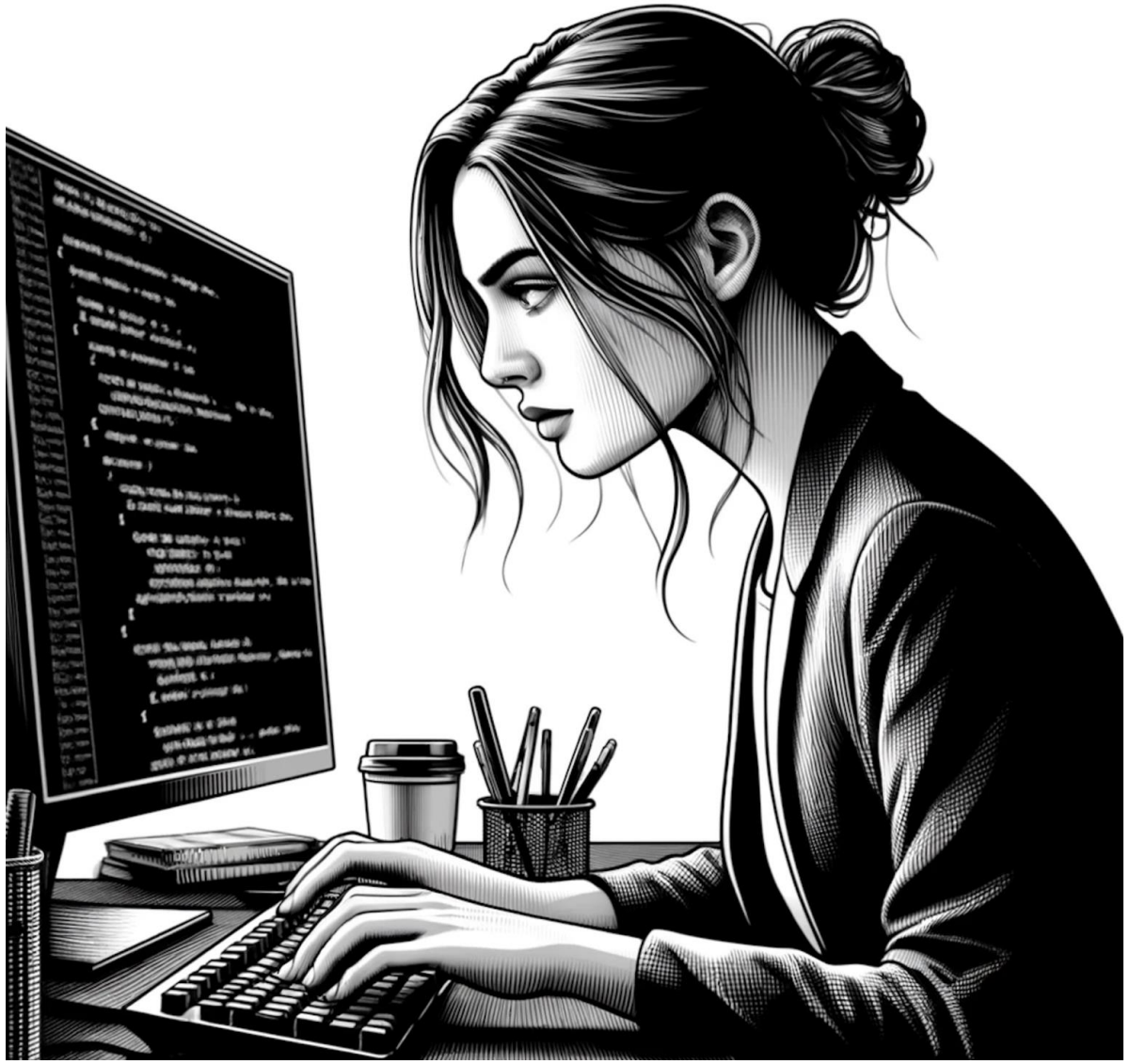
Data processing and analysis



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Reporting

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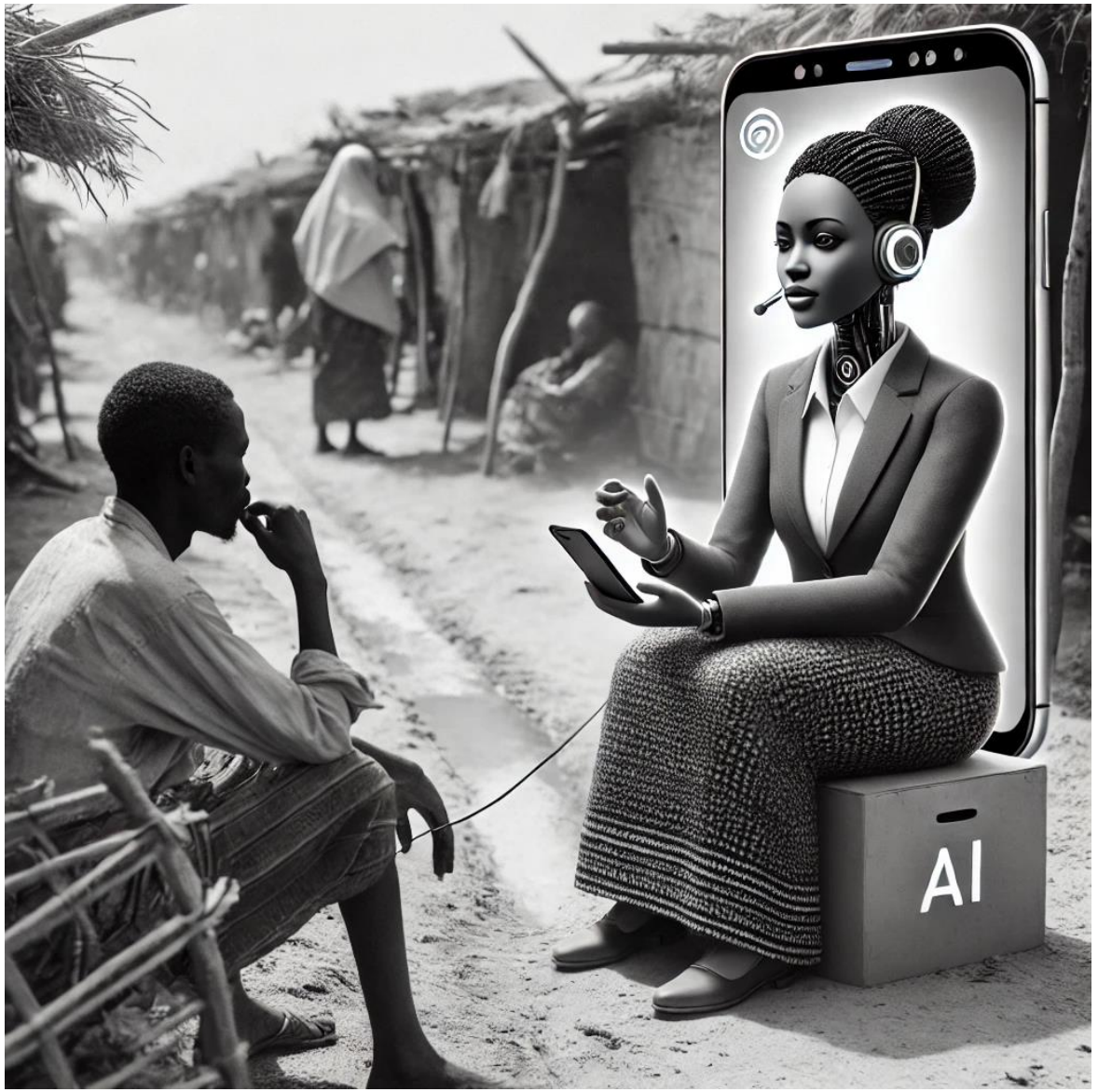
Doing things we wouldn't have thought possible

AI avatars as enumerators



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AI Agents imagining new research pathways

Principle Investigator

Immunologist

Machine Learning Specialist

Computational Biologist

Machine Learning Critic

Researchers at Stanford charged a group of 5 agents, with domain-specific backgrounds to design nanobodies directed against the SARS-CoV-2 virus.

With frequent independent lab meetings of the 5 agents, and minimal human supervision, the multi-agent team developed 2 potent new nanobodies, potentially representing a new pathway to discovery.

https://www.biorxiv.org/content/10.1101/2024.11.11.623004v1

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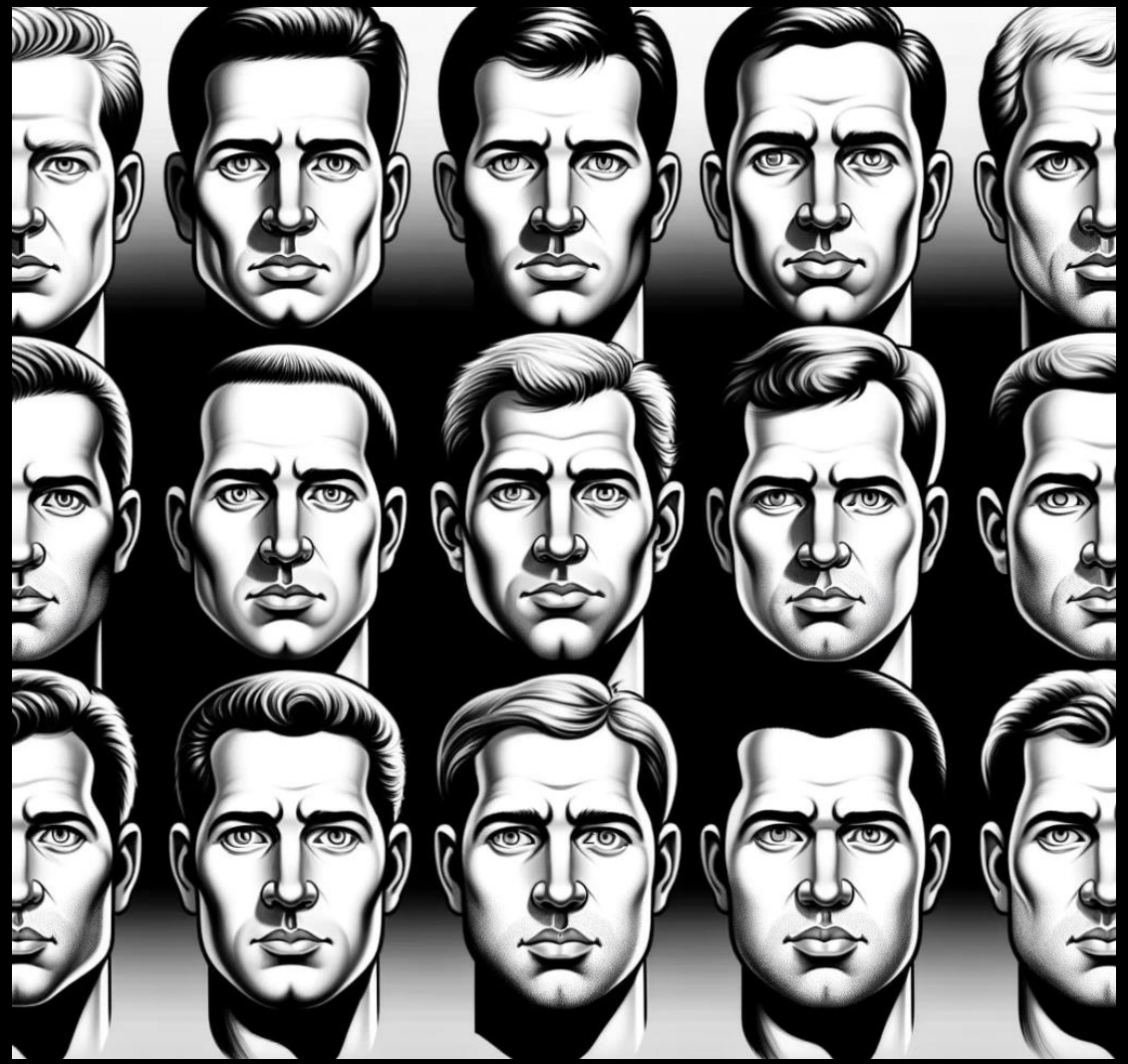
Ethical challenges with GenAI

Bias and exclusion



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Western-oriented bias in large language model responses

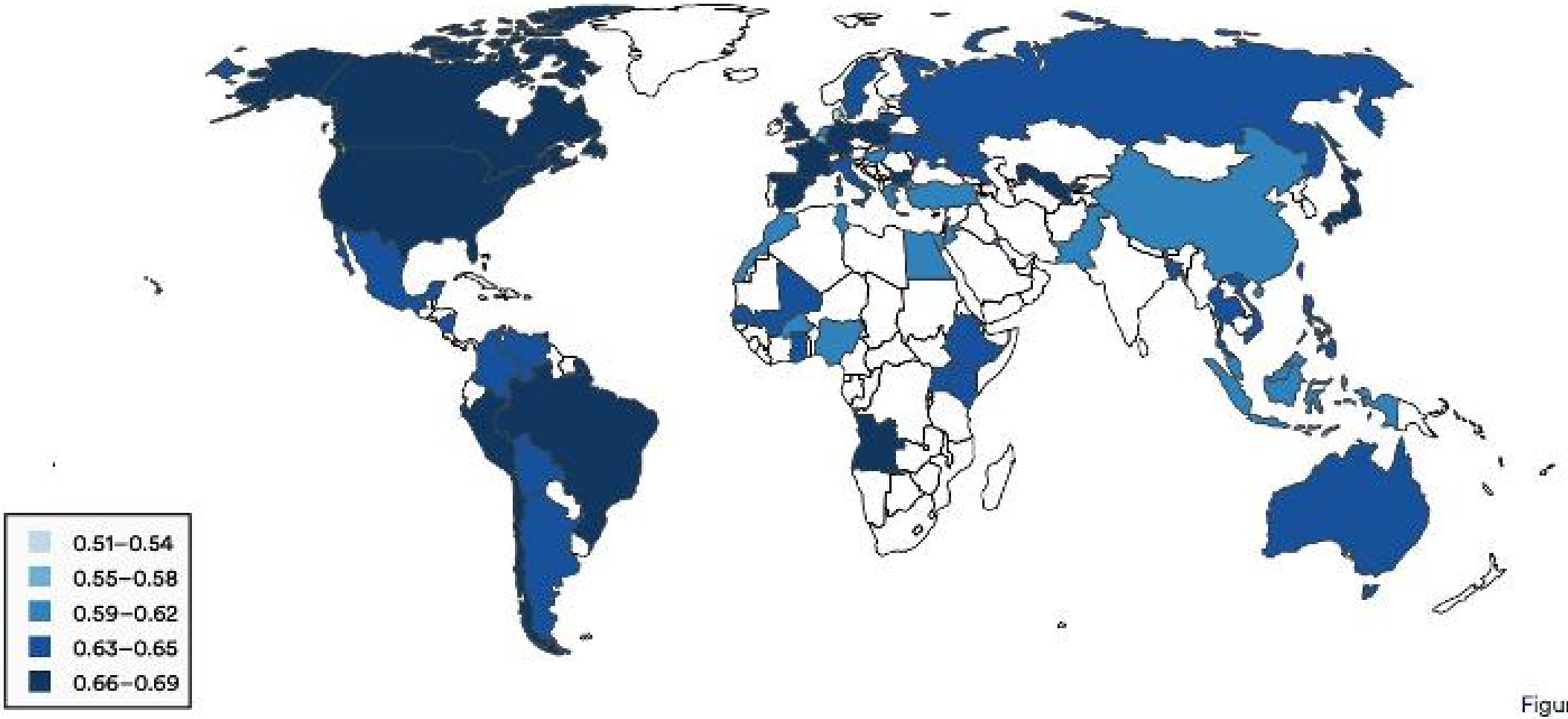

Figure 3.5.8

Source: Durmus et al. 2023 | Chart: 2024 AI Index Report

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“An American person” (2023)

See open source image here: https://github.com/row-engineering/everything/tree/main/2023/midjourney-images/person-prompt/american-person

“An African doctor treating poor white patients” (2023)

OCTOBER 6, 2023 · 7:44 AM ET

By Carmen Drahl

A researcher typed sentences like "Black African doctors providing care for white suffering children" into an artificial intelligence program designed to generate photo-like images. The goal was to flip the stereotype of the "white savior" aiding African children. Despite the specifications, the AI program always depicted the children as Black. And in 22 of over 350 images, the doctors were white.

Midjourney Bot Version 5.1. Annotation by NPR.

In a request to an artificial intelligence program for images of "doctors help children in Africa, some results put African wildlife like giraffes and elephants next to Black physicians.

Midjourney Bot Version 5.1. Annotation by NPR.

The above image is the only one from the experiment that showed a Black figure tending to a white child. This image was generated by a request for traditional African healers helping white kids.

Midjourney Bot Version 5.1. Annotation by NPR.

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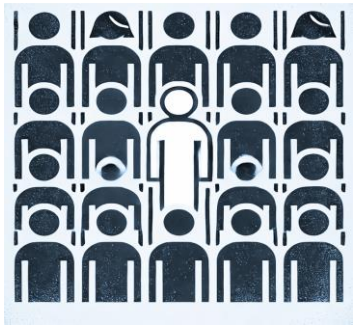
Types of Bias in LLMs

Historical Bias



Representation Bias

Semantic Bias

Label Bias

Algorithmic Bias

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Democracy, information ecosystems

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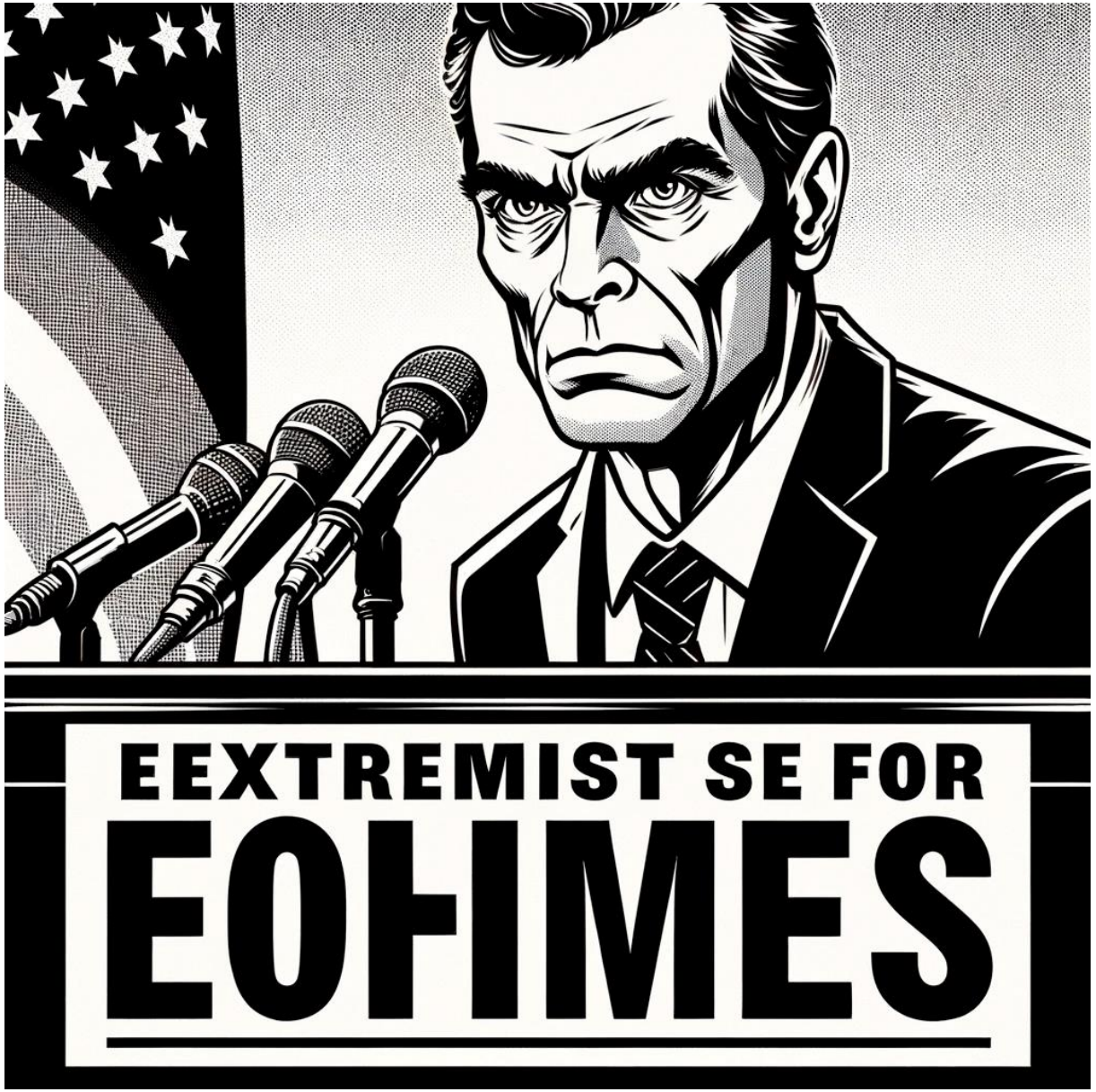
Mis- and disinformation at scale



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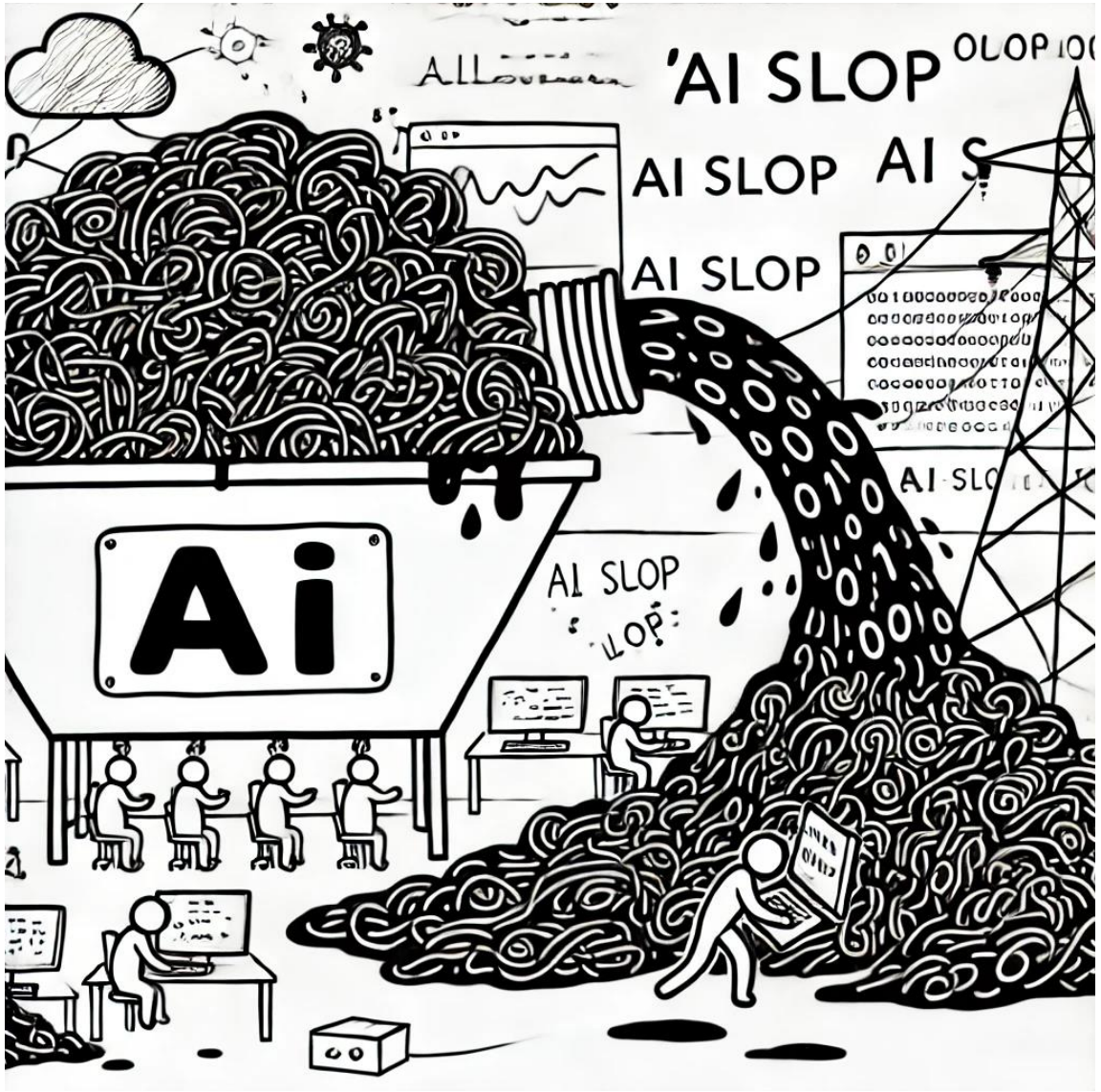
Blurring of reality

‘liar’s dividend’

‘AI slop’ replacing journalism



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Transparency, Accountability and Governance

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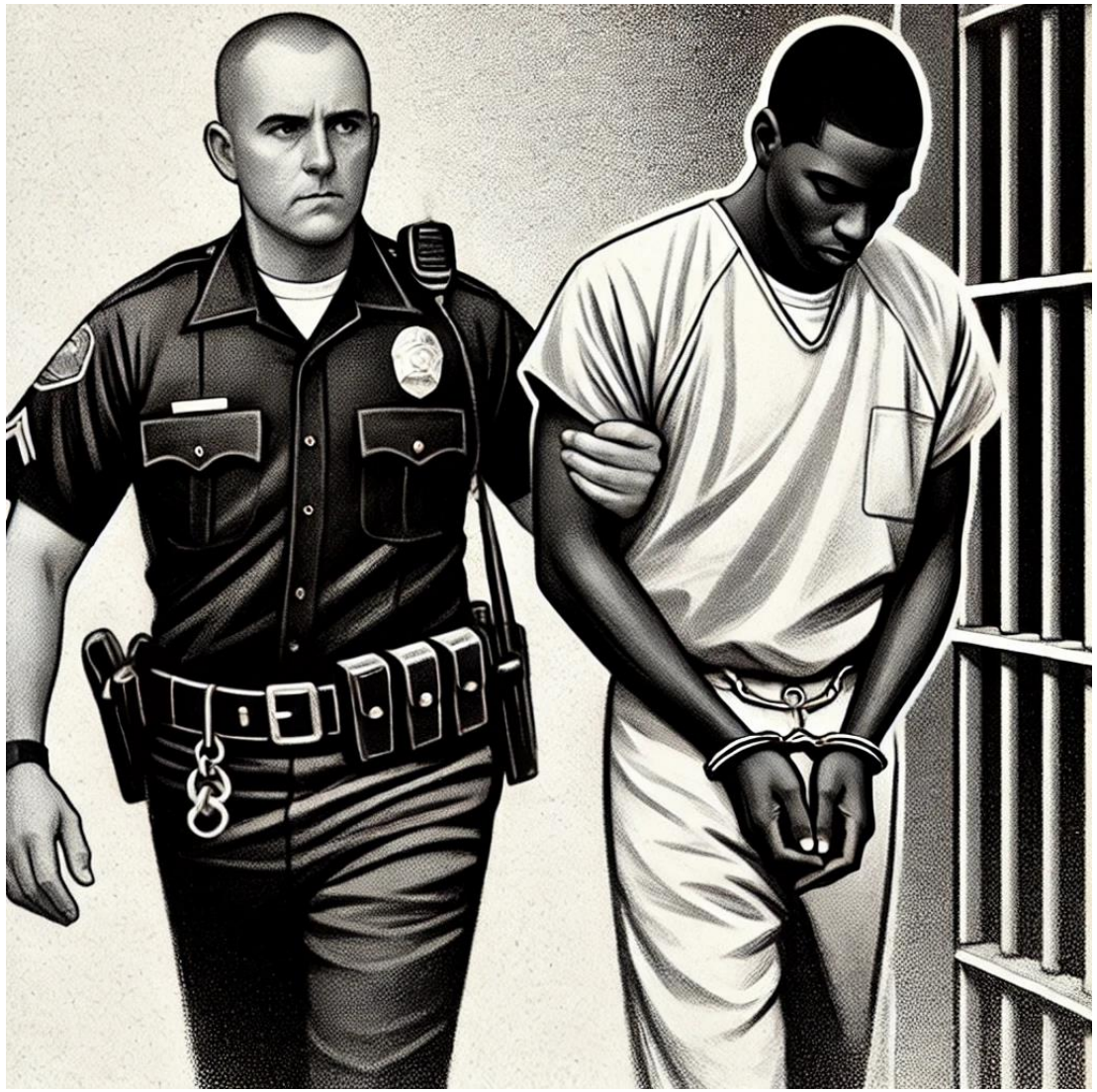
What if AI decisions are biased or simply wrong?



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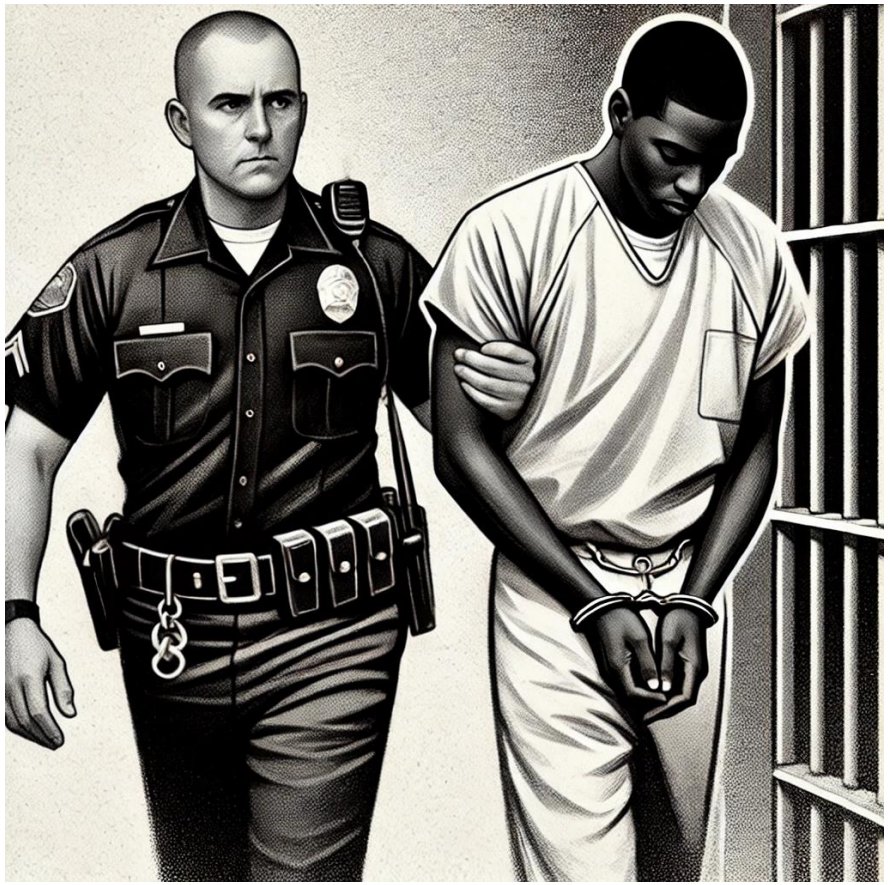
What degree of inaccuracy is acceptable, when? Who decides?

Bad spelling

vs.

Someone getting a longer jail sentence



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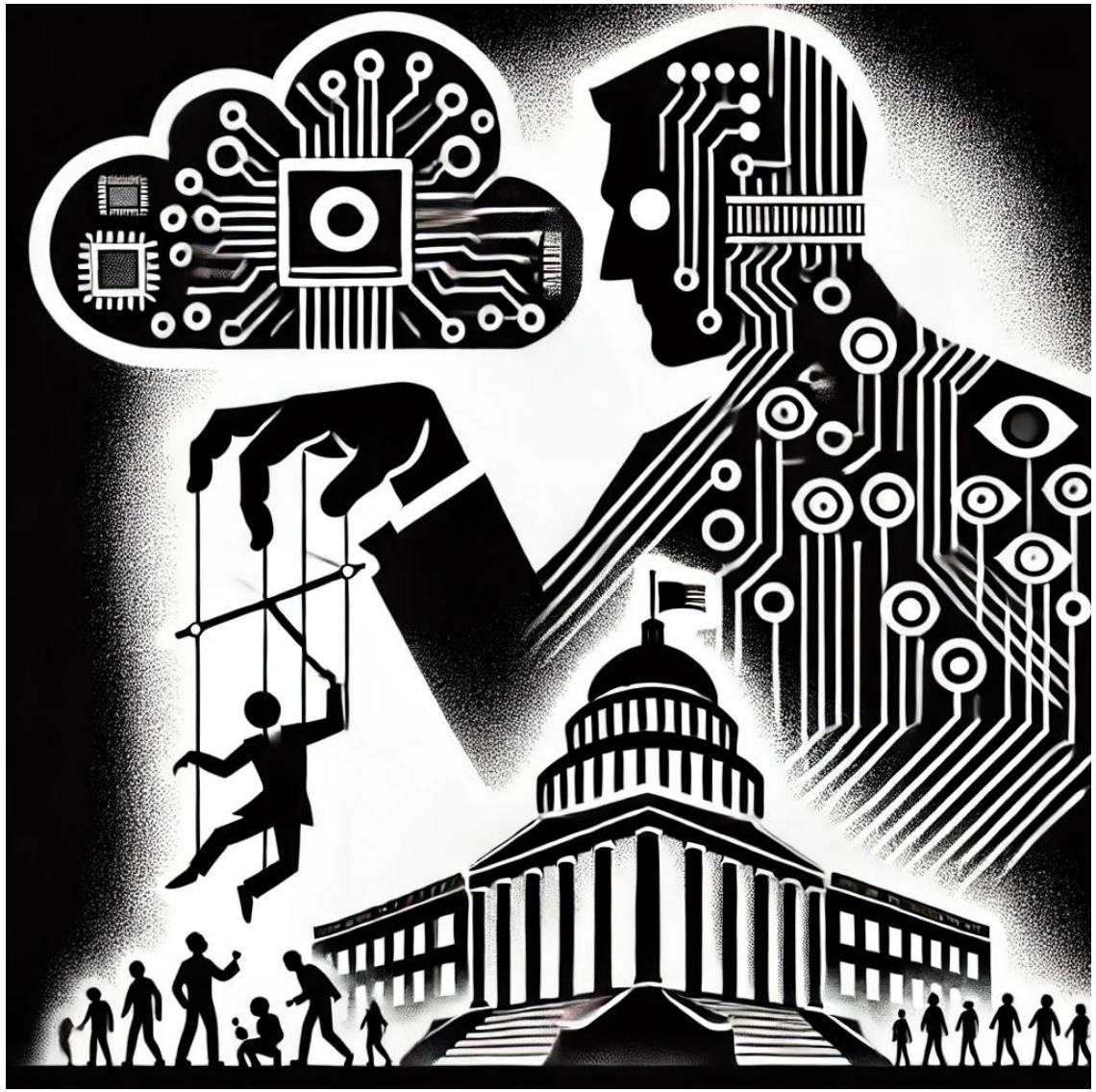
Tech companies as states, in government



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An extractive economy

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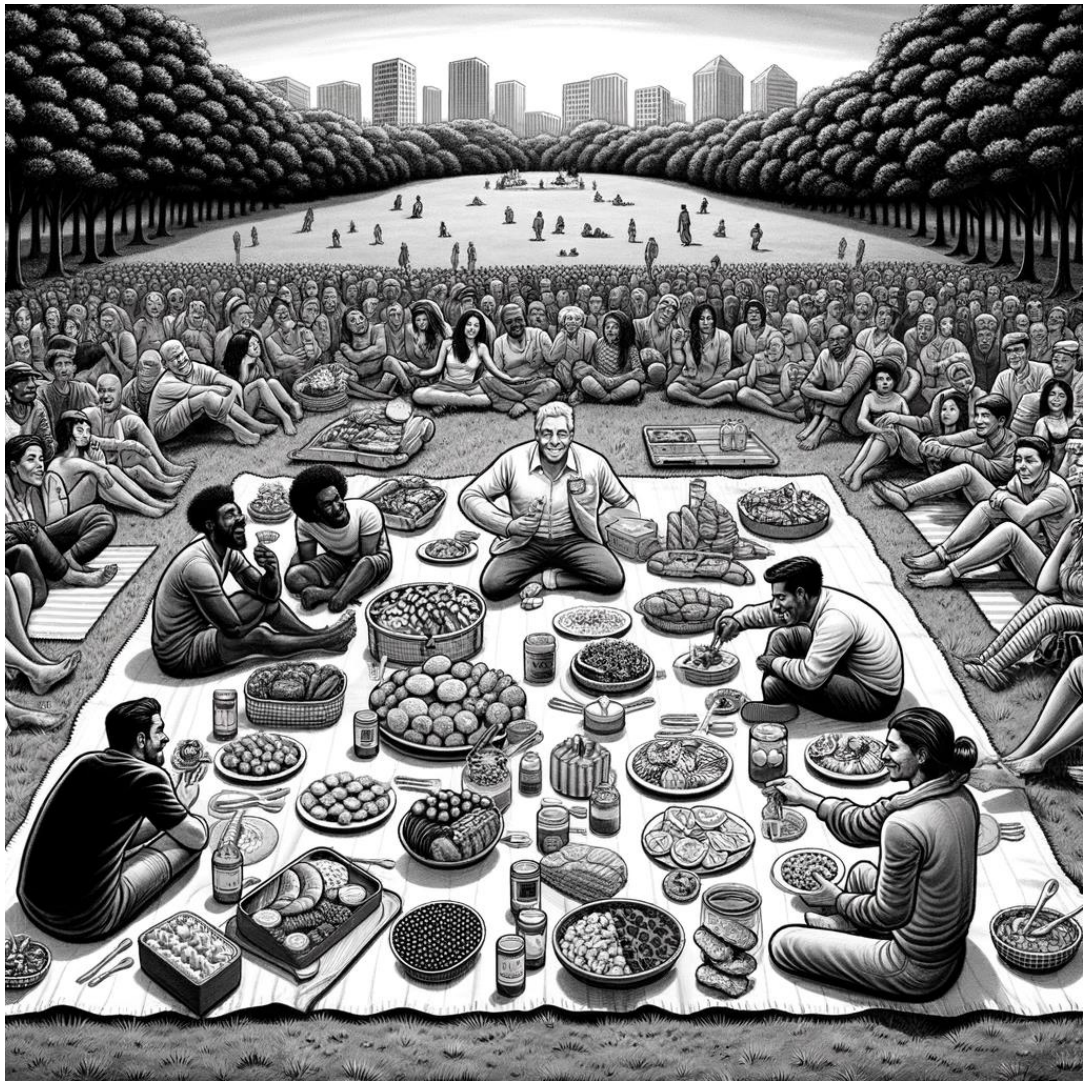
Data mining with inequity in benefits



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Automation, surveillance, replacing human labor

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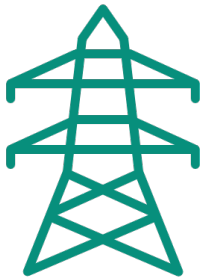
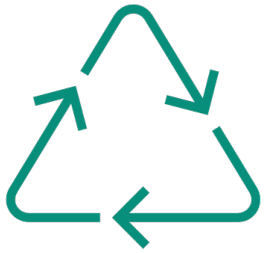
Environmental degradation



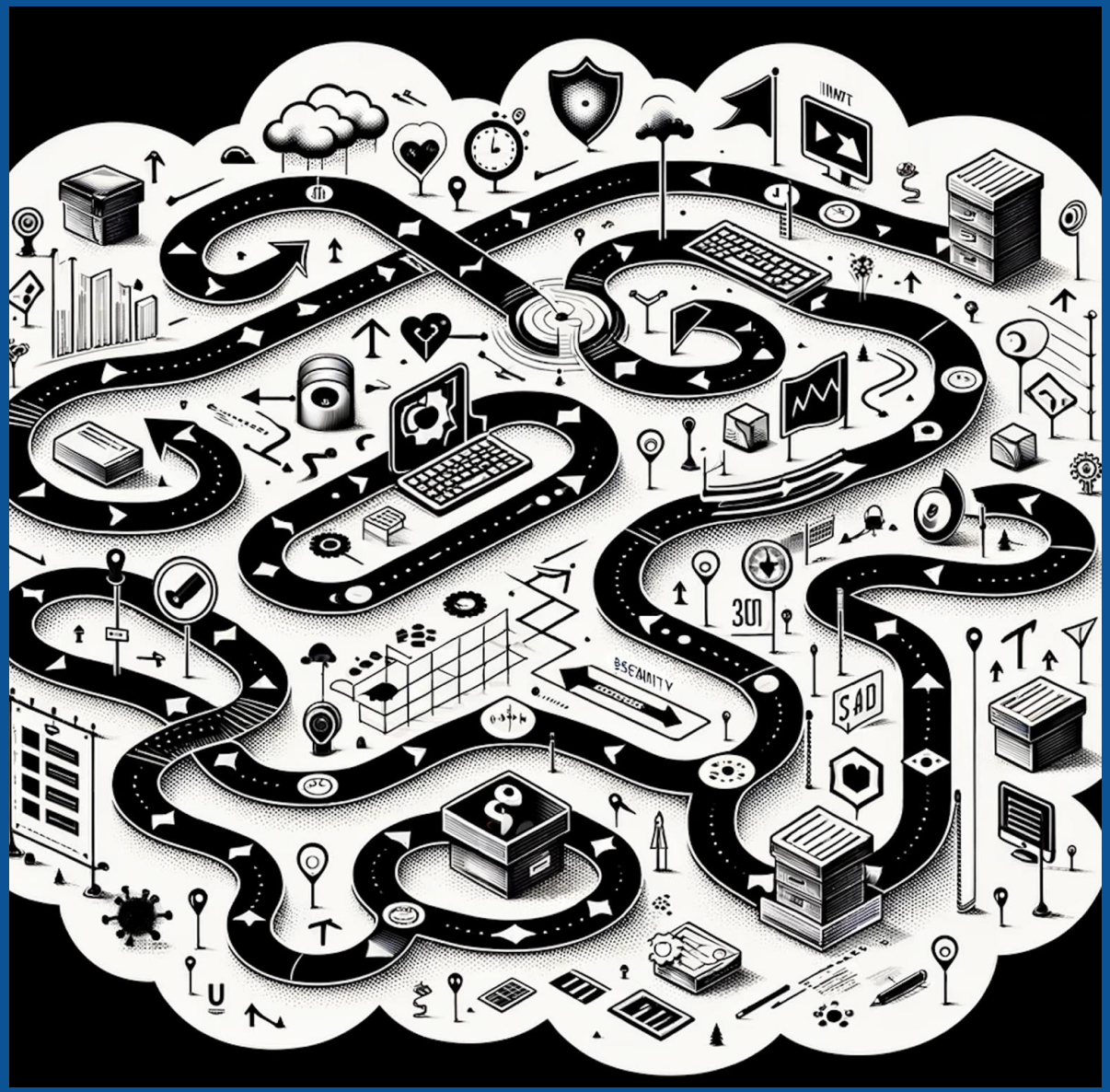
Energy consumption and emissions

High water demand

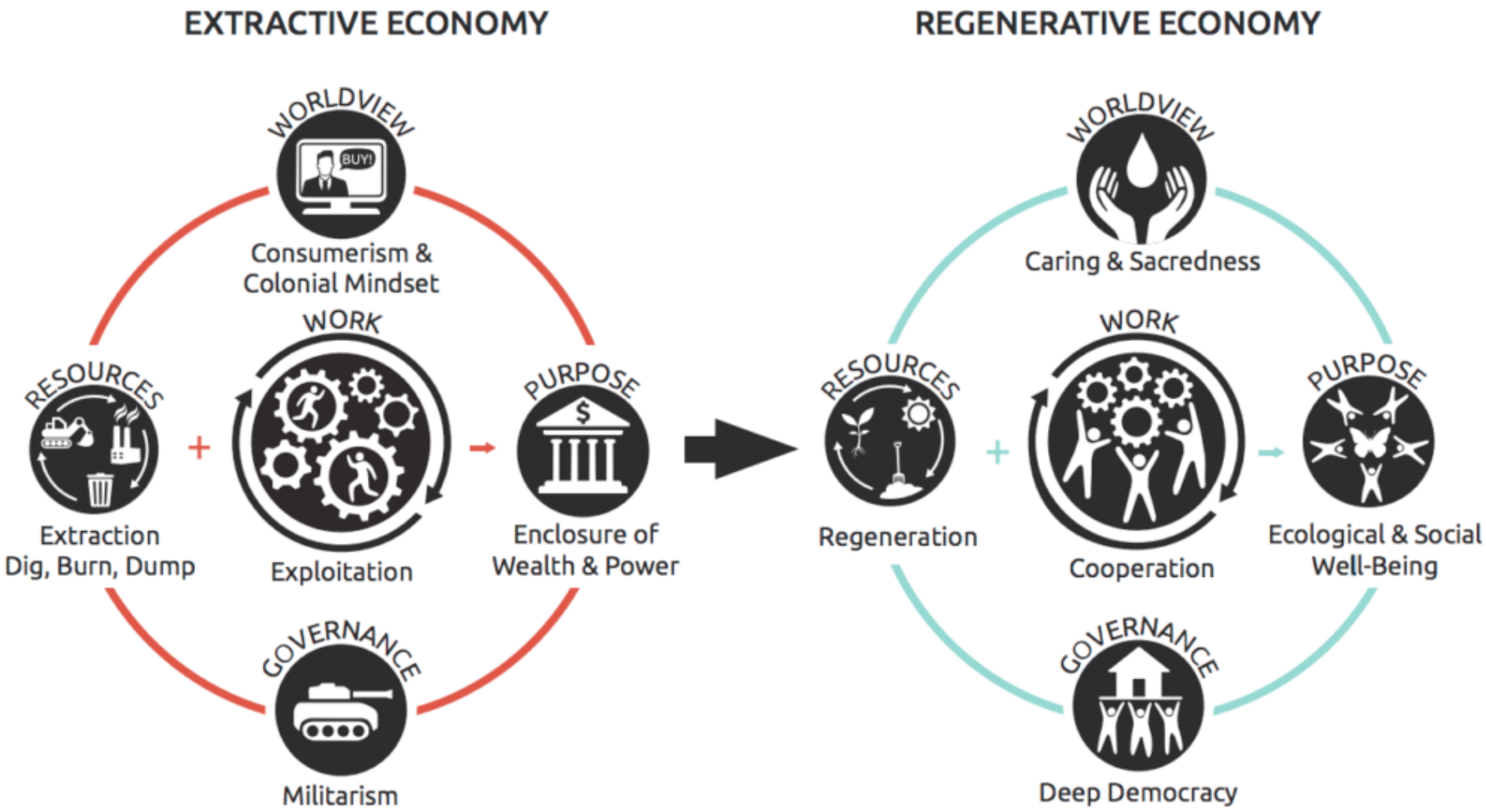


E-waste

Role of researchers and evaluators



Advocate for new models of AI governance



Developed by Movement Generation with Climate Justice Alliance - Communities United for A Just Transition

Key areas for AI + Research and Evaluation

Transdisciplinary sharing and learning

Develop critical AI literacy; internal AI policies; evaluate broad AI policies

Document, build evidence base on benefits, harms, use cases

Advocate for ethical, green, fair, transparent AI and alternative forms of AI governance

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Thank you!

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Contact: Linda@MERLTech.org
Visit: https://merltech.org
Join: The Natural Language Processing Community of Practice (NLP-CoP)

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