Artificial Intelligence in Mobile Medicine (EMS, Fire + Public Safety): Implications, Potential and Pitfalls

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BEYOND LUCID

We Connect Mobile Medical Professionals with Their Ecosystems of Care

What IS Artificial Intelligence?

Before we can contemplate the

power of A.I. as a set of capabilities,

we must define what we are referring to.

Perhaps also what we are not talking about.

Goal Today: Set Brain on Fire 🔥

This discussion will be about ideas, not a technical dive (we can have that discussion, too, if you want).

Let's contemplate what we <u>want</u>

A.I. in Mobile Medicine to be and do.

Goal Today: Set Brain on Fire

Futurism • VISIONCAST

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A.I. in Mobile Medicine to be and do.

Why? Because My Mother Said:

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“All these things just sound like Epic to me.”

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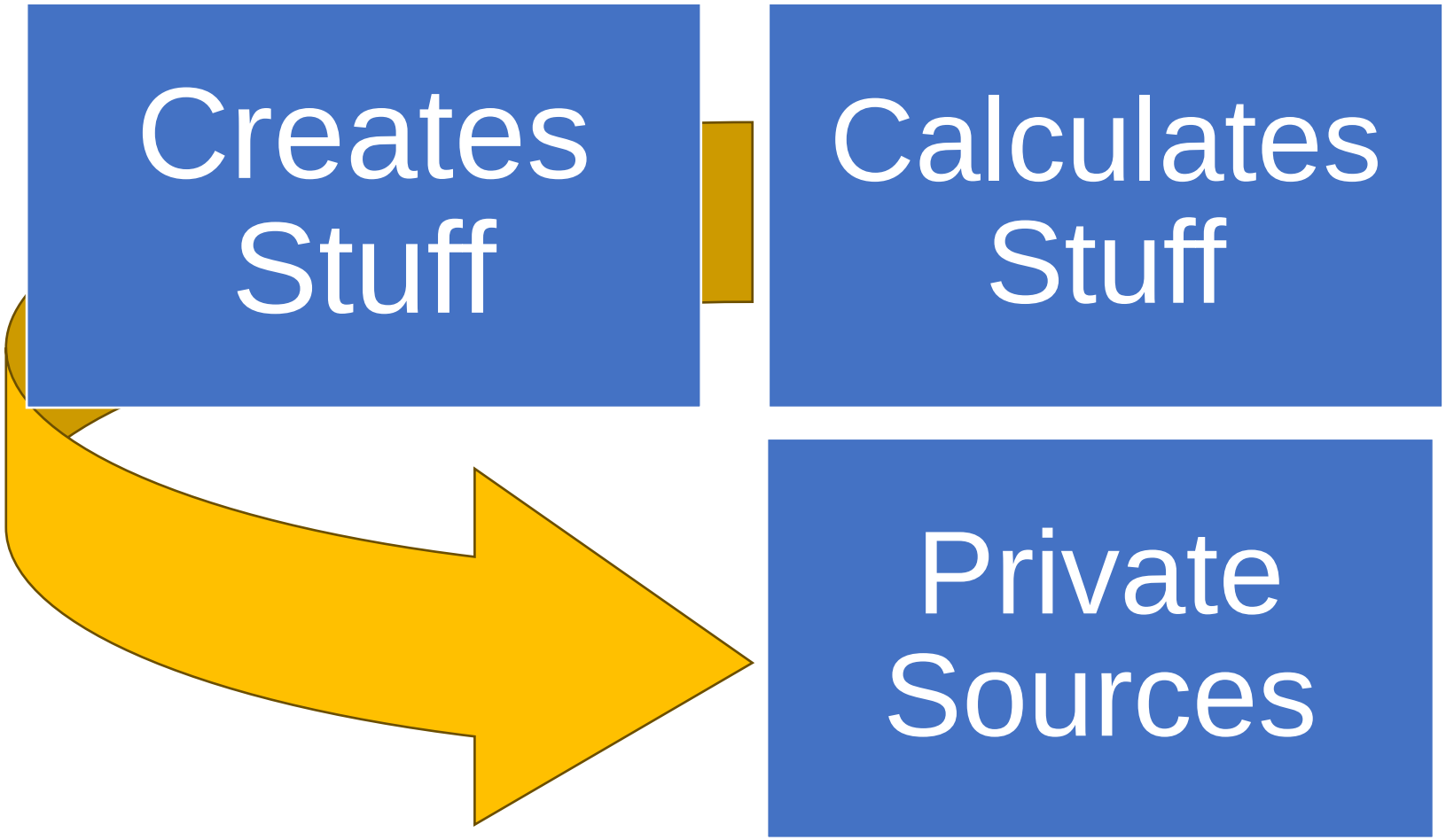
Two Fundamental "Types" of AI

Generative

Other than Generative

Generative A.I.



Access to Data

- But *which data* is central to truth vs. error and bias.

Generative A.I.

Medical charting	Exchange queries	Radiology readings	Teaching materials
Letters and opinions	Research compendia	Molecular interactions	High-speed simulations

(e.g., “Monte Carlos”)

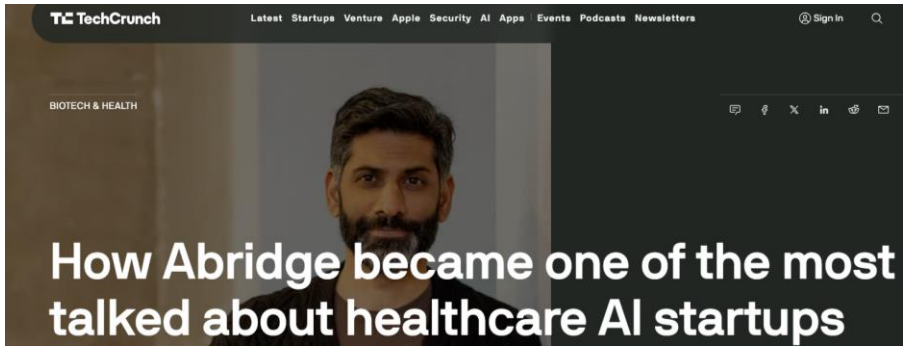
No Wonder Folks are Gaga For It

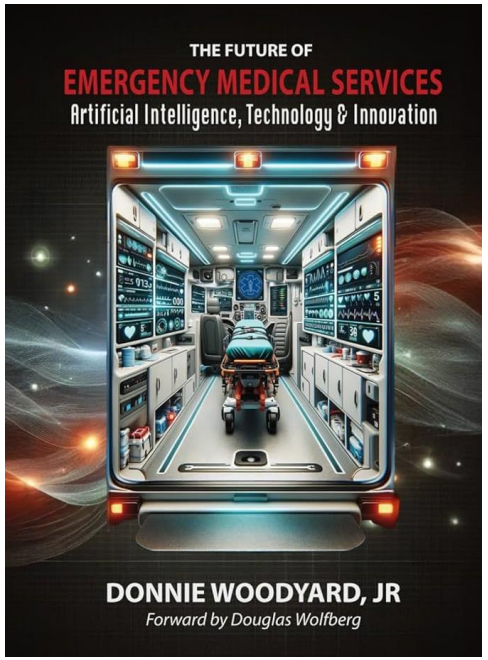
The New York Times

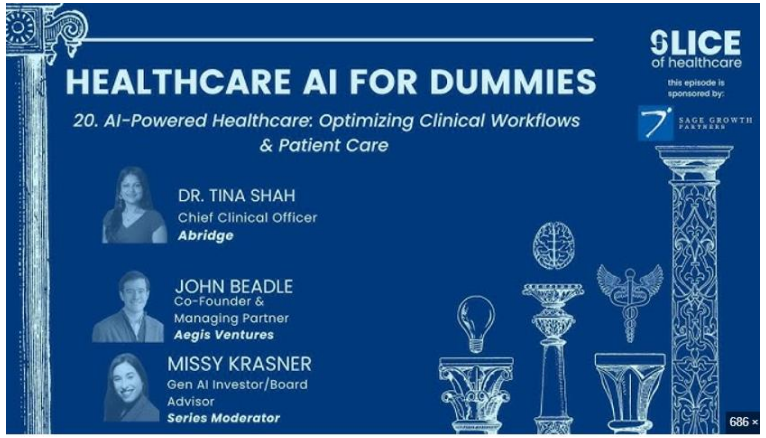
July 11, 2023

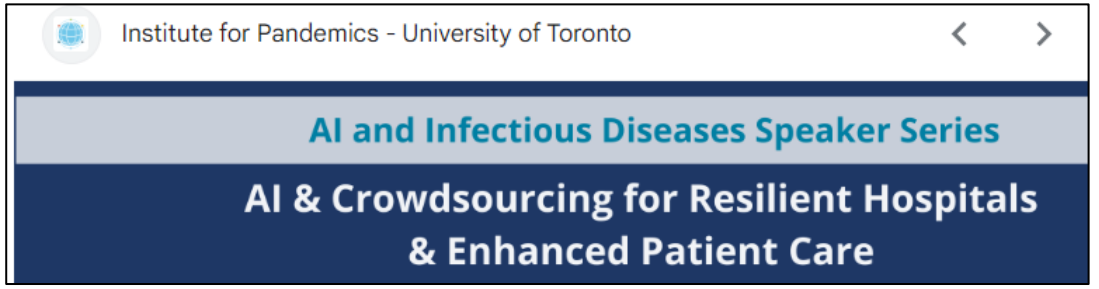
A.I. Could Solve Some of Humanity's Hardest Problems. It Already Has.

Demis Hassabis, the chief executive of DeepMind, discusses how A.I. systems can accelerate scientific research.



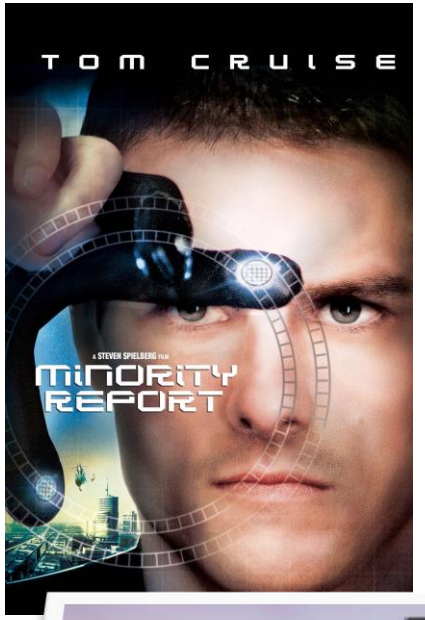


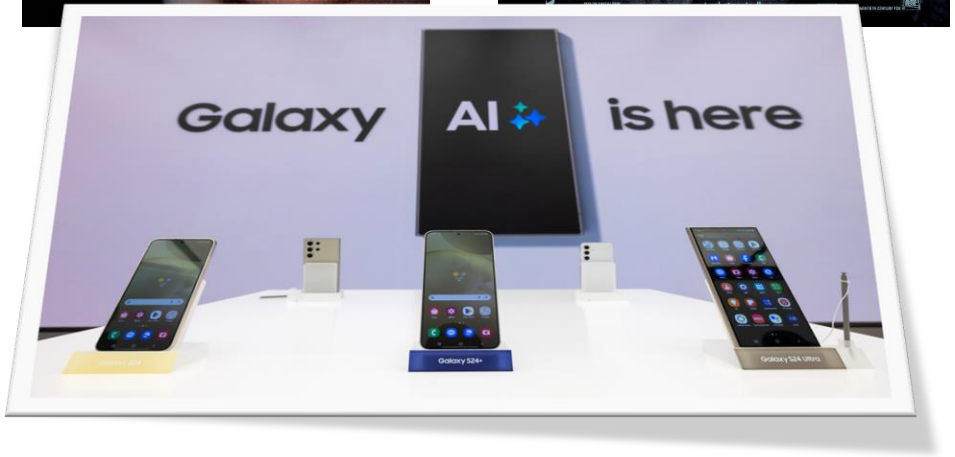




Much of A.I. Isn't New. Speed Is.

tableau from Salesforce





Birth of AI: 1950-1956

This range of time was when the interest in AI really came to a head. Alan Turing published his work "Computer Machinery and Intelligence" which eventually became The Turing Test, which experts used to measure computer intelligence. The term "artificial intelligence" was coined and came into popular use.

Dates of note:

- **1950:** Alan Turing published "Computer Machinery and Intelligence" which proposed a test of machine intelligence called The Imitation Game.
- **1952:** A computer scientist named Arthur Samuel developed a program to play checkers, which is the first to ever learn the game independently.
- **1955:** John McCarthy held a workshop at Dartmouth on "artificial intelligence" which is the first use of the word, and how it came into popular usage.

SOURCE: https://www.tableau.com/data-insights/ai/history

Mission Critical Generative A.I.

ChatGPT + Sources ➔ Infectious Disease of High Consequence (IDHC) Procedure

- AZ Dept of Health Services: Emergency Response Plan. December 2016
- AZ Dept of Health Services: Infectious Disease of High Consequence Plan. 3/2023
- ASPR-TRACIE (HHS): EMS Infectious Disease Playbook, Version 2.0. June 2023
- EMS.gov: EMS Pandemic Influenza Guidelines for Statewide Adoption, USDOT. 5/3/2007
- Phoenix Sky Harbor Communicable Disease Response Plan (CDRP). 2021
- PFD Mgmt. Procedures Vol. I (Personnel), Vol. 11 (Operations.), and Vol. 12 (EMS Proc.).
- Doctrine from PFD Infection Control Officer, PFD Occupational Health center, PFD Homeland Defense Bureau, PFD Resource Management (Logistics Section).
- Maricopa County DPH Infectious Disease Annex, v1.7 FY 2019-20 Update. National Emerging Special Pathogens Training & Education Center (NETEC): EMS Guidelines for Marburg Virus Disease. 3/9/2023
- Phoenix Fire Dept. Medical Director, Maricopa County Dept. of Public Health Epidemiologist

PFD Capt. David Moffit

Other Than Generative A.I.

Other Than Generative A.I.

Types of AI models

From sources across the web

Source: Google…no irony there! ☺

- Decision trees
- Random Forest
- Unsupervised learning
- Neural network
- Convolutional neural net…
- Linear Discriminant Analy…
- Dimensionality reduction
- Narrow AI
- Linear regression
- Reinforcement learning
- Deep learning
- KNN algorithm
- Large language models
- Reactive machines
- Supervised learning
- AI modeling
- Logistic regression
- Support Vector Machines
- Naive Bayes
- Generative Adversarial N…
- Limited memory
- Theory of mind
- General AI
- Clustering

Other Than Generative A.I.

Access to Data

- But *<u>which data</u>* is central to truth vs. error and bias.

Other Than Generative A.I.

Biometric Identification	Federated Health Data	Dynamic Protocols	Patient Matching
Risk Identification	R-T Triage Activation	SDOH Intervention	MVC-Injury Prediction

MVC = motor vehicle crash

But Are We Pushing Far Enough?

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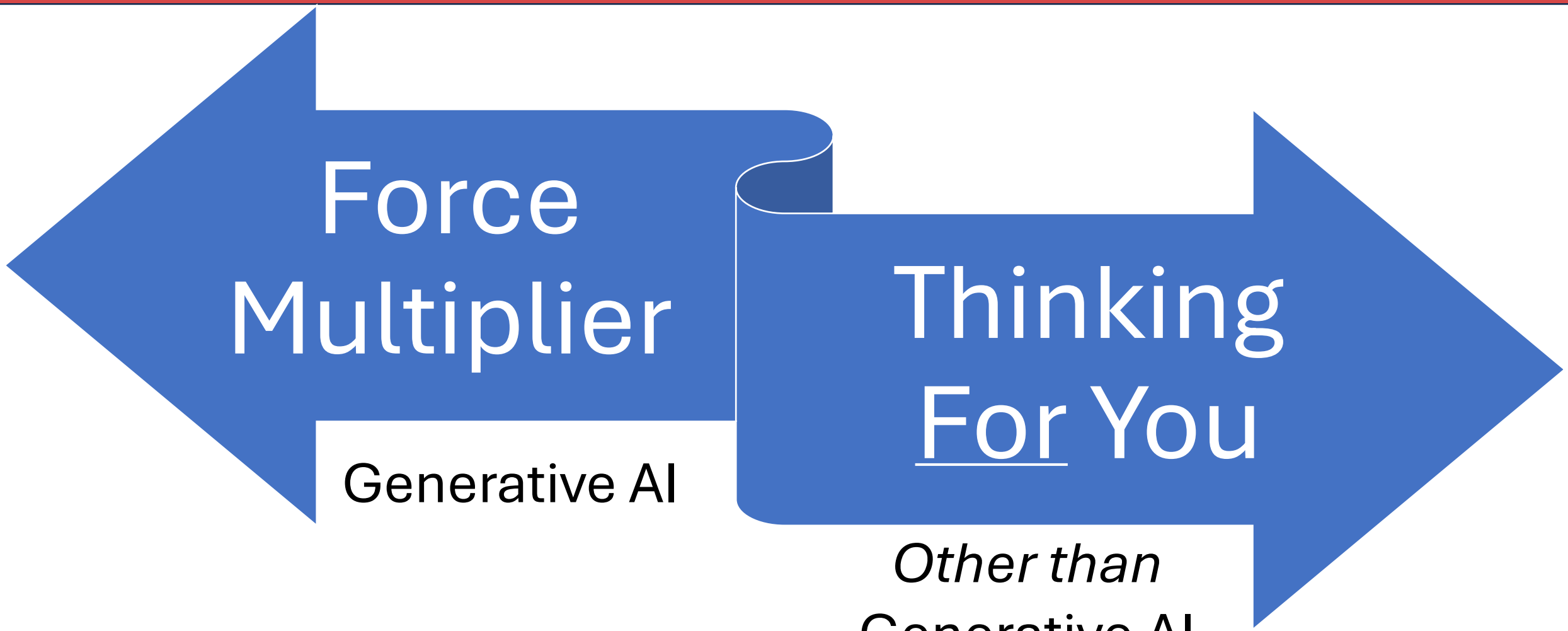

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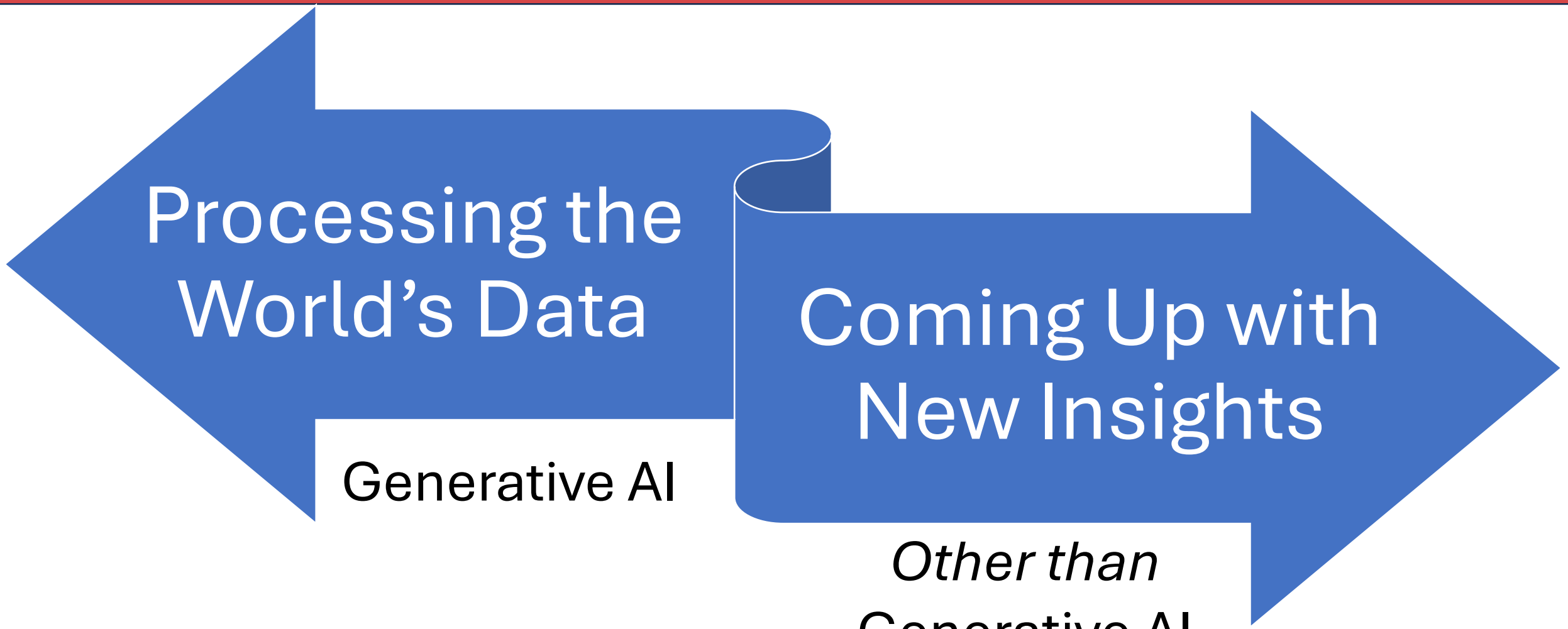

Some are questioning AI's limits

TECHNOLOGY

Would you take a drug discovered by artificial intelligence?

An OCD drug created via AI will be tested on humans.

Vox

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Using AI to create a vaccine revolution

Clinical stage company Evaxion Biotech is using artificial intelligence (AI) to simulate the immune system and create predictive models to identify novel targets for vaccines against bacterial and viral diseases and immunotherapies for cancer.

biopharmadealmakers

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ARTIFICIAL INTELLIGENCE

MIT Technology Review

AI is dreaming up drugs that no one has ever seen. Now we've got to see if they work.

AI automation throughout the drug development pipeline is opening up the possibility of faster, cheaper pharmaceuticals.

Are There Limits? Tech vs. Ethics

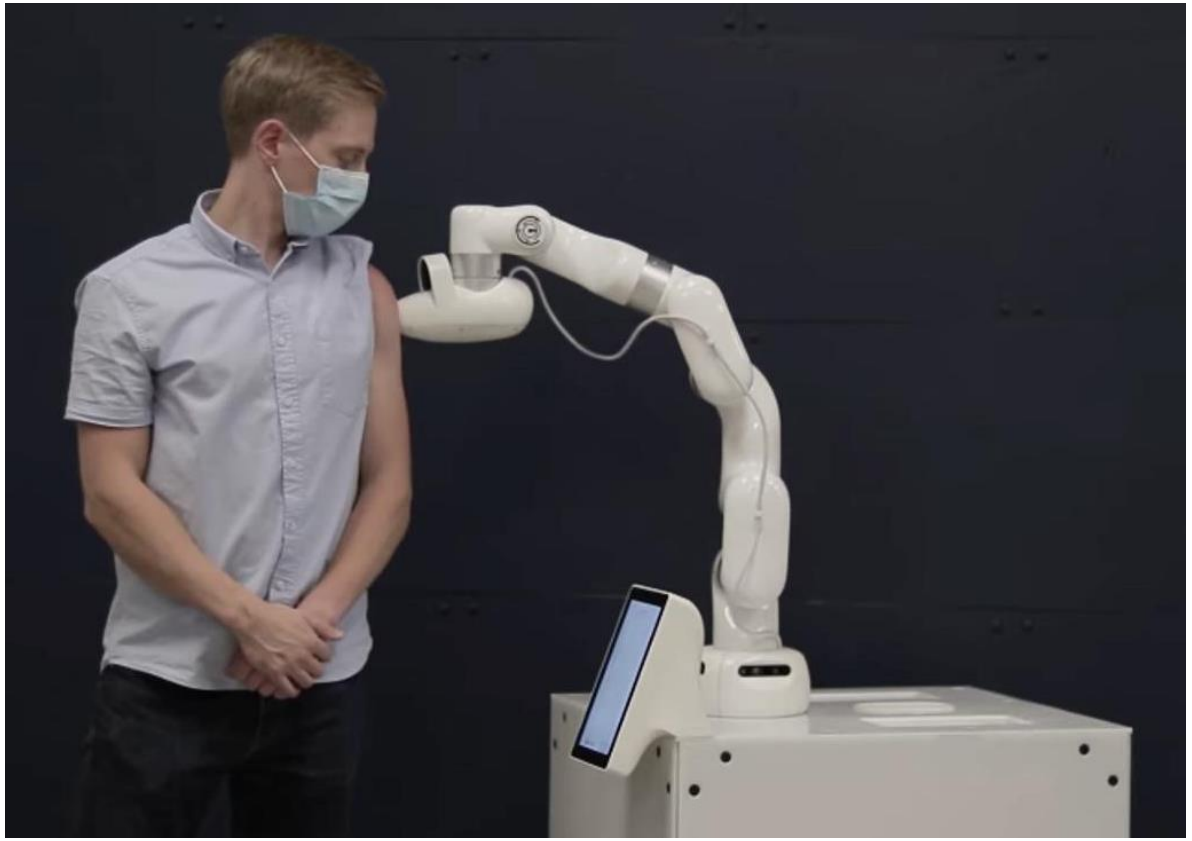
"Band-Aids Over Bullet Holes" – Is removing the human good…or even feasible?

Is the techno-chase sidetracking us from **investing in what still needs human touch?**

Are There Limits? Tech vs. Ethics

"Band-Aids Over Bullet Holes" – Is removing the human good…or even feasible?

https://spinalcord.org/disability-products-services/obi-robotic-feeding-device/



https://newatlas.com/robotics/cobi-robot-needle-less-vaccinations/

Are There Limits? Tech vs. Ethics

"Band-Aids Over Bullet Holes" – Is removing the human good…or even feasible?

https://homelessdeathscount.org/

https://www.stlpr.org/health-science-environment/2016-02-18/st-louis-county-police-add-heroin-overdose-antidote-to-patrol-cars

Are There Limits? Tech vs. Ethics

“Band-Aids Over Bullet Holes” – Is removing the human good…or even feasible?

https://invisiblepeople.tv/wp-content/uploads/2012/08/helping_the_homeless-1-1024x680.jpg

Teaching Children How to Reverse an Overdose

In rural Carter County, Tenn., health officials have embraced a strategy for stemming addiction: Teaching children as young as 6 how to administer Narcan, a nasal spray that can stop an opioid overdose from being fatal.

https://www.nytimes.com/2020/02/23/us/opioids-tennessee-narcan-training.html

The One Thing We Know for Sure

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AI is On the Mind of Government

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Groundbreaking Framework for the Safe and Secure Deployment of AI in Critical Infrastructure Unveiled by Department of Homeland Security

Release Date: November 14, 2024

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America's Cyber Defense Agency

NATIONAL COORDINATOR FOR CRITICAL INFRASTRUCTURE SECURITY AND RESILIENCE

Key Highlights of the Framework:

•**Collaborative Guidance:** The Framework includes specific actions for key stakeholders—cloud and compute providers, AI developers, critical infrastructure owners, civil society, and public sector entities—to mitigate risks, safeguard consumer rights, and promote safe and transparent AI practices.

•**Comprehensive Coverage:** It addresses vulnerabilities unique to AI in critical infrastructure, such as attacks using AI, attacks targeting AI systems, and design failures, while also supporting a "Secure by Design" approach for AI developers.

•**Endorsement from Leadership:** DHS Secretary Alejandro N. Mayorkas emphasizes the transformative potential of AI in strengthening U.S. critical infrastructure resilience, urging leaders across sectors to embrace and implement the Framework.

AI is On the Mind of Government

Request for Information: Opportunities and Challenges of Artificial Intelligence in Transportation

Posted by the **Department of Transportation** on May 3, 2024

SUMMARY:

The U.S. Department of Transportation's Advanced Research Projects Agency—Infrastructure (ARPA-I) is seeking input from interested parties on the potential applications of artificial intelligence (AI) in transportation, as well as emerging challenges and opportunities in creating and deploying AI technologies in applications across all modes of transportation. The purpose of this Request for Information (RFI) is to obtain input from a broad array of stakeholders on AI opportunities, challenges and related issues in transportation pursuant to Executive Order (E.O.) 14110 of October 30, 2023 entitled “Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence”.

BEYOND LUCID TECHNOLOGIES’S COMMENT #: DOT-OST-2024-0049-0037
Posted by the Department of Transportation on Jul 1, 2024

AI is On the Mind of Government

Artificial Intelligence

U.S. DOT Artificial Intelligence Activities

U.S. DOT is committed to safety and innovation and sees artificial intelligence (AI) as a promising capability to help achieve these aims:

- ***Enabling the safe integration of AI into the transportation system***, including as a foundational technology in many automated driving systems and unmanned aircraft systems. U.S. DOT's work in this area also focuses on safe integration of AI into conventional aircraft systems as well as traffic management operations across modes.

- ***Adopting and deploying AI-based tools into internal operations, research, and citizen-facing services.*** U.S. DOT has focused investments in the application of AI into improving the efficiency and effectiveness of internal processes and research, including natural language processing, computer vision, and machine learning-based predictive analytics.

But Why So Much Interest Now?

…And what can the problems that the federal government is seeking to solve tell us about **the power, potential, and pitfalls of A.I.?**

But Why So Much Interest Now?

- The “Silver Tsunami”
- Autism Rights Mvmt
- Rapid Global Mobility
- Climate Disasters
- Availability of Data/HIE
- Whole Blood in the Field
- Man-Made Crises/Terror
- Morbidity on Roadways

How Far Will People Let A.I. Go?

Trust Confidence	Love Parenting	Equity Community	Tradition Faith/Religion
Fear Mystery	Guilt Regret/FOMO	Aspiration Legacy	Creativity Imagination

Implications for Emergencies

Dynamic Routing → Code Black or Status Zero	Dynamic Routing → Status Bypass (Patient Distrib.)	Clinical Decision Support/Protocol Guidance	Family Reunification After Evacuation
Collective After-Action Review	Reduce Burdens → Improve Hiring	Sentinel Event Tracking • MH/BH	Syn. Surveillance + Contagion Spread Modeling
Threat ID and Localization / Public Safety	Automation of Mutual Aid at Vulnerable Sites	Prevent Adverse Encounters, 2nd ary Emergency	Protect People w/ Special Needs + Critical Wishes

Thank you! Please get in touch if you are working on related grants + projects, and/or want to collaboratively bring them to fruition.

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