

EHEALTH COMMISSION MEETING

HYBRID CONFERENCE

February 14, 2024



NOTE: NEW ZOOM WEBINAR LINK **DIAL IN BY PHONE:** US: +1 719 359 4580 OR: +1 669 900 6833 WEBINAR ID: 834 3429 8716

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February Agenda



| Title | Start | Duration |
|--|-------|----------|
| Call to Order Roll Call and Introductions Approval of January Meeting Minutes February Agenda and Objectives Kaakpema "KP" Yelpaala, Chair | 12:00 | 5 mins |
| Announcements OeHI Updates-eHealth Commission Updates Decision Items & Action Items Karen Shimamoto, Deputy Director, Office of eHealth Innovation (OeHI) eHealth Commission Members | 12:05 | 10 mins |
| Commissioner Spotlight: AI, Bias, and Innovation: Opportunities and Challenges Kaakpema "KP" Yelpaala, Senior Fellow and Lecturer and Faculty Director for InnovateHealth, Yale School of Public Health | 12:15 | 1 hour |
| Public Comment Period | 1:15 | 5 mins |
| eHealth Commission Meeting Closing Remarks Open Discussion Recap Action Items Future Agenda Items Adjourn Public Meeting Kaakpema "KP" Yelpaala, Chair | 1:20 | 10 mins |

Announcements



OeHI and eHealth Commission Updates

- OeHI Team Updates
- Commissioner Updates?

Note: If you are experiencing audio or presentation difficulties during this meeting, please text 440-796-8957

Thank you, Jason!





As a founding eHealth Commissioner, we appreciate everything you have contributed to the Commission and in support of OeHI. You will be missed!



Commissioner Spotlight Al, Bias, and Innovation: **Opportunities and Challenges** Kaakpema "KP" Yelpaala, Senior Fellow and Lecturer and Faculty Director for InnovateHealth, Yale School of Public Health



Artificial Intelligence, Bias, and Innovation: Opportunities and Challenges

Kaakpema "KP" Yelpaala

Chair, Colorado eHealth Commission

Senior Fellow & Lecturer, Yale School of Public Health Faculty Director, InnovateHealth Yale

Presentation Objectives

- Artificial Intelligence 101
- AI Opportunities and Challenges in Health
- Rules of the AI Game and Ethical Considerations
- Where do we go from here?



Part 1

Artificial Intelligence 101





What is Artificial Intelligence?

Artificial intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems.

These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions), and self-correction.



2 Types of AI Based Capabilities

1. Narrow AI (Weak AI): Narrow AI is designed to perform specific tasks or solve specific problems. It is limited to the particular task it is designed for and does not possess general intelligence.

Examples include voice assistants like Siri, image recognition software, and recommendation algorithms used by streaming services.

2. General AI (Strong AI): General AI, also known as strong AI or artificial general intelligence (AGI), would have the ability to understand, learn, and apply knowledge in a way that is indistinguishable from human intelligence.

AGI remains a theoretical concept and has not yet been achieved.

What are you ChatGPT?



ChatGPT...Are you Weak AI?



ChatGPT

Yes, I am an example of weak AI, also known as narrow AI. Weak AI is designed to perform a narrow task or a specific set of tasks, such as answering questions or generating text, and is limited to the specific domain it was designed for. Weak AI systems do not possess general intelligence or the ability to understand and learn in the way that humans do.



4 Types of AI Based Functionalities

1. **Reactive Machines**: These AI systems can only react to specific situations based on pre-defined rules and do not have memory or the ability to learn from past experiences.

An example is Deep Blue, the chess-playing computer developed by IBM.

2. Limited Memory: These AI systems can learn from historical data to make decisions or predictions.

Self-driving cars use limited memory AI to recognize traffic signs and predict the movement of other vehicles.

3. Theory of Mind: This refers to AI that can understand emotions, beliefs, intentions, and thought processes.

This type of AI does not currently exist but is a topic of research in the field of AI.

4. Self-awareness: This is the theoretical highest level of AI, where machines have consciousness and are aware of their own existence. This level of AI is purely theoretical and is a topic of philosophical debate.

What is Generative AI?

- Generative AI refers to artificial intelligence systems that can generate new content
 - Includes images, text, audio, videos and simulations that are similar to examples from a dataset they have been trained on.
- These systems use techniques like neural networks, specifically generative models such as generative adversarial networks (GANs) or variational autoencoders (VAEs), to generate new content.
- Generative AI can produce impressive results and create realistic-looking content, but it is limited to the specific task it has been trained for
 - It does not possess general intelligence or the ability to understand and learn in the way that humans do.

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What are Large Language Models?

- Large language models (LLMs) are a type of artificial intelligence that is trained on vast amounts of text data to understand and generate human language.
- LLMs are a form of natural language processing (NLP) AI.
- LLMs are characterized by their size, with millions or even billions of parameters that enable them to learn complex patterns in language.
- These models are typically pre-trained on large datasets, such as books, articles, and websites, to learn the nuances of language.
 - Once trained, they can be fine-tuned on specific tasks or domains to further improve their performance.
- These models, such as GPT-3 (Generative Pre-trained Transformer 3), are designed to process and generate text in a way that is contextually relevant and coherent.



So how do we make meaning of all of this?

- AI is what it sounds like...ARTIFICIAL intelligence
- Computer scientists are training machines to mimic human tasks and behaviors
- These machines are doing certain tasks very well, accelerating many aspects of society, but these systems are not perfect by any means

We are not here yet...



Part 2

AI Opportunities and Challenges in Health



Opportunities for AI in the health sector are far reaching and touch every aspect of life sciences and healthcare Al adoption in the health sector will continue to increase according to a recent global life sciences Deloitte survey...



Source: The Life Sciences and Health Care AI Dossier. Deloitte AI Institute.

Opportunities for AI across the patient journey: Deloitte Analysis



The future of artificial Intelligence in health care: How AI will impact, patients, clinicians. And the pharmaceutical industry. Deloitte. 2019

Key Barriers to Al Adoption in Healthcare

Poor data

Insufficient use cases











Source: The Life Sciences and Health Care AI Dossier. Deloitte AI Institute.

What is implicit bias?

"Implicit bias is a form of bias that occurs automatically and unintentionally, that nevertheless affects judgments, decisions, and behaviors."



Source: https://diversity.nih.gov/sociocultural-factors/implicit-bias

FDA seeks feedback on racial bias of pulse oximeters, convenes advisory committee

The agency published a paper on improving the evaluation of pulse oximeters to take skin pigmentation into account.

Published Nov. 17, 2023

By <u>Nick Paul Taylor</u> Contributor

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A man uses an at-home pulse oximeter to check oxygen saturation and pulse rate. No name give, Prostock-Studio via Getty Images





The world at night – A proxy for AI bias challenges?

The growth of AI creates opportunities, challenges and urgency for equitable innovation principles and frameworks

Brief Communication Open access Published: 20 October 2023

Large language models propagate race-based medicine

Jesutofunmi A. Omiye, Jenna C. Lester, Simon Spichak, Veronica Rotemberg & Roxana Daneshiou

npj Digital Medicine 6, Article number: 195 (2023) Cite this article

Bombshell Stanford study finds ChatGPT and Google's Bard answer medical questions with racist, debunked theories that harm Black patients

BY GARANCE BURKE, MATT O'BRIEN AND THE ASSOCIATED PRESS





JMIR Med Inform. 2022 May; 10(5): e36388. Published online 2022 May 31. doi: 10.2196/36388 PMCID: PMC9198828 PMID: 35639450

Evaluation and Mitigation of Racial Bias in Clinical Machine Learning Models: Scoping Review

Monitoring Editor: Christian Lovis

Reviewed by Hugues Turbe

Jonathan Huang, BSc,¹ Galal Galal, MD, MPH.^{III} Mozziyar Etemadi, MD, PhD,^{1,2} and Mahesh Vaidyanathan, MD, MBA^{1,3}

Al recognition of patient race in medical imaging: a modelling study



Summary

Background Previous studies in medical imaging have shown disparate abilities of artificial intelligence (AI) to detect Lancet Digit Health 2022; a person's race, yet there is no known correlation for race on medical imaging that would be obvious to human 4: e406-14 experts when interpreting the images. We aimed to conduct a comprehensive evaluation of the ability of AI to Published Online May 11, 2022 recognise a patient's racial identity from medical images.

https://doi.org/10.1016/ 52589-7500(22)00063-2

Google, Microsoft execs share how racial bias can hinder expansion of health Al

By Robert King · Feb 23, 2023 2:25pm

Artificial Intelligence



Large Language Models and Racial Bias: 2023 Stanford Study

- Study assessed four commercially LLMS: Bard, ChatGPT, Claude, GPT-4
- Questions were derived from discussions with physician experts on race-based misconceptions believed by medical trainees
- 9 questions were asked of each model 5 times
- All models had examples of perpetuating race-based medicine and the model was not consistent in its responses
- Note that these models are being used in various applications and connected to EHRs in some cases



Al Recognized Patients' Self-Reported Race through Medical Images: 2022 MIT Study

- Study objective to evaluate the ability of AI to identify patient's racial identify from medical images
 - Al challenges have been studied more in LLMs than medical image data
- Through public and private data sets, study found that deep learning AI models could be trained to predict self-reported race from medical images alone
 - Self-reported race for the study was Asian, White and Black
 - Data sets include chest X-rays, limb X-rays, chest CT scans and mammograms
- Researchers also found that deep learning AI models could even accurately predict self-reported race from corrupted medical image data



Figure 2: Samples of the images after low-pass filters and high-pass filters in MXR dataset HPF=high-pass filtering. LPF=low-pass filtering. MXR=MIMIC-CXR dataset.





DEFENDING THE RIGHT TO THINK FREELY IN THE AGE OF NEUROTECHNOLOGY

Nita A. Farahany

A new wave of neurotechnology is emerging, with significant privacy and ethical implications, including your brain wave data

A generation of AI & VR native babies has arrived...

Part 3

Rules of the AI Game and Ethical Considerations



White House Executive Order (E.O.) 14110 on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (October 23, 2023)

- Safety and security: The E.O. promotes understanding and mitigation of risks related to AI adoption, including biosecurity, cybersecurity, national security, and critical infrastructure.
- Innovation and competition: Actions to attract AI talent, protect IP, and promote AI innovation, especially at startups and small businesses, are emphasized.
- Worker support: Agencies are directed to research and develop mitigations for potential workforce disruptions caused by AI adoption.
- **Consideration of AI bias and civil rights:** AI models' potential biases and civil rights violations in their implementation are highlighted, with a focus on equity and civil rights in the criminal justice system and federal programs.
- **Consumer protection:** Agencies are instructed to enforce existing authorities to minimize harms to consumers and identify needed authorities related to AI.
- **Privacy:** The E.O. calls for evaluation and mitigation of privacy risks associated with AI's collection, use, and retention of user data.
- Federal use of AI: OMB is tasked with establishing an interagency council to coordinate AI use by federal agencies and develop guidance on AI governance and risk management. Agencies are directed to adopt generative AI tools with safeguards and increase AI workforce capacity.
- International leadership: The U.S. aims to be a global leader in AI by engaging with allies, developing common regulatory principles, and advancing responsible global AI standards.

Source: Executive Order on the Safe, Secure and Trustworthy Development and Use of Artificial Intelligence

European Union Al Act (2023)

Key Provisions

- Risk-based approach
- Ethical considerations
- Transparency and accountability
- Oversight and enforcement mechanisms

Implications & Challenges

- Ethical AI development
- Balancing Innovation and Regulation
- Global influence
- Flexibility and adaptation

Health Equity & Al: Mitigating Bias

Source: Abràmoff, M.D., Tarver, M.E., Loyo-Berrios, N., Trujillo, S., Char, D., Obermeyer, Z., Eydelman, M.B., Maisel, W.H. (2023). Considerations for addressing bias in artificial intelligence for health equity. *npj digital medicine*, *6*(1), 170.



Part 4

Where do we go from here?



What is equitable innovation in health?

Equitable innovation in health is a process through which solutions, products and services with transformational potential are intentionally designed and scaled to advance human welfare, reduce health inequities and mitigate harm.

Kaakpema Yelpaala's Working Definition of Equitable Innovation



Closing Thoughts

- As we work on the next version of the Colorado Health IT roadmap and the Social Health Information Exchange, we need to consider themes discussed in this presentation
- While the federal government is establishing guidelines, states will also need to assess these themes in their context through multi-sector collaboration
- Without an intentional approach, exponential medical technology advances and health innovation, including AI in health, will not bridge equity gaps
- Innovators and policy makers need deeper collaboration
 - Generational and demographic perceptions and use of technology matter deeply and are highly varied
- We need to build trust with marginalized communities around these themes and ethical guidelines for AI driven solutions

Disclaimer: This presentation was created with the help of ChatGPT!



You

Thank you for helping me ChatGPT!

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ChatGPT

You're welcome! If you have any more questions or need further assistance in the future, feel free to ask.

THANK YOU!



Public Comment Period



CLOSING REMARKS