Considerations for building ethical and socially responsible AI systems in Health Care

Session 2: Ethical, Legal and Social Implications (ELSI) of machine learning in genomics
NHGRI Machine Learning in Genomics Workshop – April 13-14, 2021

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AINOW

Opinion

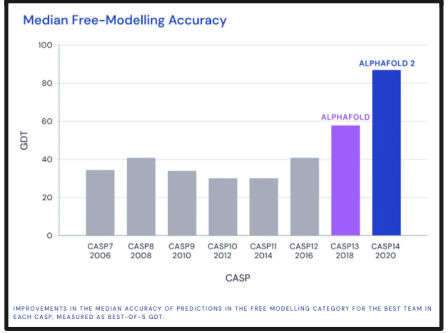
What is an “algorithm”? It depends whom you ask

For better accountability, we should shift the focus from the design of these systems to their impact.

by **Kristian Lum** and **Rumman Chowdhury** February 26, 2021

AI has cracked a problem that stumped biologists for 50 years. It’s a huge deal.

A breakthrough on the “protein folding problem” can help us understand disease and discover new drugs.



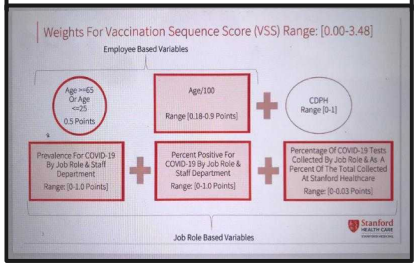
What matters is the potential for harm, regardless of whether we're discussing an algebraic formula or a deep neural network.

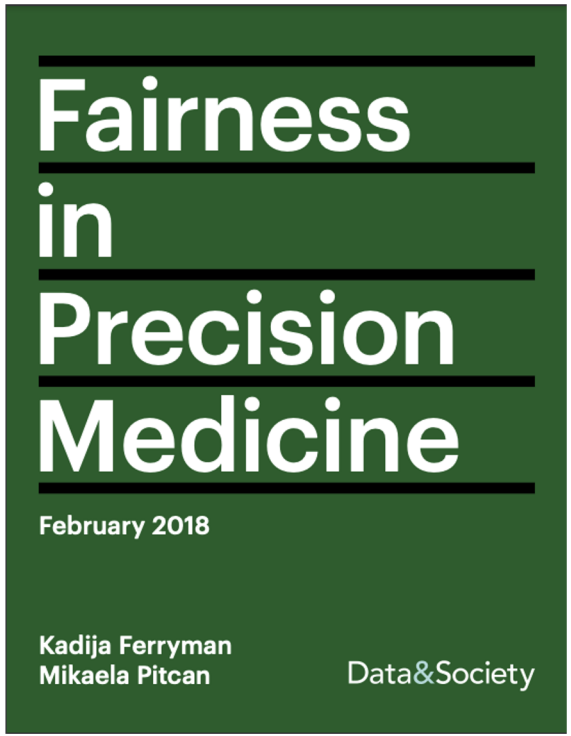
Pandemic Technology Project

This is the Stanford vaccine algorithm that left out frontline doctors

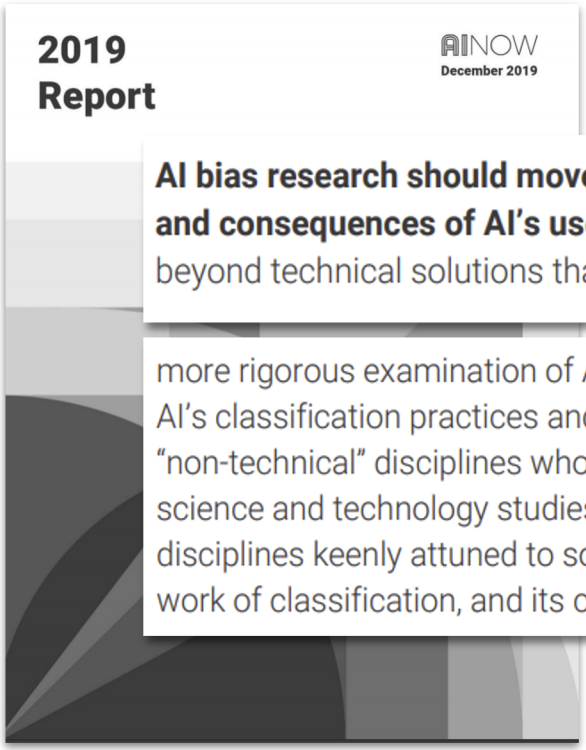
The university hospital blamed a “very complex algorithm” for its unequal vaccine distribution plan. Here’s what went wrong.

by **Eileen Guo** and **Karen Hao** December 21, 2020





The dream of precision medicine is a techno-utopia, built on real evidence of how big data analysis can transform other fields. It emphasizes health as determined not just by biology, but on a complex interplay of genetic, social, and economic factors. However, this dream should also prompt us to question how it might not develop in the ways that we think it will, and how bringing the increasing power of computing to bear on more and more kinds of health data could have unintended consequences. The use of data in sectors like criminal justice, welfare, and child services has exacerbated inequalities and caused significant harm to individuals.[6] Additionally, there's a long-standing history of misuse of medical data that disproportionately impacts poor people or regulates their access to services.[7]



AI bias research should move beyond technical fixes to address the broader politics and consequences of AI's use. Research on AI bias and fairness has begun to expand beyond technical solutions that target statistical parity, but there needs to be a much more rigorous examination of AI's politics and consequences, including close attention to AI's classification practices and harms. This will require that the field center "non-technical" disciplines whose work traditionally examines such issues, including science and technology studies, critical race studies, disability studies, and other disciplines keenly attuned to social context, including how difference is constructed, the work of classification, and its consequences.

Limitations of fair predictive algorithms using Electronic Health Records: Analyzing the research landscape

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- Gaps in individual patient records due to health disparities
- Omission of behavioral health concerns due to stigma
- Under-reporting of chronic pain due to cultural factors

Caring through Data: Attending to the Social and Emotional Experiences of Health Datafication

Elizabeth Kaziunas[1], Mark S. Ackerman[1,3], Silvia Lindtner[1], Joyce M. Lee[2]
[1]School of Information, [2]Medical School, [3]EECS
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Differential Privacy and Federated Learning

ARTICLE

Practicing Differential Privacy in Health Care: A Review

Authors: Fida K. Dankar, Khaled El Emam Authors Info & Affiliations

Publication:
Transactions on Data Privacy • April 2013

You Got a Brain Scan at the Hospital. Someday a Computer May Use It to Identify You.

In a disturbing experiment, imaging and facial recognition technologies were used to match research subjects to their M.R.I. scans.

Flawed Science and Flawed Uses

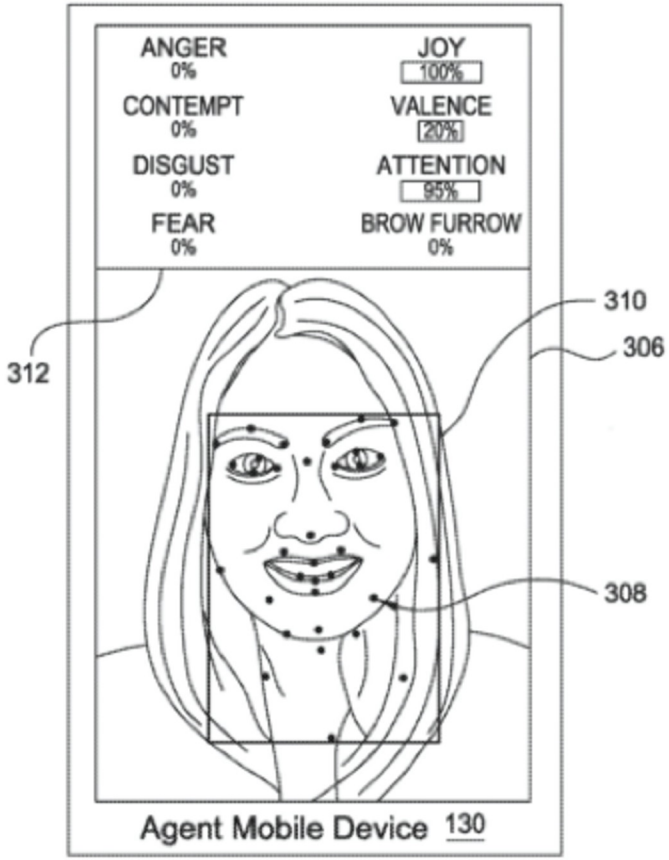
Genetic testing is an inexact science with real consequences

How flawed genetic testing could be used for more than screwing up your race.

By Rani Molla | @ranimolla | Dec 13, 2019, 8:00am EST

A judge said police can search the DNA of 1 million Americans without their consent. What's next?

By Jocelyn Kaiser | Nov. 7, 2019 , 2:40 PM



Emotion recognition to match support agents with customers (US9648171B1)
Inuit Inc.

The Electronic Privacy Information Center, known as EPIC, filed an official complaint calling on the FTC to investigate HireVue's business practices, saying the company's use of unproven artificial-intelligence systems that scan people's faces and voices constituted a wide-scale threat to American workers.

HEALTH TECH

Health systems are using AI to predict severe Covid-19 cases. But limited data could produce unreliable results

By Erin Brodwin Nov. 18, 2020

Reprints

“I think there’s a dirty little secret which is if you’re using a local model for decision support, you don’t have to go through any regulatory clearance or peer-reviewed research at all,” said Andrew Beam, assistant professor of epidemiology at the Harvard T.H. Chan School of Public Health.

Artificial Intelligence for Global Health: Learning From a Decade of Digital Transformation in Health Care

Varoon Mathur[1], Saptarshi Purkayastha, Ph.D[2], Judy Gichoya, MD, MS[3]

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[3] Department of Radiology & Imaging Sciences, Emory University

Practical ML for Developing Countries Workshop at the 8th International Conference on Learning Representations, April 2020

Ongoing Work

Focus on capacity-building, not replacing lack expertise

- Incorporate AI/ML specific challenges of data collection, labeling, model training and deployment within larger context of integration in resource-poor settings
- **Creating a Design Framework:** Understanding utility of participatory design, value-sensitive design approaches to larger recommendations for developing/deploying viable AI/ML solutions

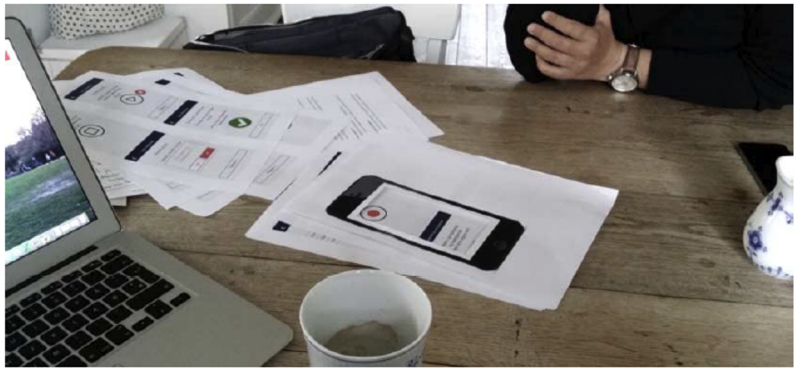
> Stud Health Technol Inform. 2017;233:95-112.

From Prototype to Product: Making Participatory Design of mHealth Commercially Viable

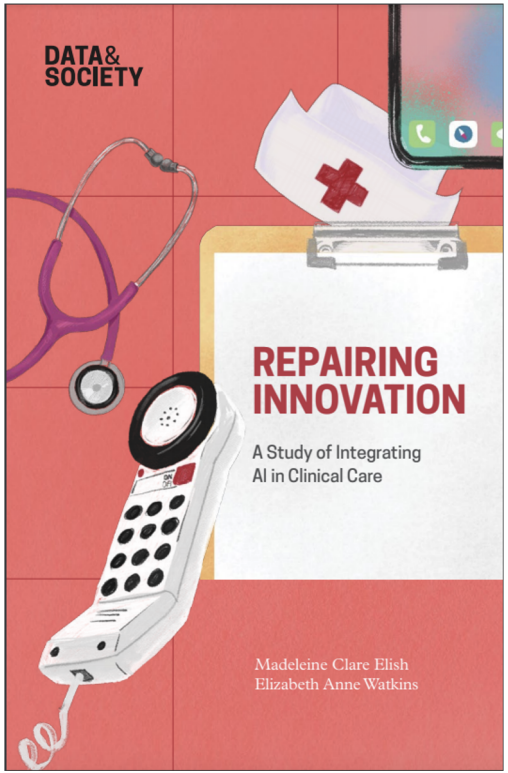
Tariq O Andersen [1], Jørgen P Bansler [1], Finn Kensing [1], Jonas Moll [1]

Affiliations + expand

PMID: 28125417



Picture 3. A co-design session in an ICD patient's home (June, 2015)



If the introduction of new technologies such as AI are beneficial because they are disruptive— in that they create new pathways to achieve a goal—**this disruption also causes forms of breakage, upsetting existing power hierarchies or rerouting information flows that must be repaired in order for the intervention to work effectively in a particular context.** Repair work can take many forms, from emotional labor to expert justifications, and involves the labor of integrating a new technology into an existing professional context.

Opinion

Participation-washing could be the next dangerous fad in machine learning

Many people already participate in the field's work without recognition or pay.

by **Mona Sloane** August 25, 2020

Machine learning extends the tech industry's broader priorities, which center on scale and extraction. That means participatory machine learning is, for now, an oxymoron. By default, most machine-learning systems have the ability to surveil, oppress, and coerce (including in the workplace). These systems also have ways to manufacture consent—for example, by requiring users to opt in to surveillance systems in order to use certain technologies, or by implementing default settings that discourage them from exercising their right to privacy.

Given that, it's no surprise that machine learning fails to account for existing power dynamics and takes an extractive approach to collaboration. If we're not careful, participatory machine learning could follow the path of AI ethics and become just another fad that's used to legitimize *in*justice.

Conclusion

"If medicine is to fulfill her great task, ***then she must enter the political and social life.*** *The physicians are the natural attorneys of the poor, and the social problems should largely be solved by them."*

- Dr. Rudolf Virchow