DOES THE FUTURE BELONG TO AI DOCTORS?

NO, IT BELONGS TO HUMAN-AI INTERACTION

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1) Difficulties in training a good AI system: Massive amounts of data

(garbage in, garbage out)

Anonymized data?

Identifying Personal Genomes by Surname Inference

MELISSA GYMREK, AMY L. MCGUIRE, DAVID GOLAN, ERAN HALPERIN, AND , YANIV ERLICH   Authors Info & Affiliations

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Anonymity Compromised

The balance between maintaining individual privacy and sharing genomic infor⊠mation for research purposes has been a topic of considerable controversy. **Gymrek *et al.*** (p. 321; see the Policy Forum by **Rodriguez *et al.***) demonstrate that the anonymity of participants (and their families) can be compromised by analyz⊠ing Y-chromosome sequences from public genetic genealogy Web sites that con⊠tain (sometimes distant) relatives with the same surname. Short tandem repeats (STRs) on the Y chromosome of a target individual (whose sequence was freely available and identified in GenBank) were compared with information in public genealogy Web sites to determine the shortest time to the most recent common ancestor and find the most likely surname, which, when combined with age and state of residency identified the individual. When STRs from 911 individuals were used as the starting points, the analysis projected a success rate of 12% within the U.S. male population with Caucasian ancestry. Further analysis of detailed pedi⊠grees from one collection revealed that families of individuals whose genomes are in public repositories could be identified with high probability.

Non personal data?

Synthetic data?

Non-personal nature

Possible solution

European Health Data Space

2) Bias

Codification

Data

Biases in healthcare

How to mitigate bias

- Codification
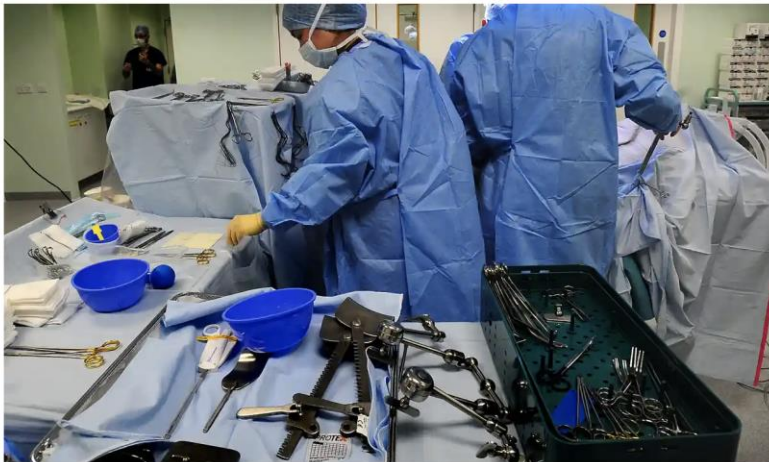- Data (quality and quantity)

But humans are also – even more- biased

AI can be every easily fooled

3) Imprecision and wrong results

Human mistakes…

Rising number of foreign objects found in patients after surgery in England

In what NHS calls 'never events', items including swabs, blades and drill bits left in patients 291 times in England in 2021-22

More than 7 million incorrect diagnoses made in US emergency rooms every year, government report finds

By Nadia Kounang, CNN
Updated 5:11 PM EST, Fri December 16, 2022

Assam

Assam: Doctors Operate on Wrong Leg of Minor Boy at JMCH, Probe On

A nine-year-old boy, who was getting treatment for a disorder on his right leg at the JMCH, was reportedly operated on his left leg.

Assam: Doctors Operate on Wrong Leg of Minor Boy at JMCH, Probe On

A nine-year-old boy, who was getting treatment for a disorder on his right leg at the JMCH, was reportedly operated on his left leg.

Elderly patient overdosed by hospital nurses on incorrect medication, died days later

4) Lack of explainability

White box

Grey box

Black box

Why is a justification important in healthcare?

Grounded medical decisions   **Patient's informed consent**

Perspective

Mechanism of Action and Target Identification: A Matter of Timing in Drug Discovery

Ronald L. Davis[1],*

SUMMARY
Two opposing viewpoints are held regarding the need for understanding a drug's molecular target and mechanism of action. One extreme viewpoint is that it is unnecessary, because, after all, there are many beneficial drugs in use for which the target and mechanism of action remain unknown. A second extreme viewpoint is that target identification and mechanism of action should be elucidated very early in the drug discovery process due to the tangible benefits provided by this knowledge. I offer an intermediate perspective that considers the complexity of the disease of interest, the existence of a standard-of-care treatment, and the resources available to the investigator.

INTRODUCTION

Review

Selective Serotonin Reuptake Inhibitors and Adverse Effect A Narrative Review

Amber N. Edinoff [1],*, Haseeb A. Akuly [1], Tony A. Hanna [1], Carolina O. Ochoa [2], Shelby J. Patti [2], Yahya A. Ghaffar [2], Alan D. Kaye [3], Omar Viswanath [4,5,6], Ivan Urits [3,7], Andrea G. Boyer [8], Elyse M. Corr and Adam M. Kaye [9]

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Psychiatry

TIC REVIEW   OPEN

rotonin theory of depression: a systematic um of the evidence

rieff[1,2], Ruth E. Cooper[3], Tom Stockmann[4], Simone Amendola[5], Michael P. Hengartner[6] and Ma

) 2022

nin hypothesis of depression is still influential. We aimed to synthesise and evaluate evidence on wh with lowered serotonin concentration or activity in a systematic umbrella review of the principal r ubMed, EMBASE and PsycINFO were searched using terms appropriate to each area of research, fr mber 2020. Systematic reviews, meta-analyses and large data-set analyses in the following areas w nd serotonin metabolite, 5-HIAA, concentrations in body fluids; serotonin 5-HT$_{1A}$ receptor binding; se ls measured by imaging or at post-mortem; tryptophan depletion studies; SERT gene associations nt interactions. Studies of depression associated with physical conditions and specific subtypes of pression) were excluded. Two independent reviewers extracted the data and assessed the quality o AMSTAR-2, an adapted AMSTAR-2, or the STREGA for a large genetic study. The certainty of study r odified version of the GRADE. We did not synthesise results of individual meta-analyses because th g studies. The review was registered with PROSPERO (CRD42020207203). 17 studies were included: 12 analyses, 1 collaborative meta-analysis, 1 meta-analysis of large cohort studies, 1 systematic review genetic association study and 1 umbrella review. Quality of reviews was variable with some gene o meta-analyses of overlapping studies examining the serotonin metabolite, 5-HIAA, showed no as (largest $n = 1002$). One meta-analysis of cohort studies of plasma serotonin showed no relationship ce that lowered serotonin concentration was associated with antidepressant use ($n = 1869$). Two r g studies examining the 5-HT$_{1A}$ receptor (largest $n = 561$), and three meta-analyses of overlapping ng (largest $n = 1845$) showed weak and inconsistent evidence of reduced binding in some areas, w with increased synaptic availability of serotonin in people with depression, if this was the original, ffects of prior antidepressant use were not reliably excluded. One meta-analysis of tryptophan depl n most healthy volunteers ($n = 566$), but weak evidence of an effect in those with a family history of stematic review ($n = 342$) and a sample of ten subsequent studies ($n = 407$) found no effect in volunt ryptophan depletion studies has been performed since 2007. The two largest and highest quality s genetic association study ($n = 115,257$) and one collaborative meta-analysis ($n = 43,165$), revealed with depression, or of an interaction between genotype, stress and depression. The main areas of consistent evidence of there being an association between serotonin and depression, and no suppor sion is caused by lowered serotonin activity or concentrations. Some evidence was consistent with antidepressant use reduces serotonin concentration.

Not everything in healthcare is crystal clear

Human mind is a Black Box

5) The lack of human specifics

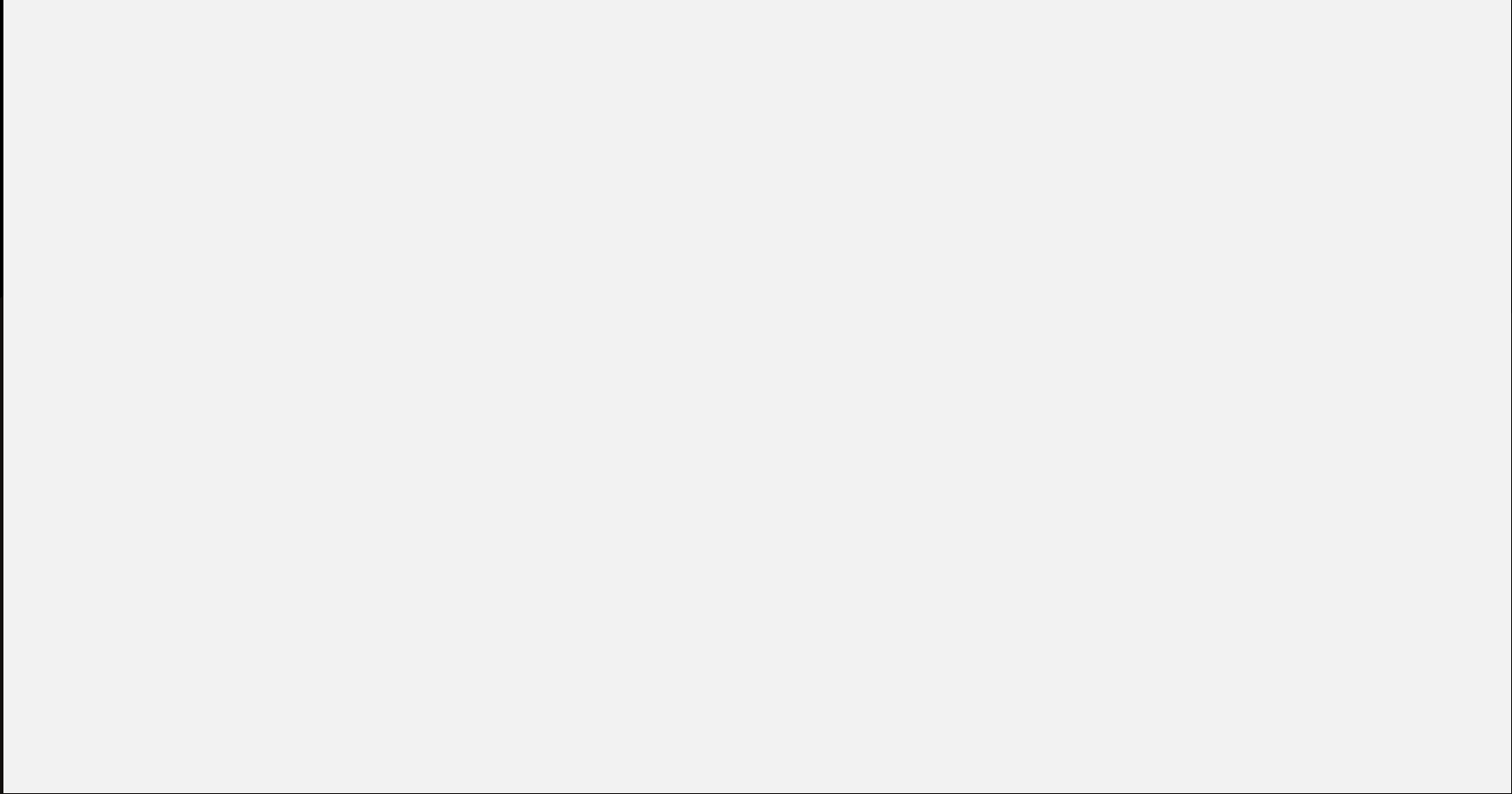Thinking out of the box

If - Then

Ability to operate in (un)predictable scenarios

AI is better at dealing with a predictable world

Intuiton

- Marques, C.S., Lopes, C., Braga, V., Ratten, V. and Santos, G., 2022. Intuition and rationality in intrapreneurship and innovation outputs: The case of health professionals in primary health care. *International Entrepreneurship and Management Journal*, *18*(2), pp.579-602.

- Pearson, H., 2013. Science and intuition: do both have a place in clinical decision making?. *British Journal of Nursing*, *22*(4), pp.212-215.

Empathy (Emotional Intelligence)

Strong AI

ntuition is the N
al Intelligence

human intervention and allow mach

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t is generative AI, and
ace human creativ

The Future of AI: Artificial Empathy

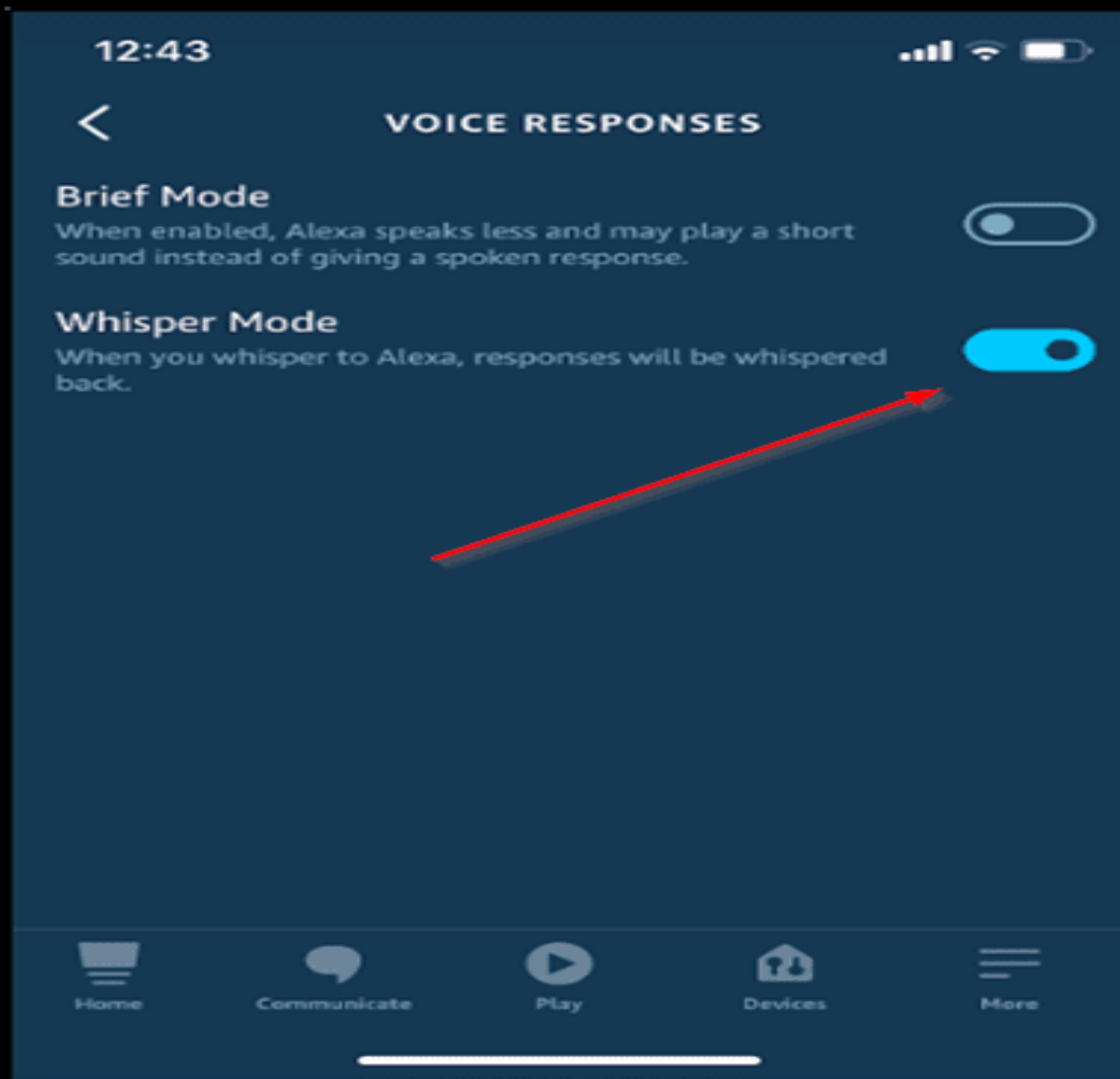Neurotech@Berkeley · Follow

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Still about empathy...

Substitution or... collaboration?

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