

UIMP 2024. ENCUENTRO ISCIII

Avanzando en conocimiento para una sociedad más saludable. Encuentro de la Alianza de Institutos de Investigación Sanitaria y el Comité de Bioética de España. Nuevo marco normativo europeo de IA: Impacto en investigación.

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CIBERSAM G04

Qué es la Inteligencia Artificial

La IA es una colección de tecnologías que combina **datos, algoritmos** y potencia **computacional**

La IA tiene como objetivo crear sistemas que exhiban un comportamiento inteligente y que puedan **aprender, explicar y asesorar** a sus usuarios

Campo de estudio que tiene como objetivo permitir que las máquinas perciban su entorno y actúen **racionalmente sobre la información procesada**

INTELIGENCIA ARTIFICIAL

Programas con la habilidad de aprender y razonar como humano

MACHINE LEARNING

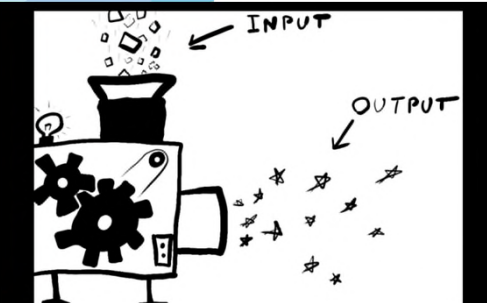
Algoritmos con capacidad para aprender

DEEP LEARNING

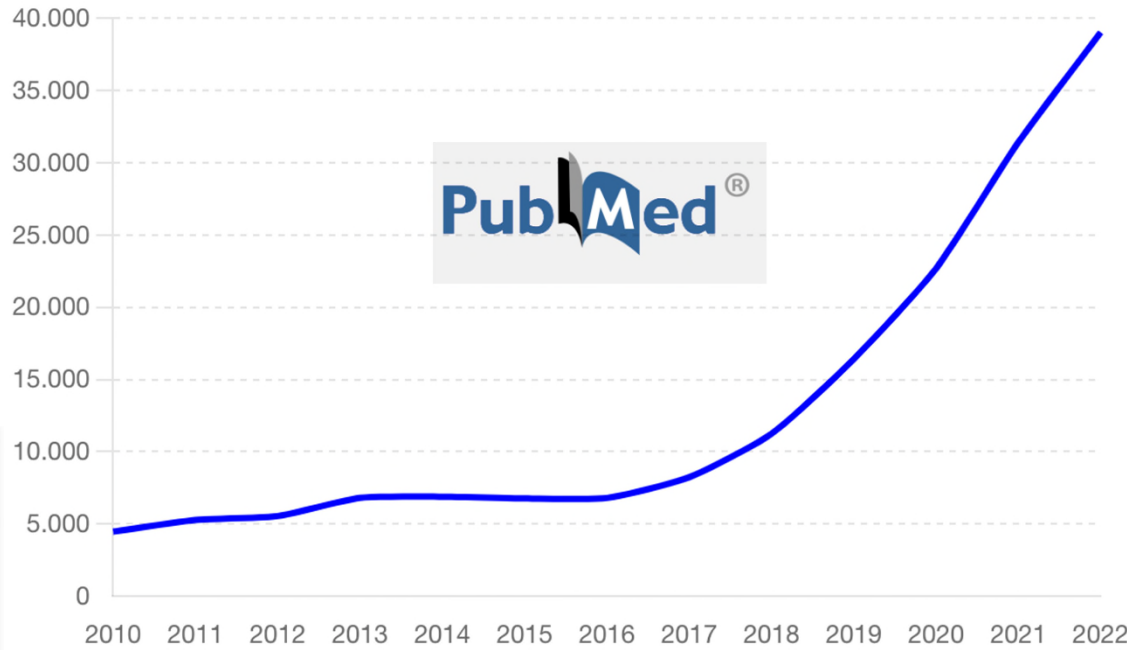
Subtipo de machine learning en el que redes neuronales artificiales se adaptan y aprenden a través de cantidades enormes de datos

IA GENERATIVA

Crea nuevo contenido



Chat GPT, EU White paper 2021, Hauser 2022, Jin 2023



Science

\$15
22 DECEMBER 2023
science.org

AAAS

AI-POWERED FORECASTING

Predicting worldwide weather
and cyclone tracks with greater speed
and accuracy p. 1416

Diagnosticar
Tratar
Monitorizar



Multimodal
Personalizada

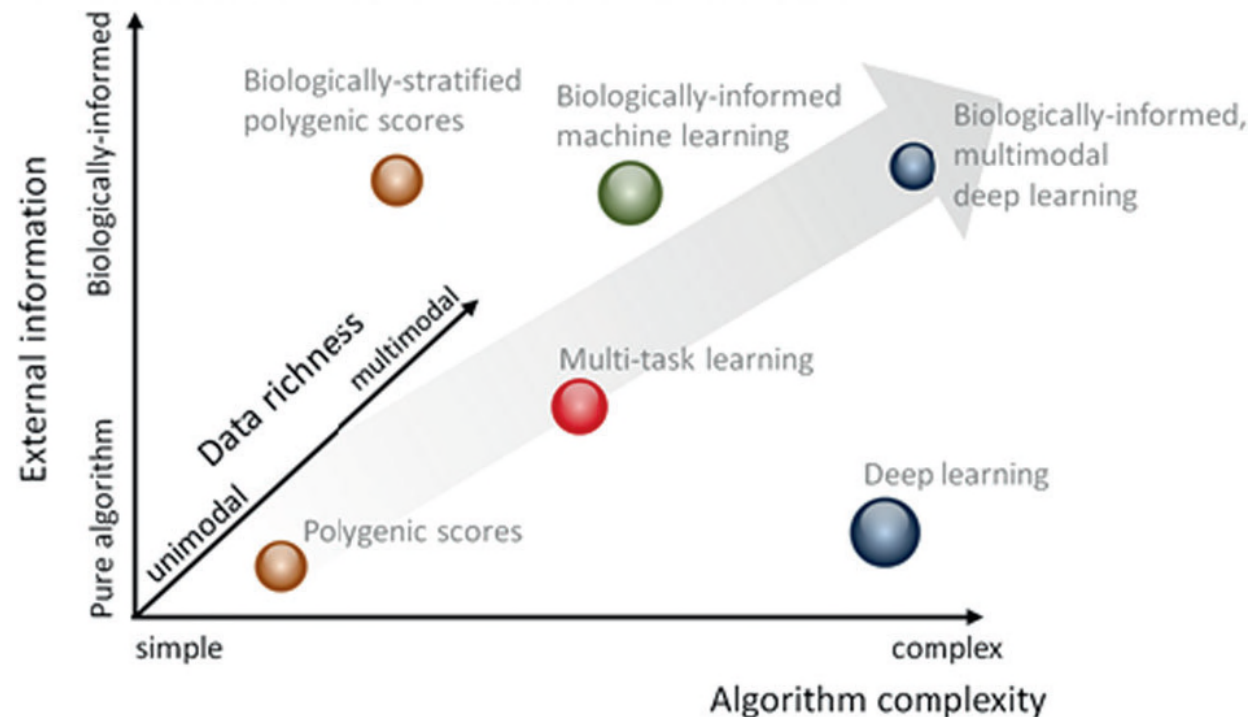
Medical forecasting

ERIC J. TOPOL  [Authors Info & Affiliations](#)

SCIENCE • 23 May 2024 • Vol 384, Issue 6698 • DOI: 10.1126/science.adp7977

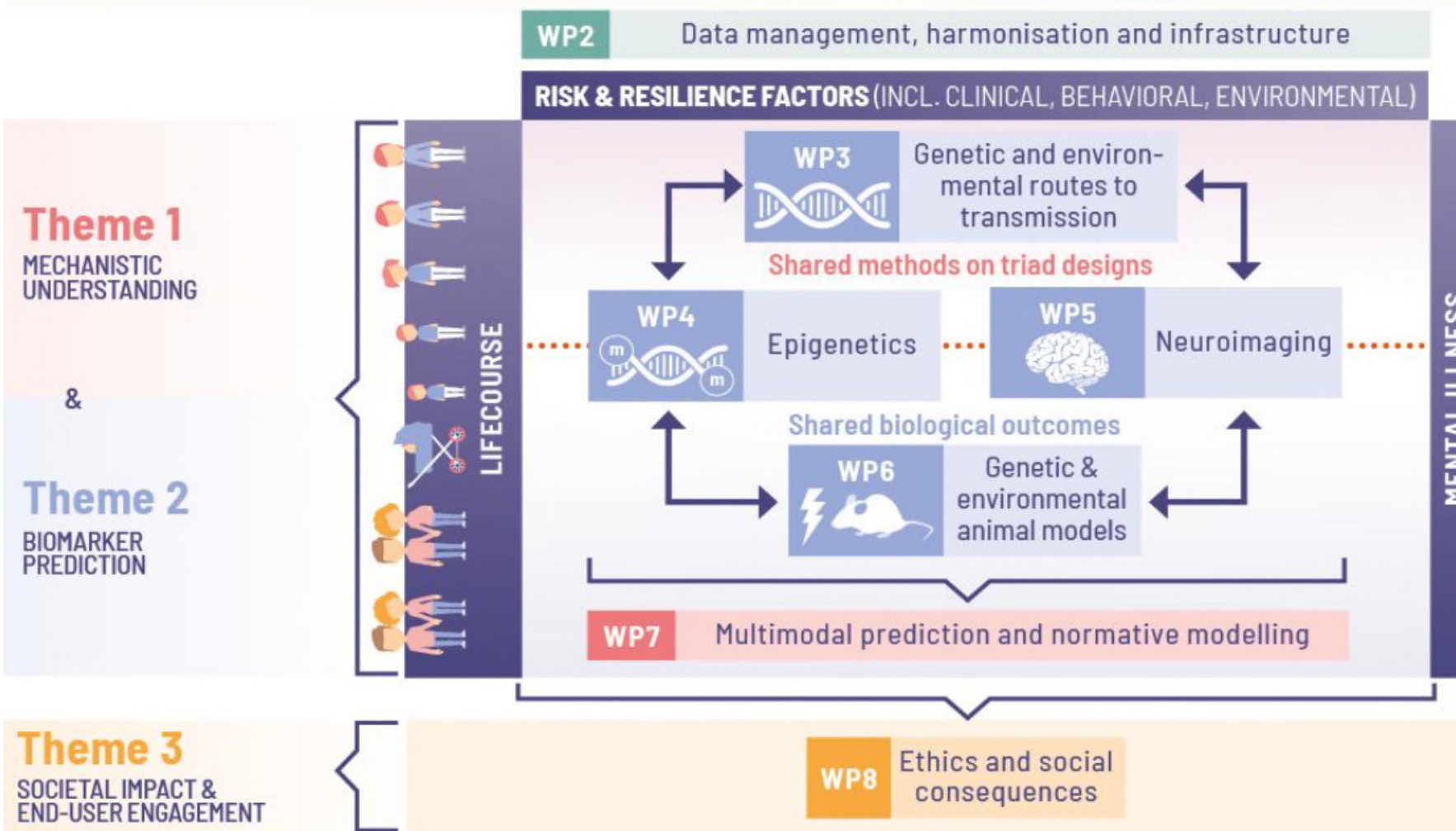
Taking lessons from the major progress in AI-powered weather forecasting, which affects our daily lives, there is now an opportunity to greatly sharpen medical forecasting at the individual level to improve long-term health outcomes. All those big, rich data for each individual are being left on the table, unintegrated, not analyzed.

Harnessing intensive computing resources and performing large-scale prospective validation studies can get us to where we should be for identifying people at high risk for major diseases, arming them with ways to preempt or mitigate their occurrence.



IA en salud mental: investigación

INTERGENERATIONAL TRANSMISSION OF RISK OF MENTAL ILLNESS



WP7 STAGE 1: Create multimodal variables	Cohorts UK Biobank ABCD
OTHER WPs: Screen & interpret multimodal/multilevel variables	UK Biobank ABCD Generation R ORACLE COPSAC ALSPAC MoBa MCS High Risk Cohorts
WP7 STAGE 2: Apply and predict	Generation R HCP PNC High Risk Cohorts

MORE INFO?
family-project.eu



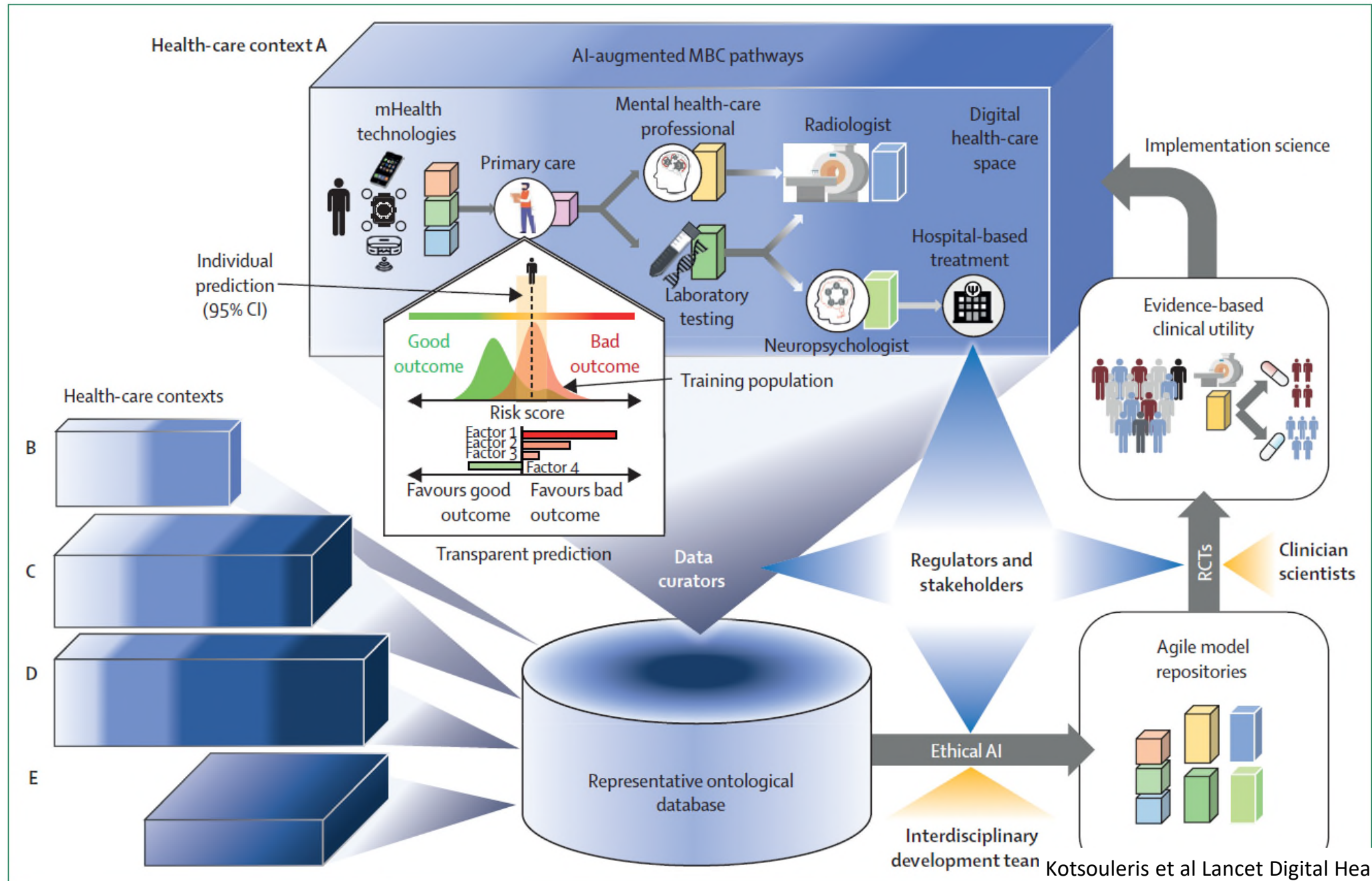
PARTNERS



“Predecir riesgo de padecer un trastorno de salud mental”

The FAMILY consortium is a five-year interdisciplinary, multi-site project, involving 16 partners from Europe and the US.

IA en salud mental: modelo de traslado a la clínica



SPECIAL REPORT

Jeffrey M. Drazen, M.D., *Editor*;
Isaac S. Kohane, M.D., Ph.D., and Tze-Yun Leong, Ph.D., *Guest Editors*

AI IN MEDICINE

Benefits, Limits, and Risks of GPT-4 as an AI Chatbot for Medicine

Paciente:

Diagnóstico y tratamiento, 2a opinión

Abordar temas sensibles

No limitación de tiempo, menos errores

Profesional sanitario:

“Curbside consult”

Benchmarking con 12 médicos: acuerdo, capacidad
para expresar dudas al mismo nivel

Rendimiento en MIR (Redacción médica 2023)/ USMLE

Resumen / notas clínicas a partir de entrevista

Clinician: I have a patient with a history of chronic obstructive pulmonary disease (COPD) who is experiencing shortness of breath. What should I be looking for to determine whether this patient is having an exacerbation?

GPT-4: As a health care provider, when evaluating a patient with a history of COPD who presents with shortness of breath, you should be looking for signs and symptoms of an exacerbation. An exacerbation of COPD is defined as an acute worsening of respiratory symptoms beyond the patient's usual day-to-day variation and is typically characterized by increased cough, increased sputum production, and increased dyspnea.

Some of the key clinical features that suggest an exacerbation of COPD include:

1. Increased shortness of breath, cough, and sputum production.
2. Increased wheezing, chest tightness, and chest discomfort.
3. Changes in the color, amount, and thickness of the sputum.
4. Increased use of rescue medication, such as short-acting bronchodilators.
5. Fatigue, confusion, or altered mental status.
6. Cyanosis, a bluish discoloration of the skin or lips, due to inadequate oxygenation.

It is important to note that other medical conditions can mimic an exacerbation of COPD, such as congestive heart failure or pulmonary embolism. Therefore, it is essential to perform a thorough evaluation, including a detailed history, physical examination, and diagnostic testing, to confirm the diagnosis and identify any potential underlying causes.

Prompt recognition and appropriate management of COPD exacerbations are critical to minimizing their impact on the patient's quality of life and overall prognosis. If you suspect that your patient is having an exacerbation, you should consult with a pulmonologist or respiratory therapist to develop an appropriate treatment plan, which may include oxygen therapy, inhaled bronchodilators and corticosteroids, and antibiotics for suspected bacterial infections.

Figure 4. An Example “Curbside Consult” Interaction with GPT-4.

DrugGPT: new AI tool could help doctors prescribe medicine in England

The Guardian

Sun 31 Mar 2024 10:00
CEST

New tool may offer prescription 'safety net' and reduce the 237m medication errors made each year in England

Does AI Help or Hurt Human Radiologists' Performance? It Depends on the Doctor



HARVARD
MEDICAL SCHOOL

March 19, 2024

IA generativa en investigación

- Limpieza y refinar bases de datos
- Gestión de referencias bibliográficas
- Análisis estadístico
- Generación de gráficos y figuras
- Revisión por pares

Perspective

Artificial intelligence and illusions of understanding in scientific research

<https://doi.org/10.1038/s41586-024-07146-0>

Lisa Messeri^{1,4,5} & M. J. Crockett^{2,3,4,5}

Received: 31 July 2023

Accepted: 31 January 2024

Published online: 6 March 2024

Check for updates

Scientists are enthusiastically imagining ways in which artificial intelligence might improve research. Why are AI tools so attractive and what is implementing them across the research pipeline? Here we develop scientists' visions for AI, observing that their appeal comes from p

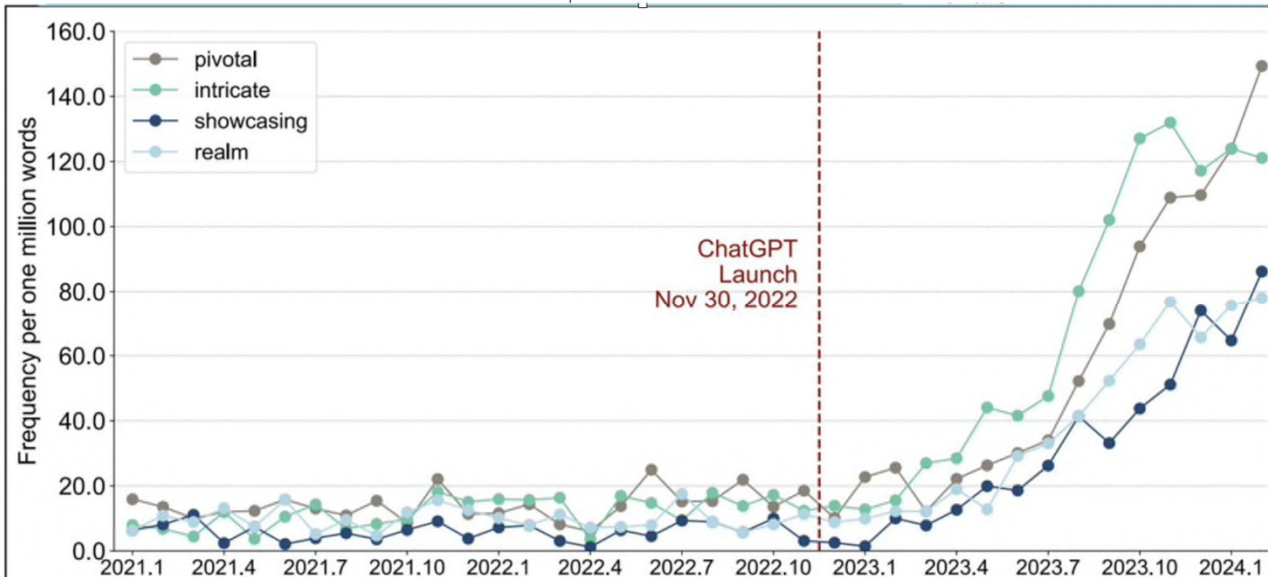


Table 1 | Visions of AI across the research pipeline

Vision	Research stage	Limits to overcome	Vision
AI as Oracle	Study design	There is too much literature to digest; scientific publications vary in quality; readers are biased; too many research paths to choose from	Tools that objectively and efficiently search, evaluate and summarize scientific literature and generate new hypotheses
AI as Surrogate	Data collection	Data are too difficult, time consuming or expensive to obtain	Tools that accurately and tractably generate surrogate data points from natural complex systems, including human participants
AI as Quant	Data analysis	Data are too large or complex to curate and analyse	Tools that surpass the limits of human intellect in curating and analysing vast and complex datasets to produce new knowledge
AI as Arbiter	Peer review	There are too many papers and proposals to review; reviewers are biased	Tools that objectively and efficiently evaluate scientific merit and the replicability of findings

<https://doi.org/10.1038/s41551-024-01228-0>

The advent of human-assisted peer review by AI

The Internet didn't disrupt academic publishing. Audiovisual generative AI might do.

thoroughness, language clarity and presentation of the data and visuals. You also know that the expert AI agents will consistently find the sort of inadequacies in the work that most scientists working in the same research area

How peer review is disrupted by AI. Today are asynchronous steps, they can be t

entrants quickly adapting to take advantage of the eyes, ears and mouths of AI?

Published online: 12 June 2024

References

1. Liang, W. et al. Preprint at <https://arxiv.org/abs/2406.01228>

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Riesgos y errores asociados a IA

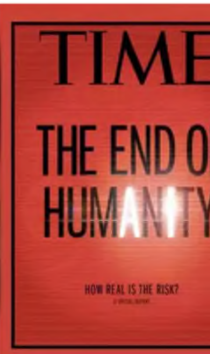
CHATGPT LISTED AS AUTHOR ON RESEARCH PAPERS

Many scientists disapprove of articles crediting the AI tool as a co-author.

620 | Nature | Vol 613 | 26 January 2023

The Guardian

Real news v fake news: Is AI a threat to democracy?



Ético
Legal
Social
Economic

DATOS

MODELOS

USO

The New York Times
YouTube, the Great Radicalizer

Incompletos
Asimétricos
Muestra no representativa
Confidencialidad

Amplificación sesgos
Falta de transparencia
Hallucinations
Emergent capabilities

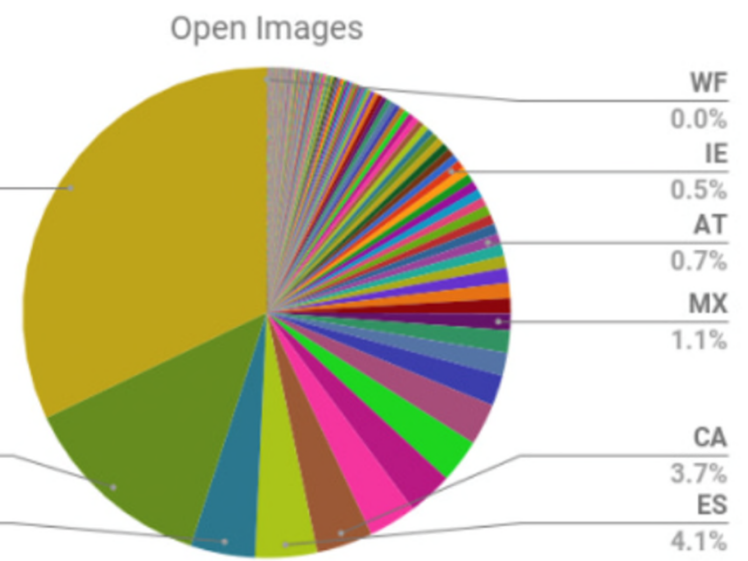
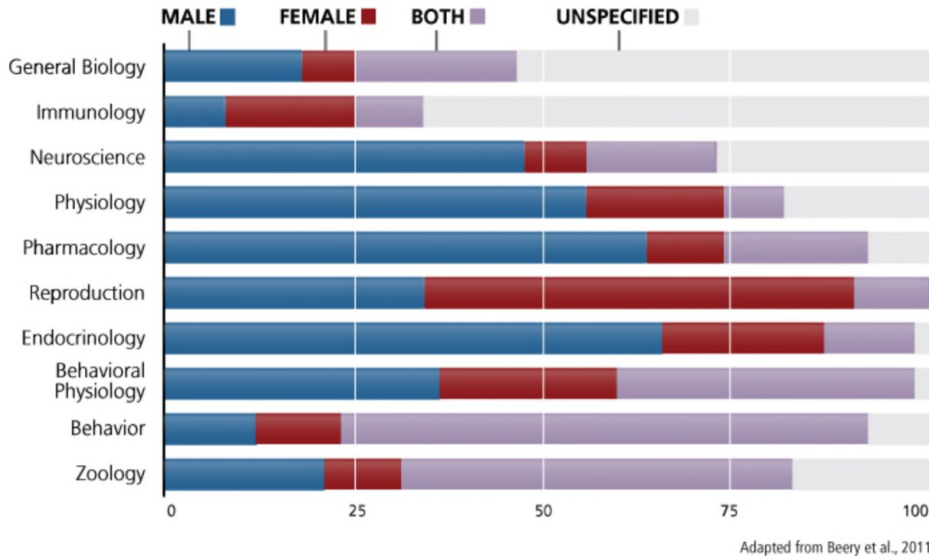
Confusión ciudadana
Plagio
Perjuicios

Sesgos asociados a IA

The unseen Black faces of AI algorithms

An audit of commercial facial-analysis tools found that dark-skinned faces are misclassified at a much higher rate than are faces from any other group. Four years on, the study is shaping research, regulation and commercial practices.

Proportion of Research Studies Using Male and/or Female Animals
From published journal articles within specified biomedical subfield, 2009



Investigación e Innovación Responsable (RRI)

Ser preciso en el uso de los términos sexo y género. Es indispensable informar sobre el sexo/género de las y los casos a estudio, sean humanos, animales, tejidos o células.

Objetivar el sexo/género en el diseño del estudio y recogida de datos

Estimar el tamaño muestral para el análisis de sexo/género.

Exponer los tamaños de efecto y distribuciones en gráficas de dispersión.

Obviar interpretaciones erróneas



Reflexionar sobre el abordaje de sexo/género en investigaciones anteriores, y sobre el interés de abordarlo en el presente estudio.

Garantizar proporciones adecuadas para cada categoría de sexo/género

Notificar los datos crudos por sexo/género en Resultados y Material suplementario o en un depósito de datos accesible.

Reportar tanto los resultados positivos como negativos cuando se llevan a cabo análisis diferenciados por sexo/género.

Subrayar si los resultados son generalizables en las diferentes categorías de sexo/género en la Discusión.



FACTSHEET | 20 March 2024

Living guidelines on the RESPONSIBLE USE OF GENERATIVE AI IN RESEARCH

https://unesdoc.unesco.org/ark:/48223/pf0000381137_spa

https://unite.un.org/sites/unite.un.org/files/unite_paper_-_ethical_ai_at_the_un.pdf

https://research-and-innovation.ec.europa.eu/document/edc8027b-2811-4347-82f4-fa8b29ece534_en

Sugranyes et al., 2023



Ley Europea de Inteligencia Artificial

AI standards for the AI Act



The **purpose of the AIA** is set out in **Article 1** →

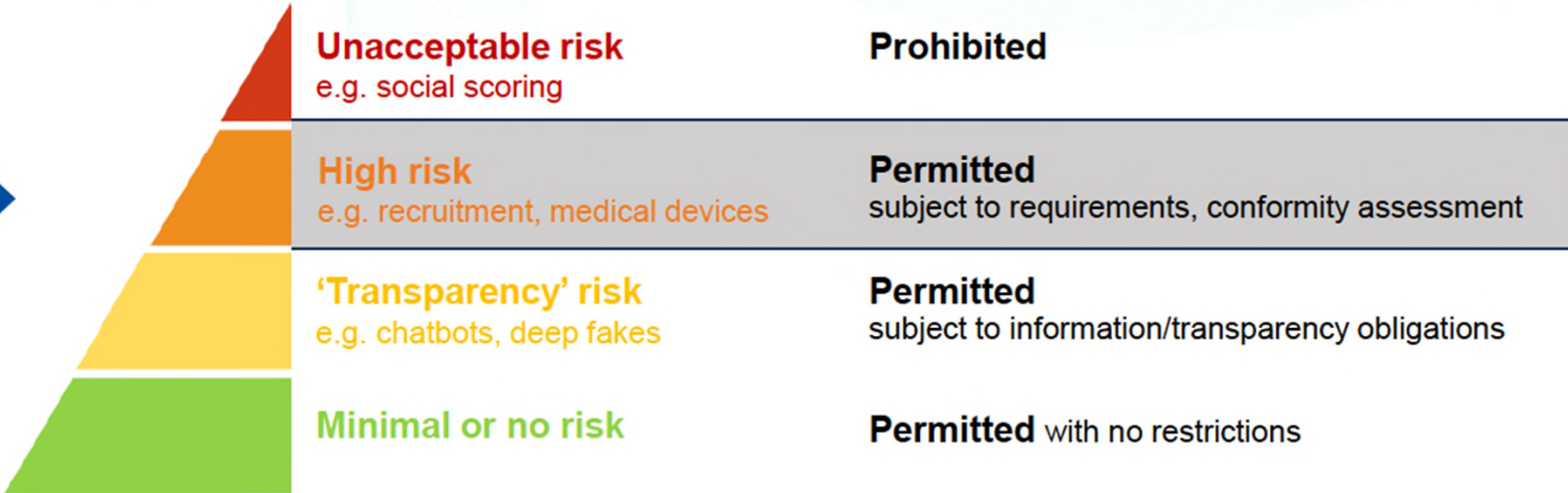
“ensuring a **high level of protection of health, safety, fundamental rights** enshrined in the Charter of FR, including democracy, the rule of law and environmental protection, **against the harmful effects of the AI systems** in the Union”

Ley de Inteligencia Artificial



General-purpose AI models | AI systems – risk classification

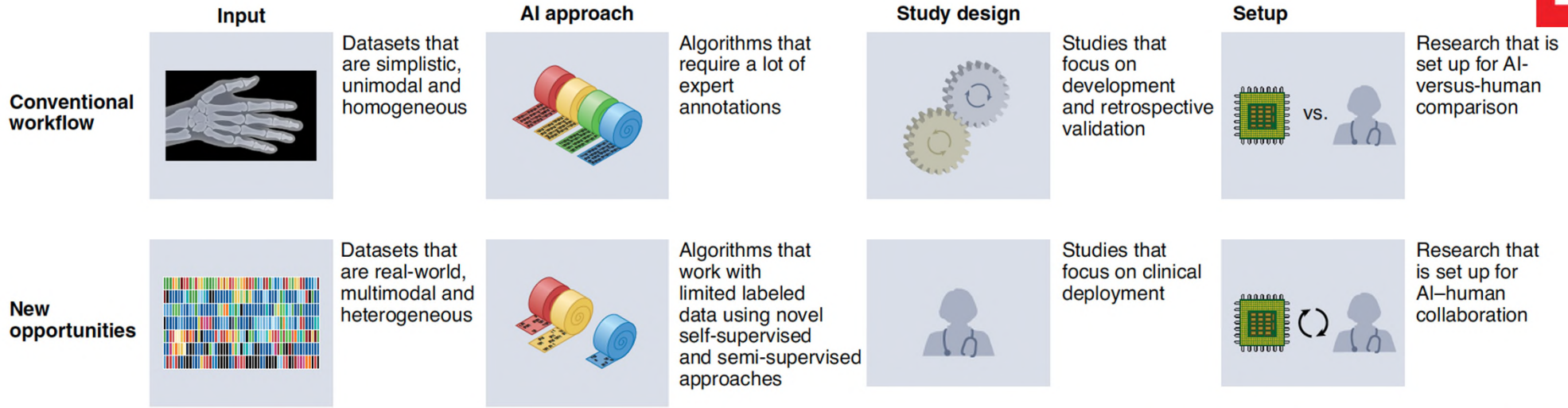
- Transparency rules for all models
- Risk management in case of systemic risk



Mandatory Requirements for all high-risk AI system before they can be used and strong system of enforcement and post-market monitoring

Reflexiones

- Responsabilidad a lo largo de todo el flujo de obtención, análisis y uso de datos
- Representatividad no solo en datos y algoritmos - también en los equipos
- Uso de la IA generativa en nuestro ámbito: asistencia, academia
- Formación en "salud digital / IA" currículum docente
- *La IA no regulada genera más desigualdades.* Ley EU de IA aborda riesgos en salud, seguridad y derechos fundamentales



The AI will only be as good as the data it is trained with.

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