

Presente y Futuro de la IA en Salud

Pedro Larrañaga

Universidad Politécnica de Madrid



Red Temática sobre Inteligencia Artificial en Biomedicina (RED2018-102312-T)

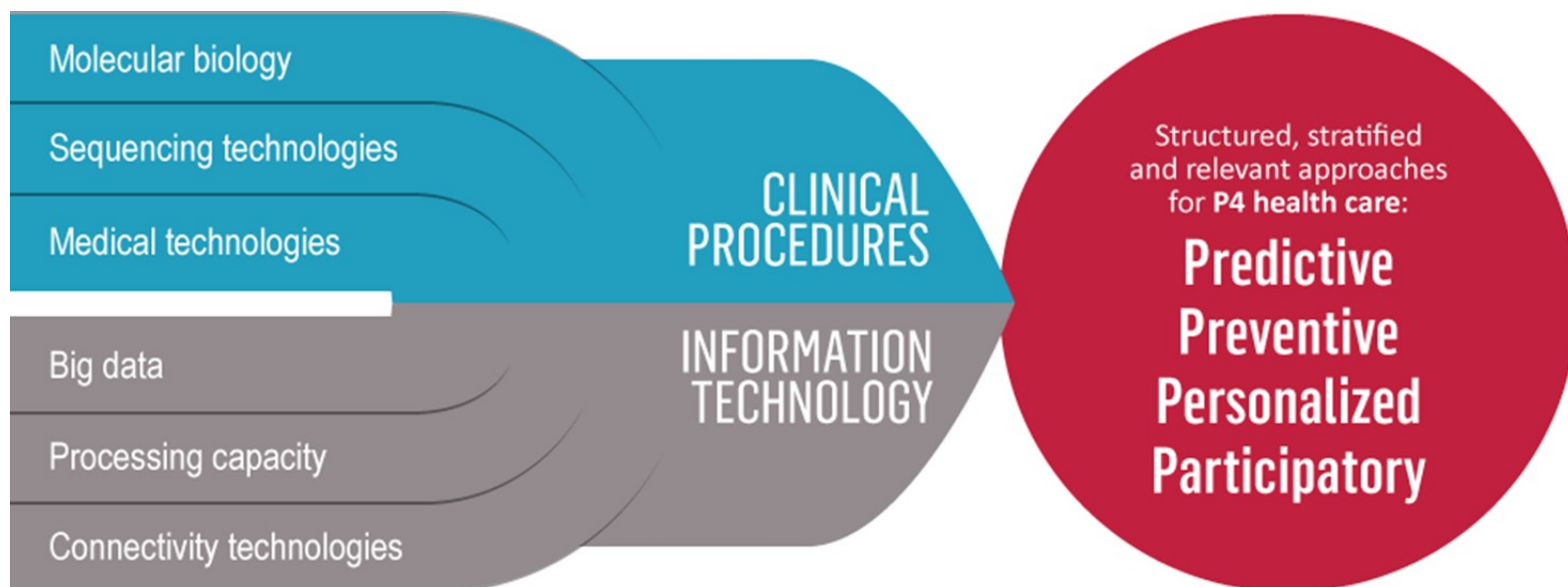
<https://iabiomed.es>

- **Grupos de investigación:** Universidad de Murcia, UPV-EHU, Universitat Rovira i Virgili, UPM, UNED, Universitat de Girona, UPC, Universitat Jaume I, Universidade da Coruña, Universidad de Oviedo
- **Objetivos:** colaboración, sinergias, retos, formación, visibilidad, transferencia de conocimiento
- **Técnicas de IA en Biomedicina:** aprendizaje automático, computación evolutiva, ingeniería del conocimiento, lógica difusa, minería de datos, minería de procesos, modelos gráficos probabilistas, ontologías, procesamiento del lenguaje natural, razonamiento basado en casos, razonamiento temporal, representación del conocimiento y sistemas de apoyo a la decisión
- **Artificial Intelligence in Medicine in Europe (AIME):** 1985. Program Chair. Local Organisation. Tutorials. Best Paper
- **Conferencia Española de Inteligencia Artificial:** Workshops de Grupos de Investigación Españoles de IA en Biomedica (2018, 2021)

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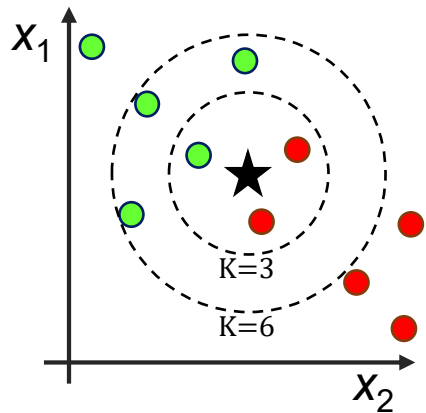
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Inteligencia Artificial en Salud

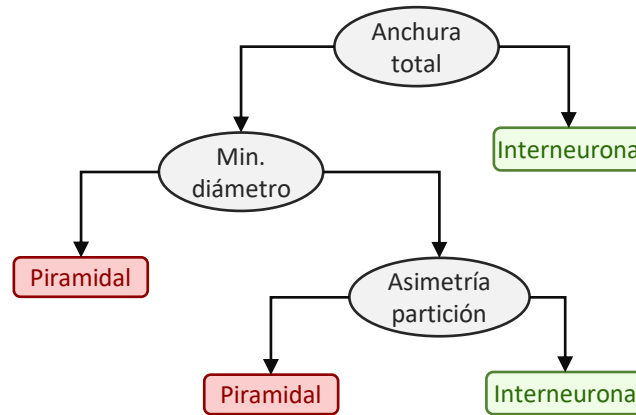


Clasificación supervisada

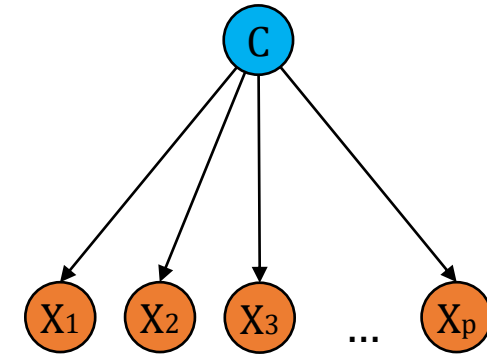
K vecinos más cercanos



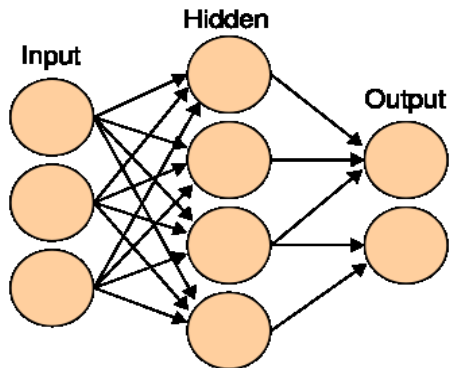
Árboles de clasificación



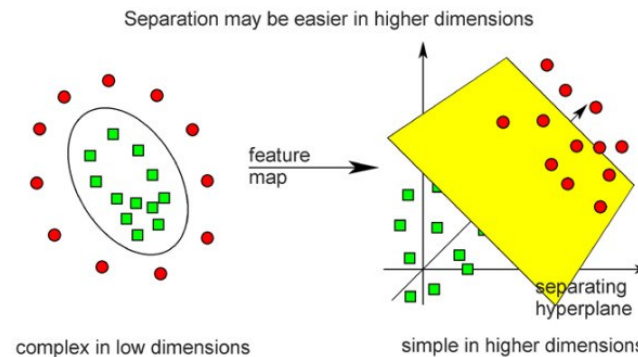
Naïve Bayes



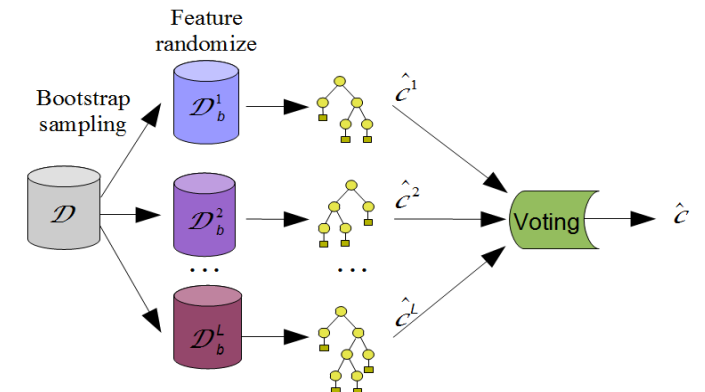
Redes neuronales artificiales



Máquinas de vectores soporte

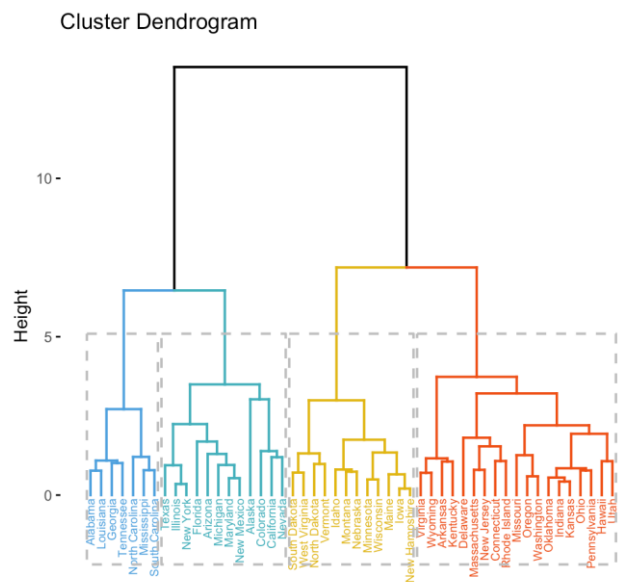


Bosque aleatorio

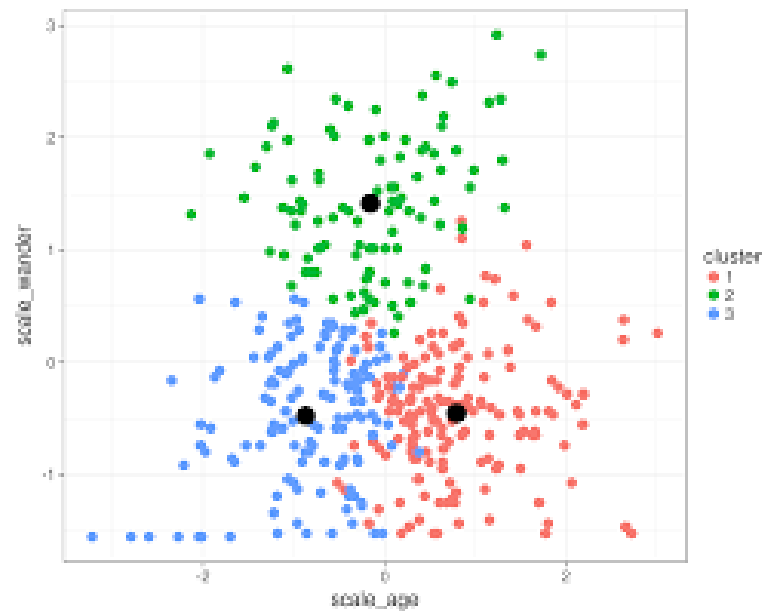


Clustering

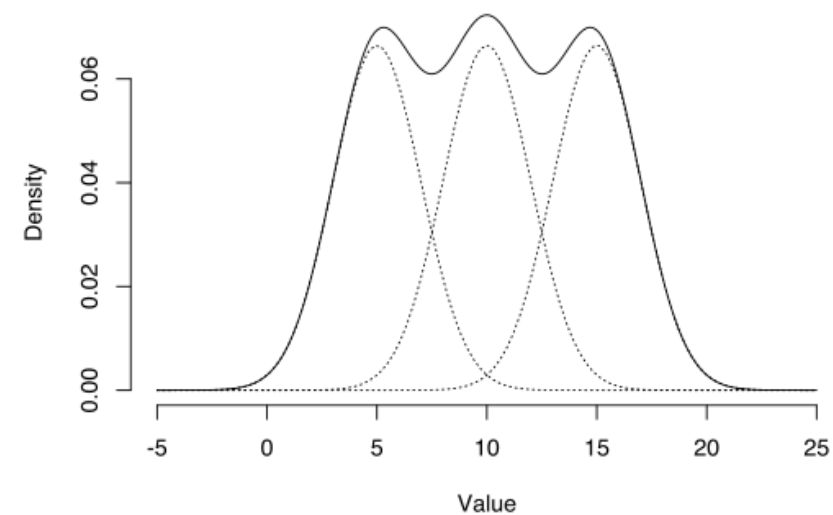
Clustering jerárquico



Clustering particional. K medias



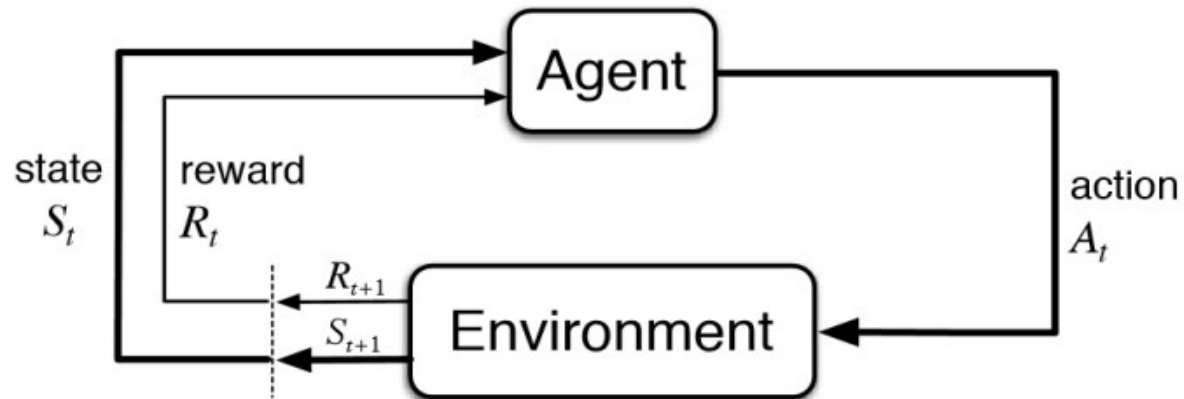
Clustering probabilista. Algoritmo EM



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Aprendizaje por refuerzo

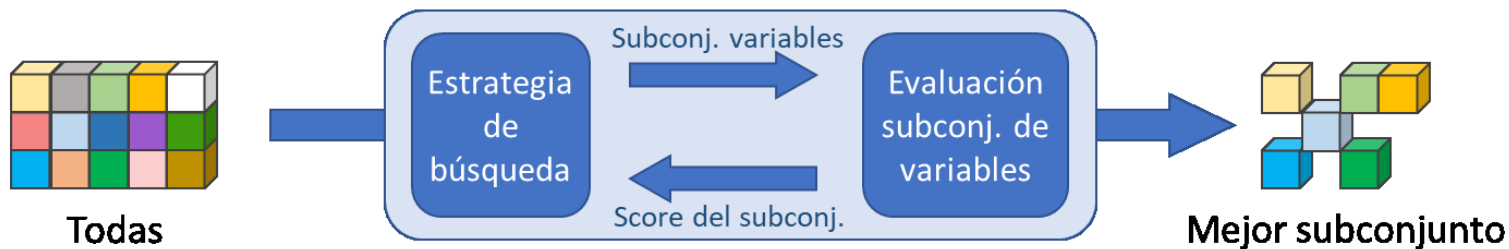


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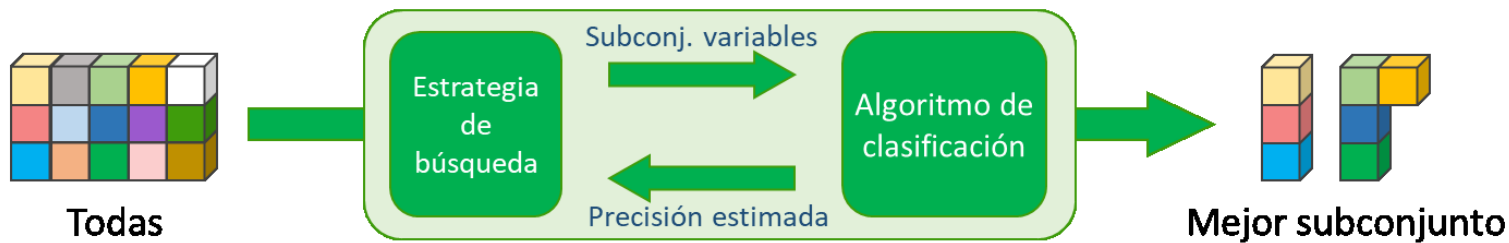
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Selección de variables

Filtrado



Envoltura

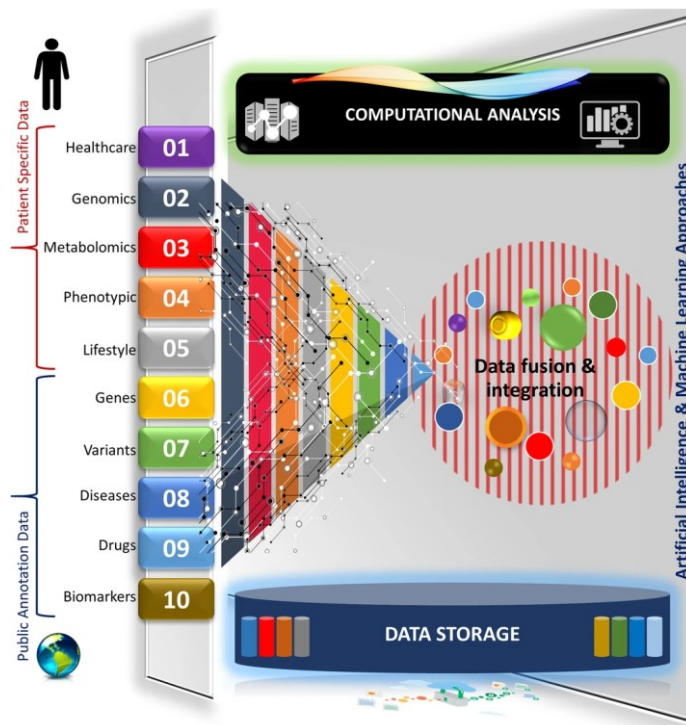


Algunos aspectos especiales en salud

Monitorización. Flujo de datos. Temporalidad



Fusión de datos heterogéneos



Diagnóstico como inferencia abductiva

La búsqueda de la explicación mas probable

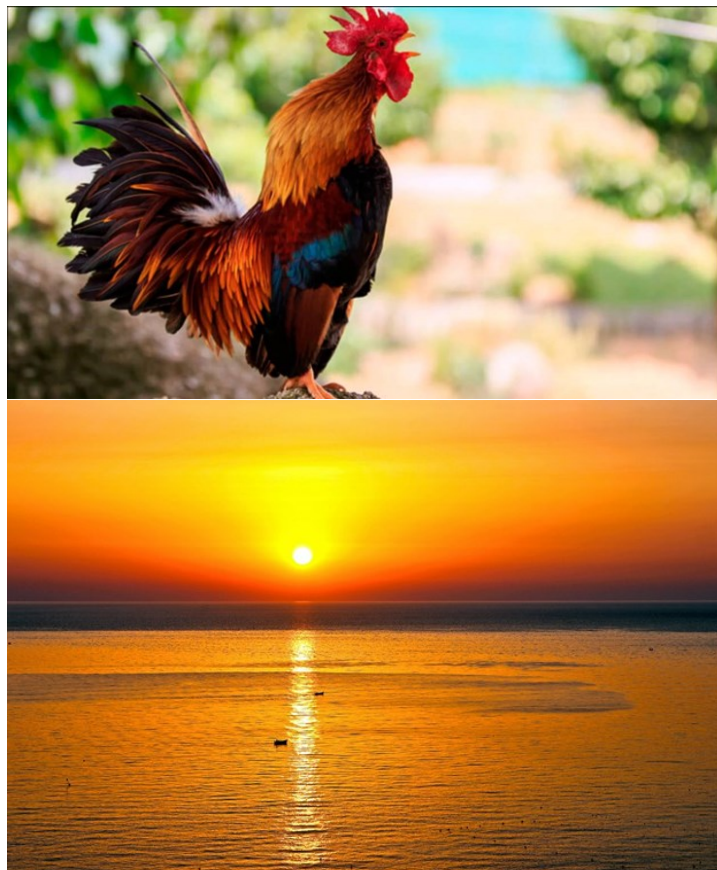
$$(e_1^*, \dots, e_d^*) = \arg \max_{(e_1, \dots, e_d)} p(E_1 = e_1, \dots, E_d = e_d | S_1 = s_1, \dots, S_n = s_n)$$

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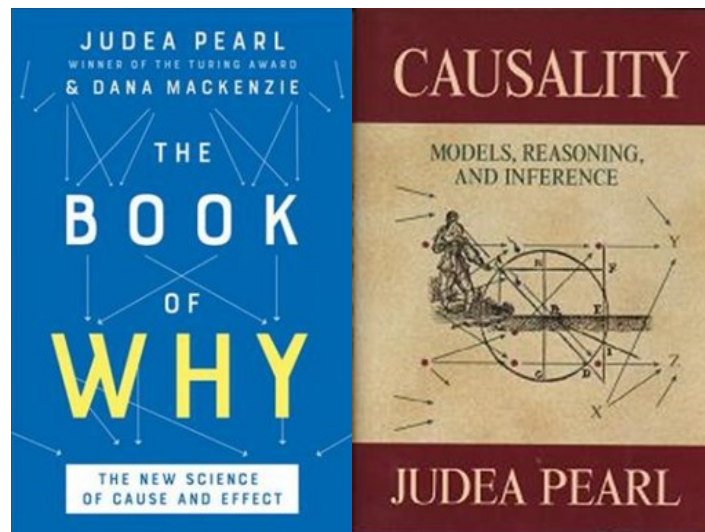
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Algunos aspectos especiales en salud

Correlación



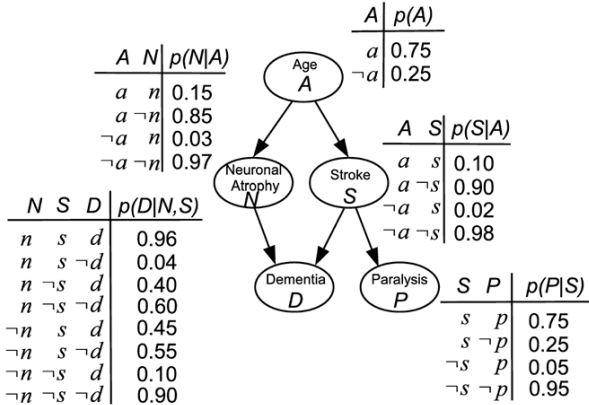
Causalidad



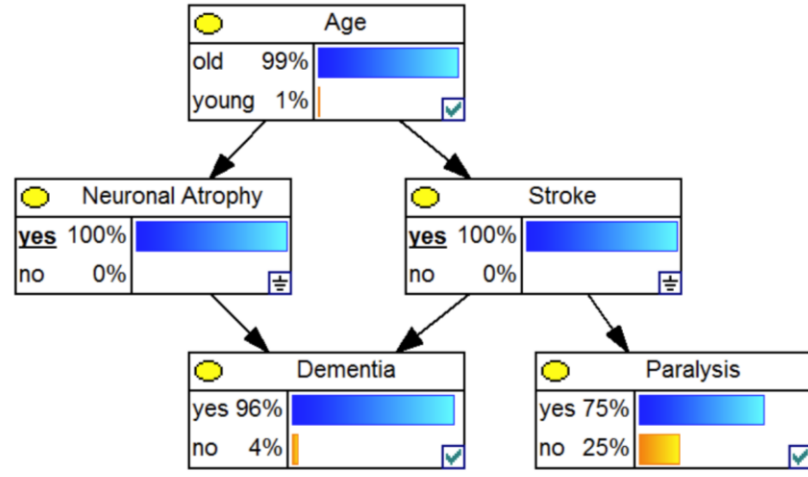
Razonamiento contrafactual



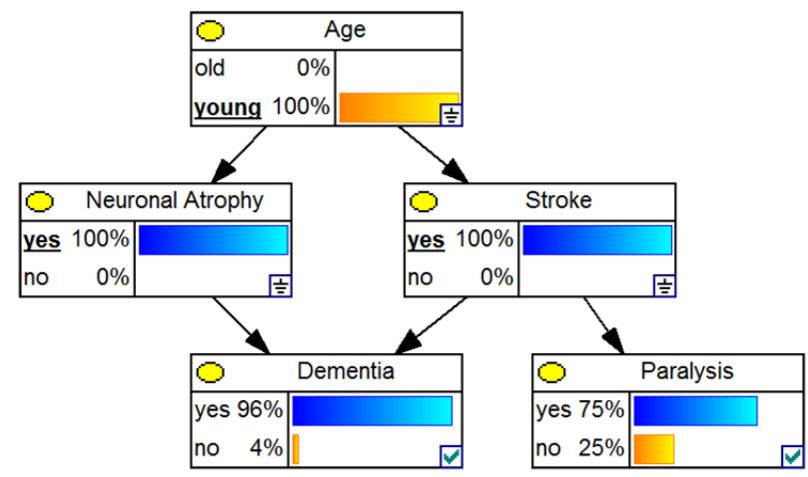
XAI versus IA interpretable



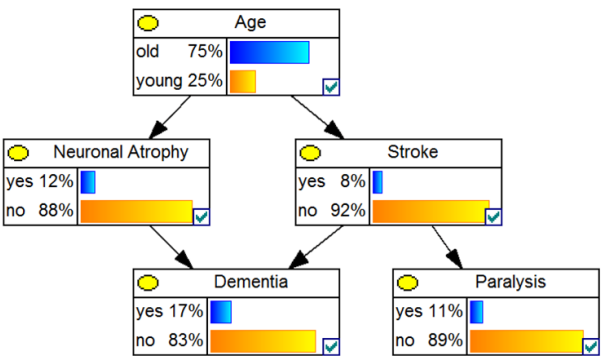
$$p(A, N, S, D, P) = p(A)p(N|A)p(S|A)p(D|N, S)p(P|S)$$



Evidence: "Stroke = yes, Neuronal Atrophy=yes"



Evidence: "Stroke = yes, Neuronal Atrophy=yes, Age= young"



No evidence



XXIV Congreso Nacional de Informática de la Salud

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Formación

Artificial Intelligence in Healthcare

STANFORD SCHOOL OF MEDICINE

Professional Program

Fee: Fee may apply



Overview

Artificial intelligence (AI) has transformed industries around the world, and has the potential to radically alter the field of healthcare. Imagine being able to analyze data on patient visits to the clinic, medications prescribed, lab tests, and procedures performed, as well as data outside the health system -- such as social media, purchases made using credit cards, census records, Internet search activity logs that contain valuable health information, and you'll get a sense of how AI could transform patient care and diagnoses.

Courses

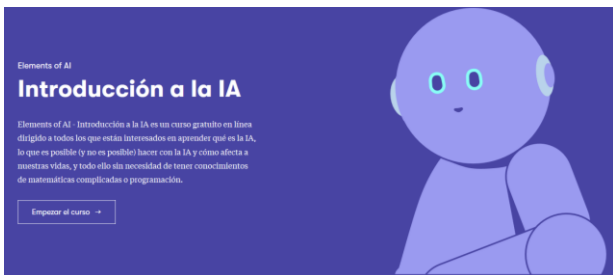
Introduction to Healthcare
SOM-XCHE008
Online, Coursera - [Open For Enrollment](#)

Introduction to Clinical Data
SOM-XCHE009
Online, Coursera - [Open For Enrollment](#)

Fundamentals of Machine Learning for Healthcare
SOM-XCHE010
Online, Coursera - [Open For Enrollment](#)

Evaluations of AI Applications in Healthcare
SOM-XCHE011
Online, Coursera - [Open For Enrollment](#)

AI in Healthcare Capstone
SOM-XCHE012
Online, Coursera - [Open For Enrollment](#)



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Ética. Regulación

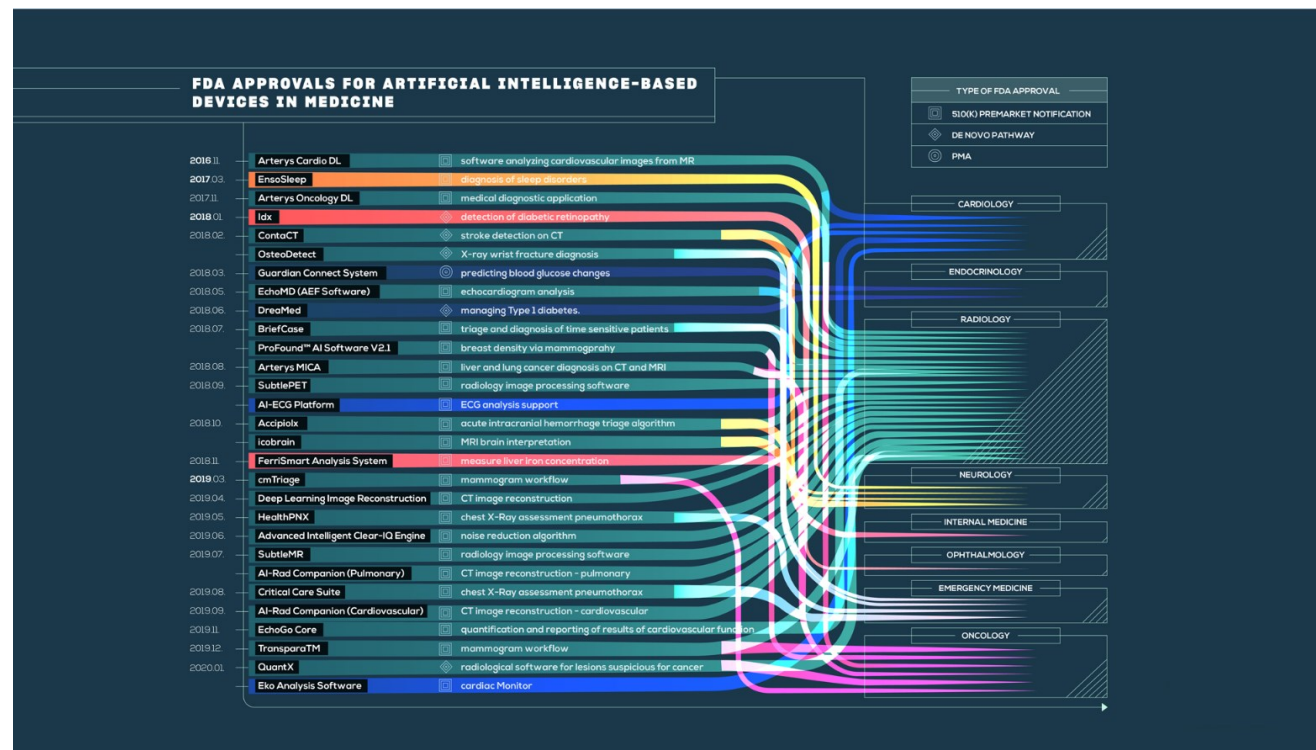


ARTICLE OPEN

Check for updates

The state of artificial intelligence-based FDA-approved medical devices and algorithms: an online database

Stan Benjamins^{1,2}, Pranavsinh Dhunoo³ and Bertalan Meskó^{3,4}*



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La IA va a permitir a los médicos desarrollar una medicina mas humana

REVIEW ARTICLE | FOCUS

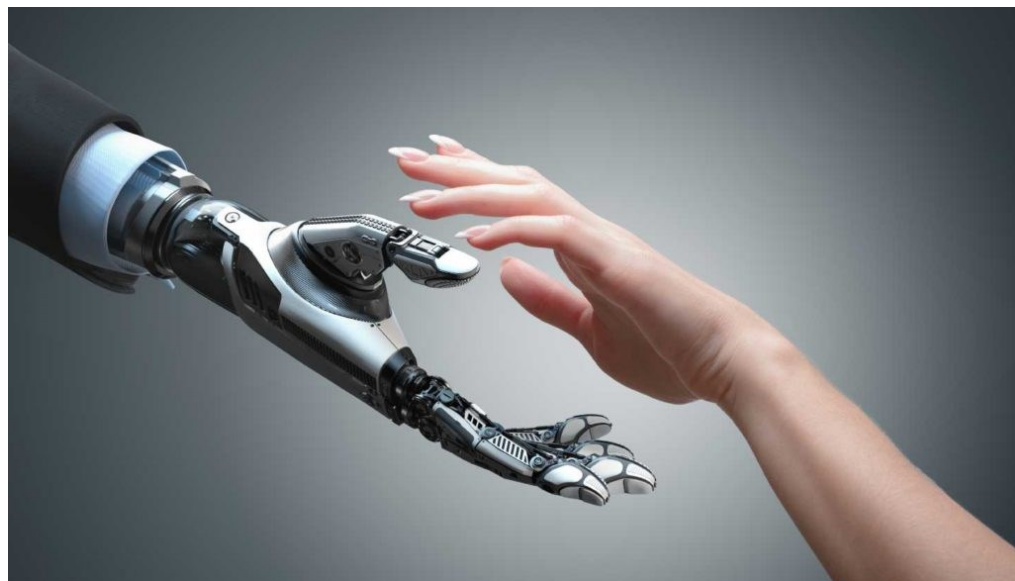
<https://doi.org/10.1038/s41591-018-0300-7>

nature
medicine

High-performance medicine: the convergence of human and artificial intelligence

Eric J. Topol 

NATURE MEDICINE | VOL 25 | JANUARY 2019 | 44-56 | www.nature.com/naturemedicine



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