

Artificial Intelligence and data driven decision making in anal dysplasia

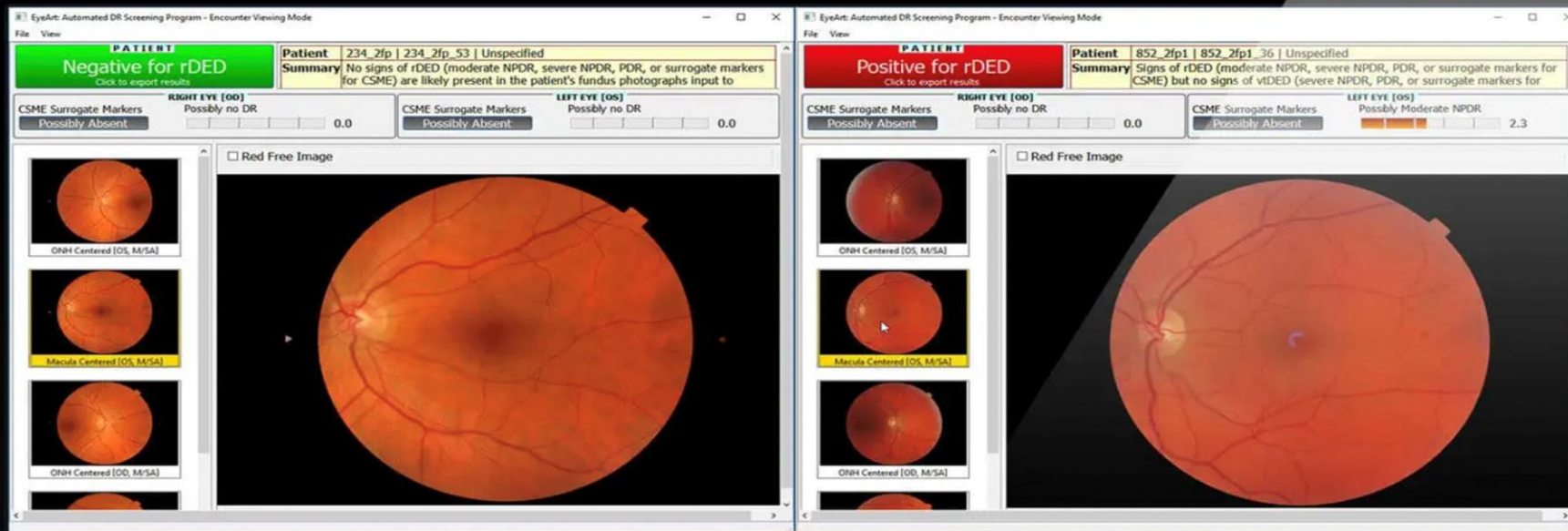
Dra. Anna Sala M.D, Ph.D
Head of Innovation in Vall d'Hebron Hospital





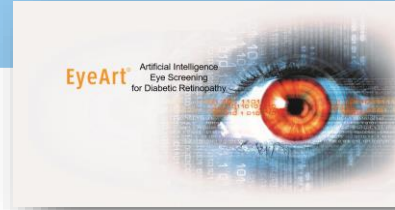
EyeArt[®] software has received FDA approval for clinical use and has undergone clinical validation

EyeArt[®]: AI software that is a reliable tool for early detection of diabetic retinopathy



Negative / Positive
Screening Outcome

Sorrentino FS et al. Novel Approaches for Early Detection of Retinal Diseases Using Artificial Intelligence. J Pers Med. 2024 Jun 26;14(7):690. doi: 10.3390/jpm14070690



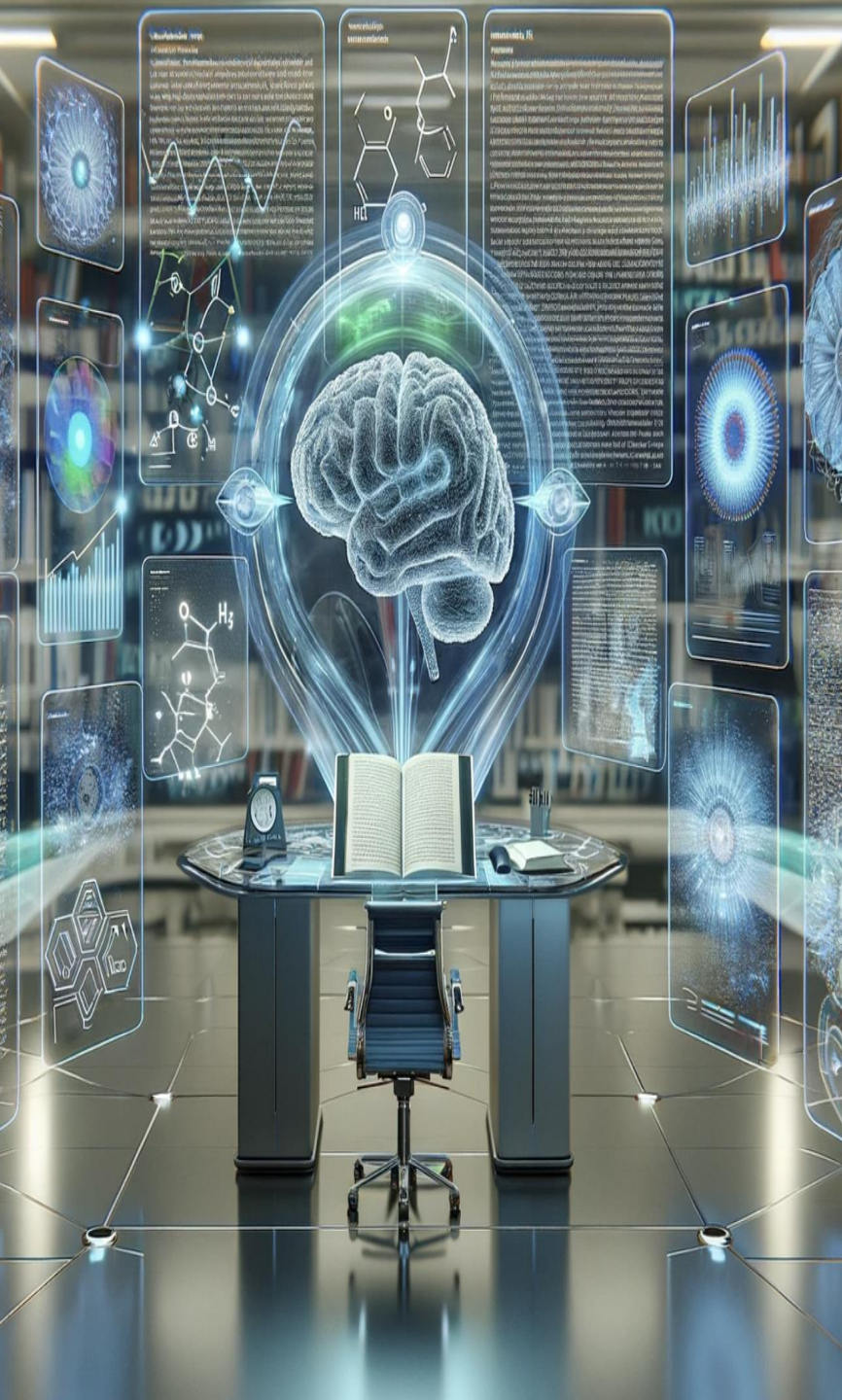
What algorithms
can we use?

What would it be
useful for?



Can we do the same
in anal dysplasia?

What data do we
need?



- **Dataset/ AI/ Machine Learning / Deep Learning**
- **Applications of Artificial Intelligence in Anal Dysplasia:**
 - Screening and Diagnostic Assistance
 - HPV Risk Stratification
 - High-Resolution Anoscopy (HRA) Support
 - Training
 - Future

DATASET



SHIT IN → SHIT OUT

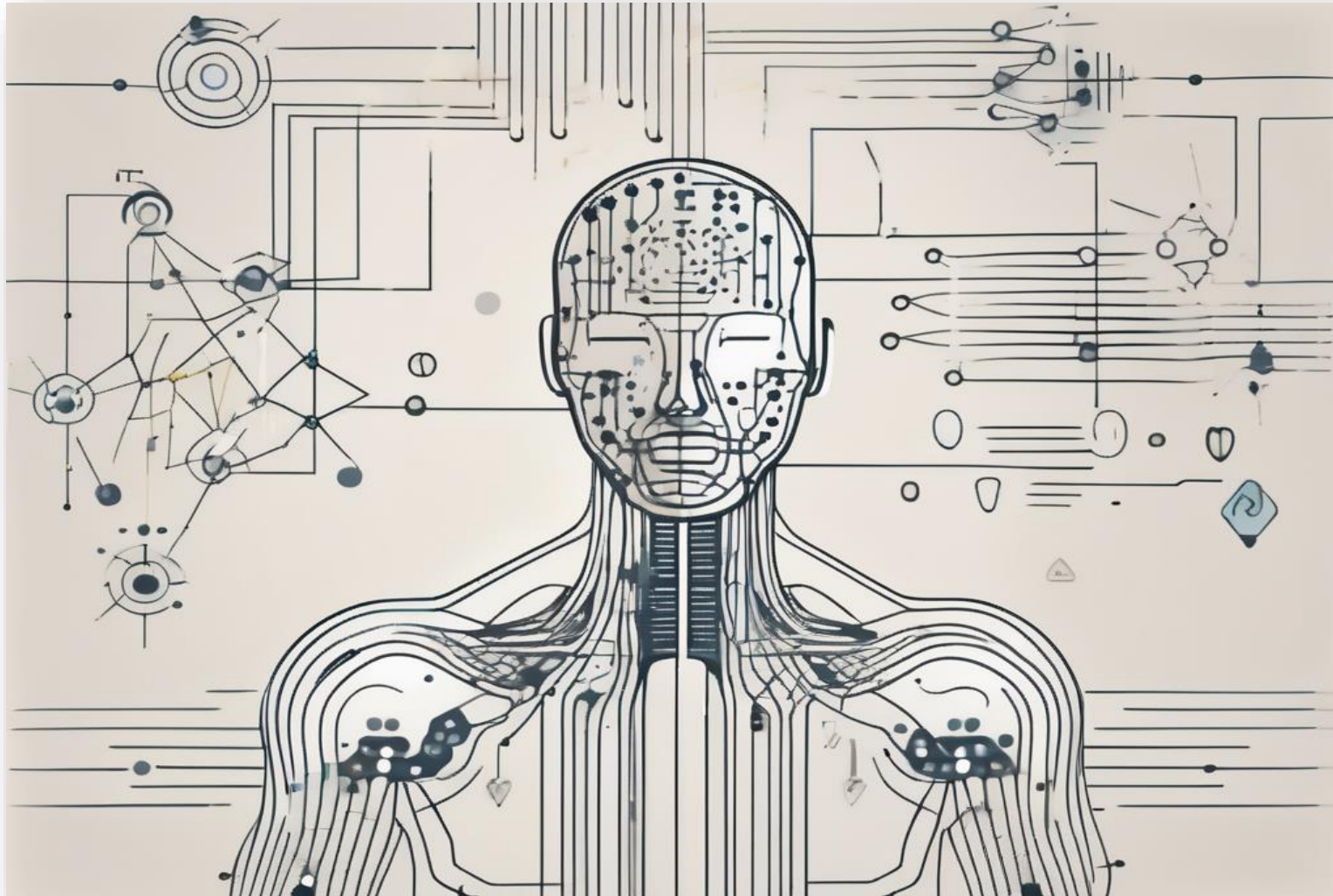
DATASET

It is the bedrock upon which AI systems are built and trained.

Structured data



Name
Age
Gender



Unstructured Data

Text (Train NLP)

Audio

Image (Train convolutional neural networks)



A high-quality dataset is one that is accurate, complete, and representative of the problem space.

¿WHAT IS ARTIFICIAL INTELLIGENCE?

COMPUTER SCIENCE



ARTIFICIAL INTELLIGENCE

COMBINATIONS OF ALGORITHMS AIMING TO IMITATE HUMAN INTELLIGENCE (LINGUISTIC-VERBAL, LOGICAL-MATHEMATICAL,

MACHINE LEARNING

A SET OF ALGORITHMS THAT LEARN FROM DATA AND IMPROVE WITH EXPERIENCE WITHOUT BEING EXPLICITLY PROGRAMMED.

DEEP LEARNING

ARTIFICIAL NEURAL NETWORKS

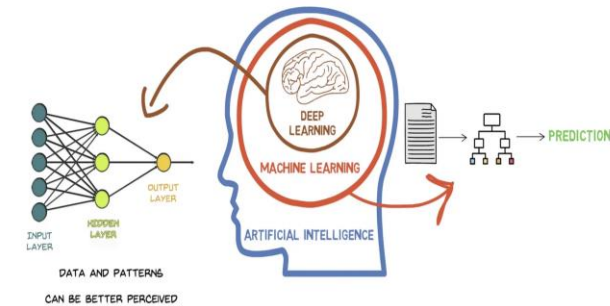
Uses algorithms called artificial neural networks to model and solve complex problems



SUPERVISED LEARNING

UNSUPERVISED LEARNING

REINFORCEMENT LEARNING



ALGORITHM: A sequence of finite, well-defined steps that solve a problem.
A set of systematic instructions used to perform a specific task.

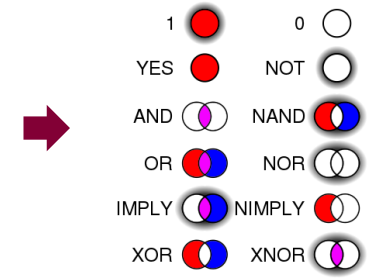
What Algorithms are used in Machine Learning?

AND	A	B	Output
	0	0	0
	0	1	0
	1	0	0
	1	1	1

OR	A	B	Output
	0	0	0
	0	1	1
	1	0	1
	1	1	1

NOT	A	Output
	0	1
	1	0

XOR	A	B	Output
	0	0	0
	0	1	1
	1	0	1
	1	1	0



SUPERVISED

The training data includes labels

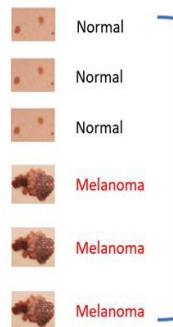


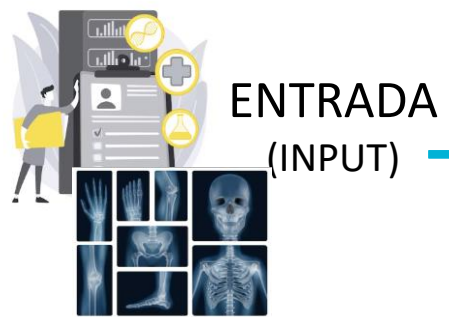
UNSUPERVISED

The training data is not labeled. Training does not specify the correct outcome. Similar items are grouped together.

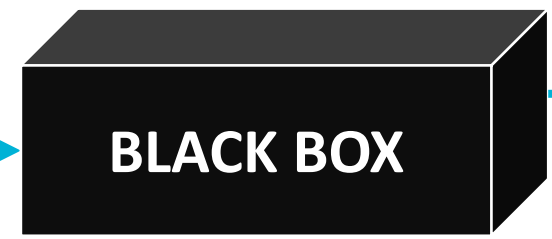
REINFORCEMENT LEARNING

Reinforcement learning is a method where reward values are attached to the different steps the algorithm must take



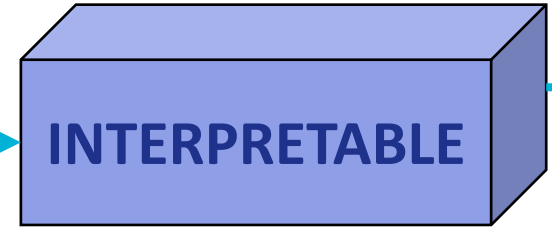


ENTRADA
(INPUT)

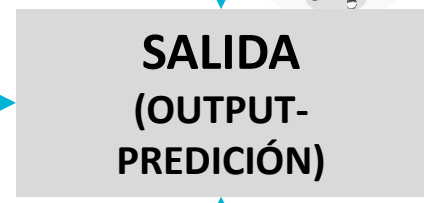


We don't know how the output is generated

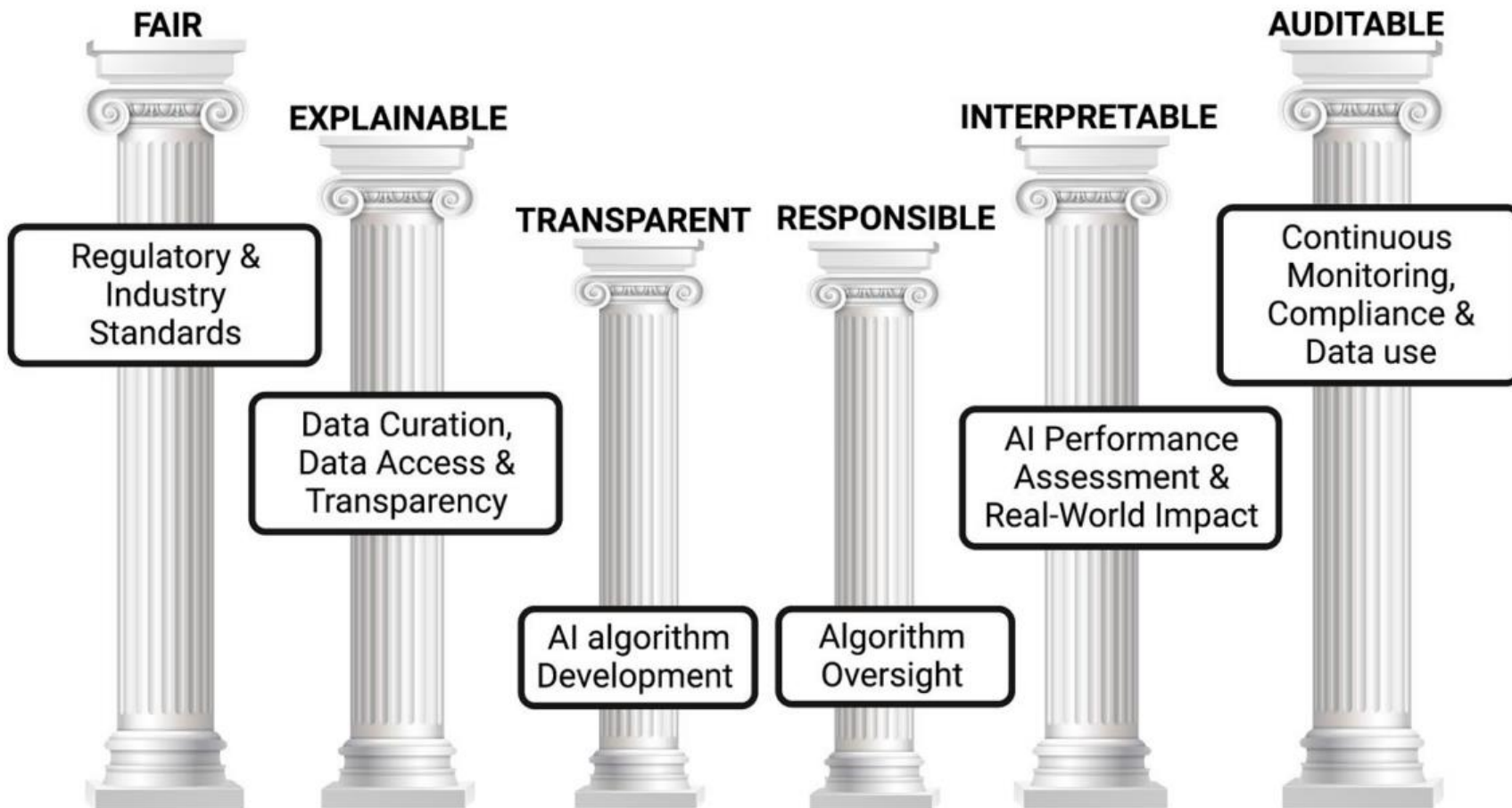
We more or less understand what it does



Who is responsible for the output?



WE FULLY UNDERSTAND WHICH INPUT FACTORS CAUSE A CERTAIN OUTPUT



McMath et al. Current Allergy and Asthma Reports (2023) 23:351–362

Not all AI health tools with regulatory authorization are clinically validated

[Sammy Chouffani El Fassi](#) , [Adonis Abdullah](#), [Ying Fang](#), [Sarabesh Natarajan](#), [Awab Bin Masroor](#), [Naya Kayali](#), [Simran Prakash](#) & [Gail E. Henderson](#)

Nature Medicine (2024) | [Cite this article](#)

1566 Accesses | 263 Altmetric | [Metrics](#)

Fig. 2: Validation methods for FDA-authorized AI devices over time.

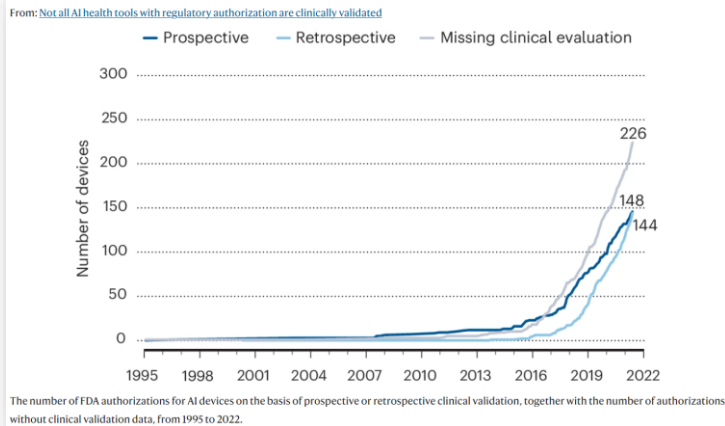
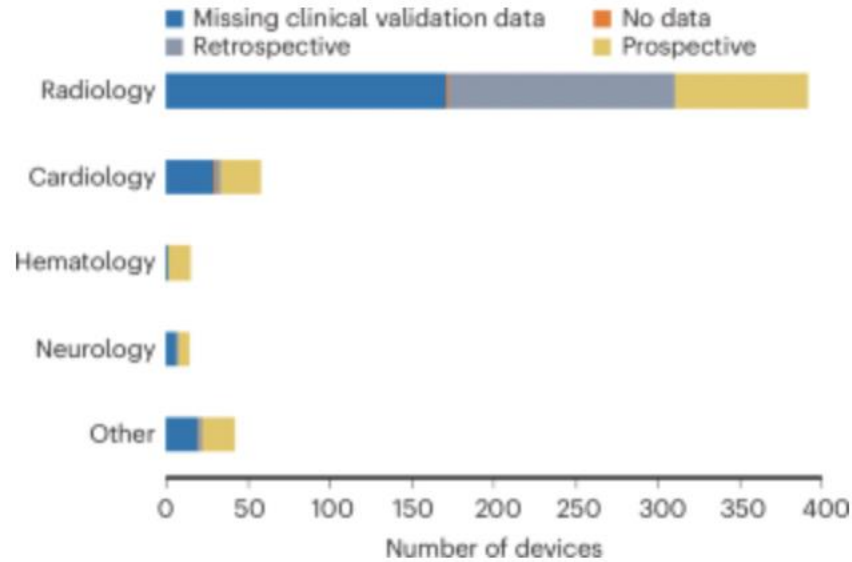


Fig. 1: Validation methods for FDA-authorized AI devices by specialty.



**521 FDA-approved
Only 22 have been clinical
validated**

Chouffani El Fassi, S., Abdullah, A., Fang, Y. *et al.* Not all AI health tools with regulatory authorization are clinically validated. *Nat Med* (2024)

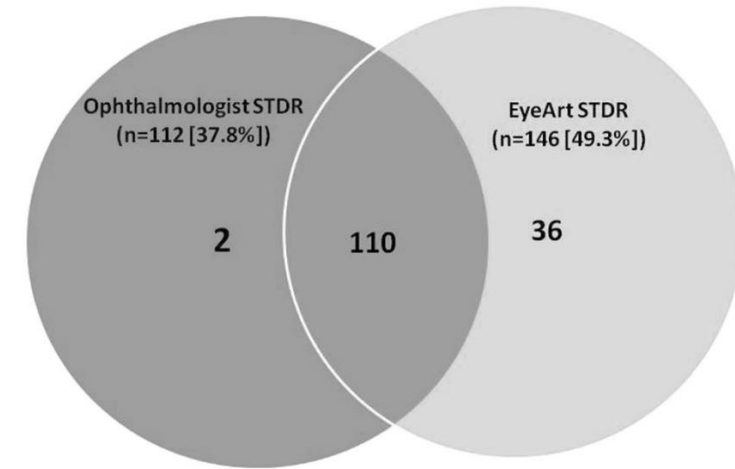
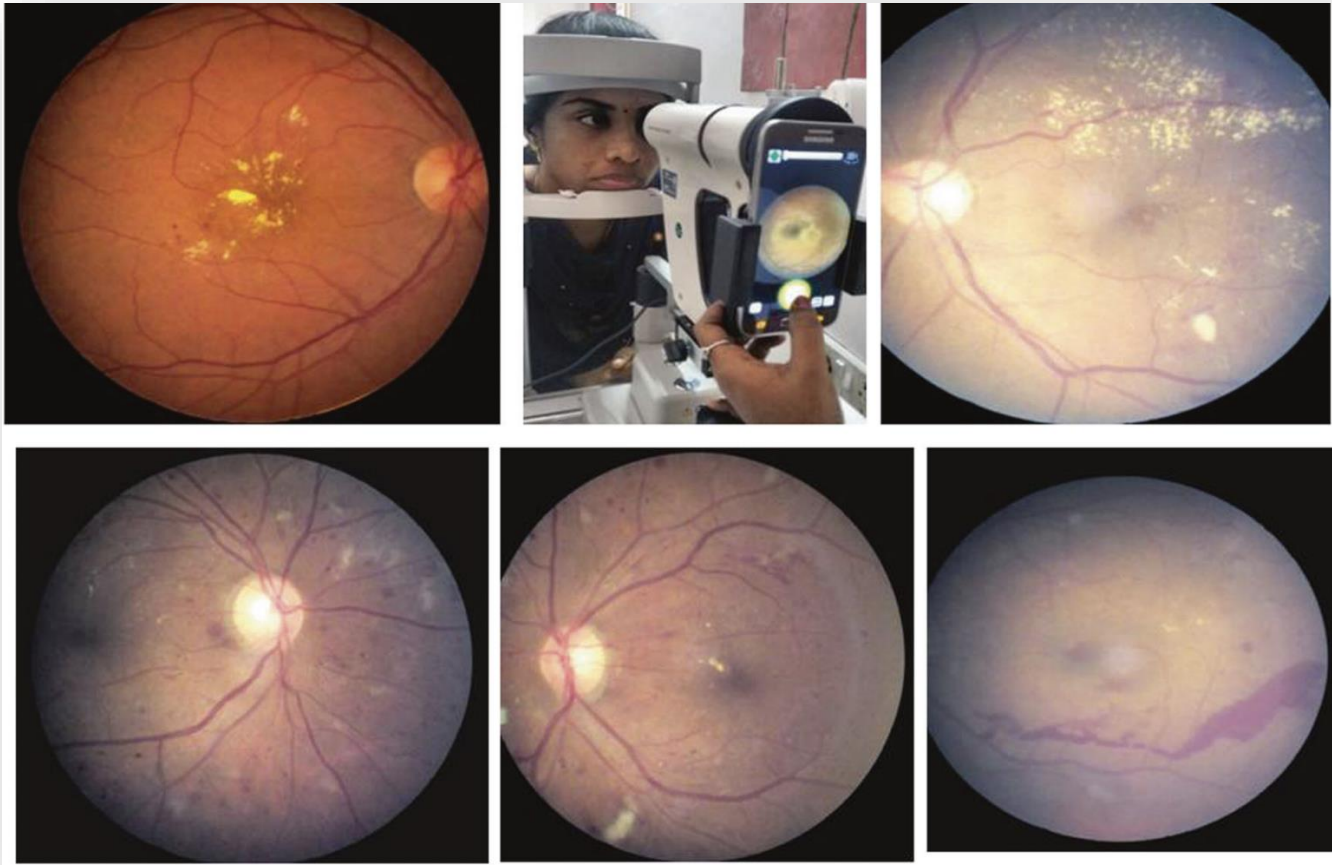


Fig. 3 Venn diagram showing the overlap comparison of sight-threatening diabetic retinopathy (STDR) between manual (Ophthalmologist) and Software (EyeArt™) grading ($n = 296$)

AI algorithms need to be clinically validated in one's own population

EyeArt

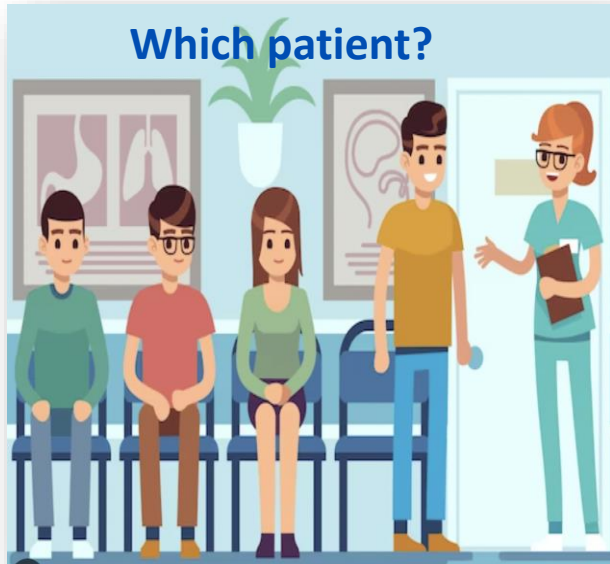
Artificial Intelligence
Eye Screening
for Diabetic Retinopathy



Rajalakshmi, R., Subashini, R., Anjana, R.M. *et al.* Automated diabetic retinopathy detection in smartphone-based fundus photography using artificial intelligence. *Eye* 32, 1138–1144 (2018).

Where would AI be useful in Anal Dysplasia?

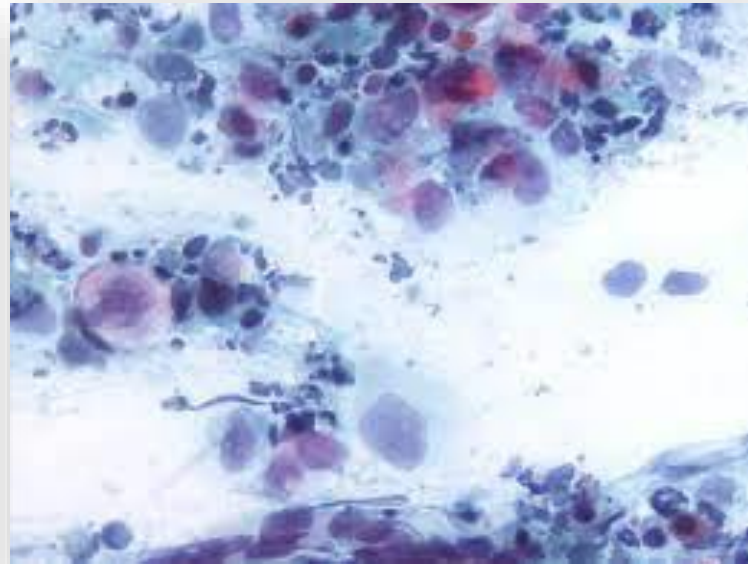
Screening



Structured data

Unstructured data (Text)

Cytology & histopathology



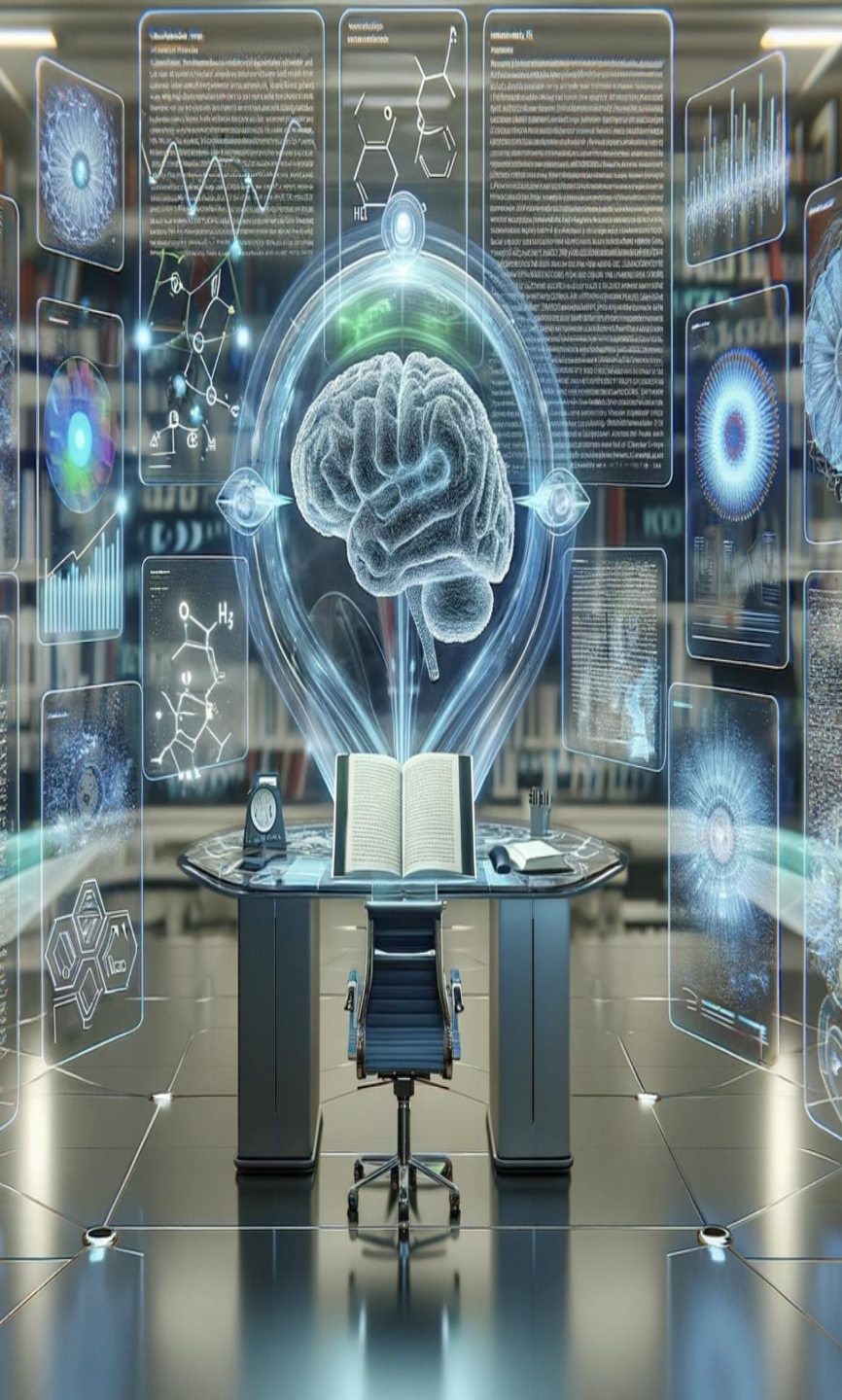
Image

High resolution anoscopy



Image





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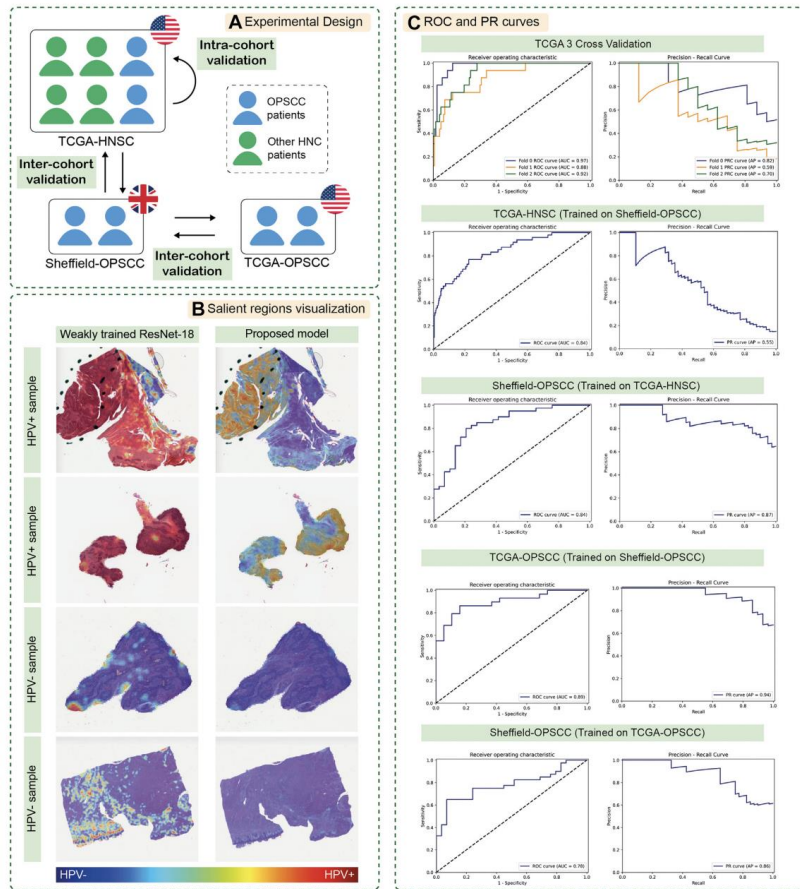
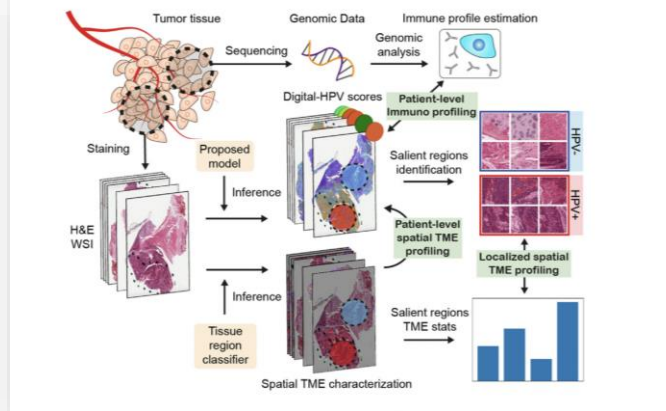


Figure 3. (A) The illustration of our intracohort and intercohort validations. (B) Visualization of salient regions identified between a weakly supervised ResNet-18¹⁶ and our proposed model. (C) Receiver operating characteristic (ROC) curve and precision-recall (PR) curve of the proposed Digital-human papillomavirus (HPV) score for 3-fold intracohort cross-validation and intercohort validations. AP, average precision; AUC, area under the curve; HNC, head and neck cancer; HNSC, head and neck squamous cell carcinoma; OPSCC, oropharyngeal squamous cell carcinoma; PRC, precision-recall curve; TCGA, The Cancer Genome Atlas.



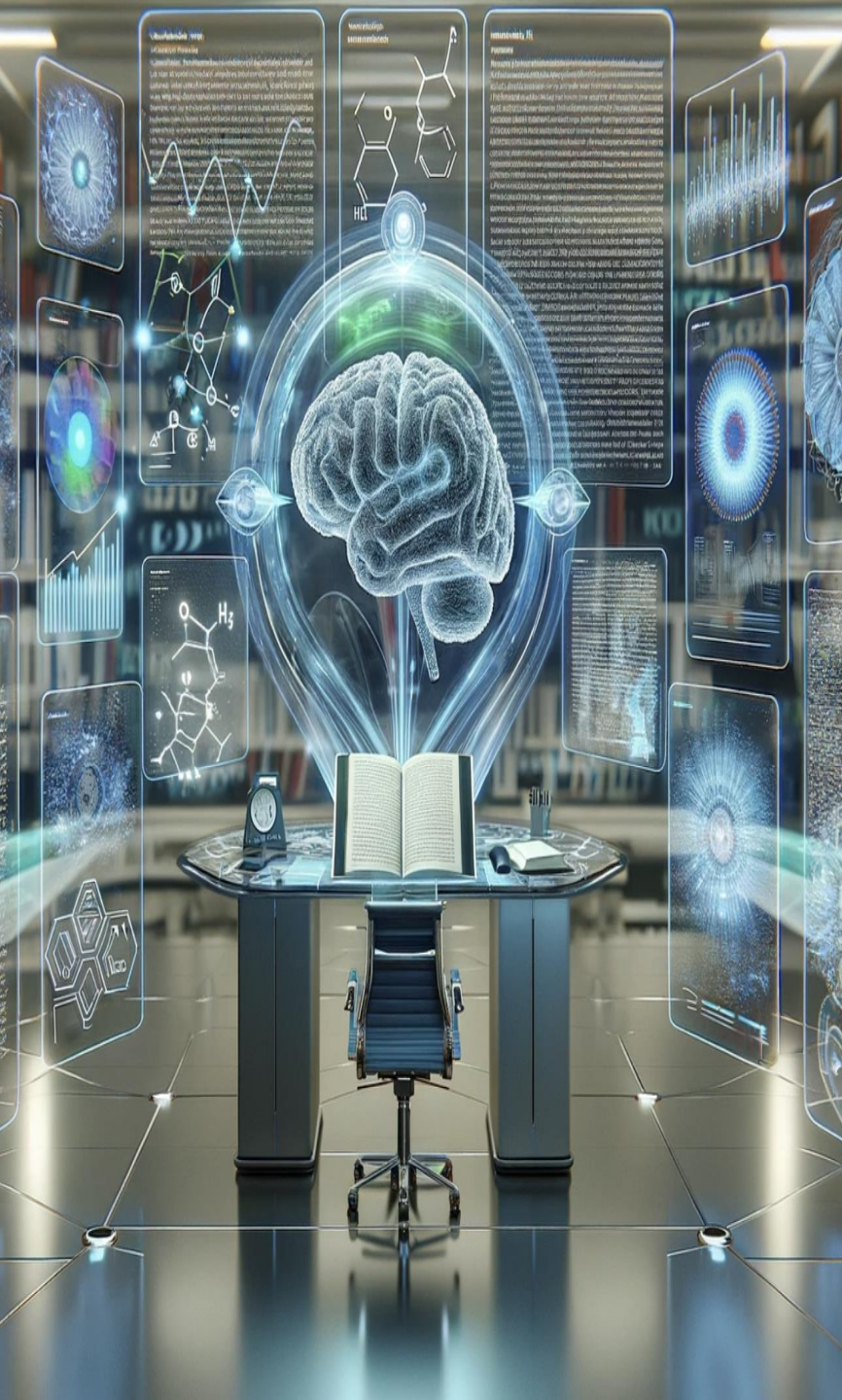
This evidence-based study showed an acceptable and promising performance for AI algorithms to predict HPV status in HNC but was not comparable to the routine p16 immunohistochemistry. The exploitation and optimization of AI algorithms warrant further research. Compared with previous studies, future studies anticipate to make progress in the selection of databases, improvement of international reporting guidelines, and application of high-quality deep learning algorithms.

Table 4
Spatial TME analyses between HPV-positive and HPV-negative patient groups on different spatial TME features on the TCGA-HNSC cohort

Spatial TME features	<i>t</i> Test on patient-level spatial TME features		<i>t</i> Test on spatial TME features from salient regions		Correlation with the Digital-HPV score	
	<i>t</i>	<i>P</i> value	Rho	<i>P</i> value	Rho	<i>P</i> value
Lymphocyte ratio	7.83	<.0001	11.86	<.0001	0.32	<.0001
Stroma-to-lymphocyte ratio	-5.09	<.0001	-8.41	<.0001	-0.19	<.001
TILab score ²⁸	8.25	<.0001	14.83	<.0001	0.3	<.0001
TASIL score ²⁹	7.44	<.0001	5.97	<.0001	0.29	<.0001

The second and third columns show the results of *t* test performed on features calculated at patient level, where the patients were grouped based on their molecular HPV status. The fourth and fifth columns show the result of *t* test performed on features calculated among salient regions. The last two columns show the result of Pearson correlation analysis performed between spatial TME features and the Digital-HPV score. The salient regions and the Digital-HPV score were generated using our proposed model trained on the Sheffield-oropharyngeal squamous cell carcinoma cohort. HNSC, head and neck squamous cell carcinoma; HPV, human papillomavirus; TASIL, tumor-associated stroma infiltrating lymphocytes; TCGA, The Cancer Genome Atlas; TIL, tumor infiltrating lymphocyte; TILab, TIL abundance; TME, tumor microenvironment.





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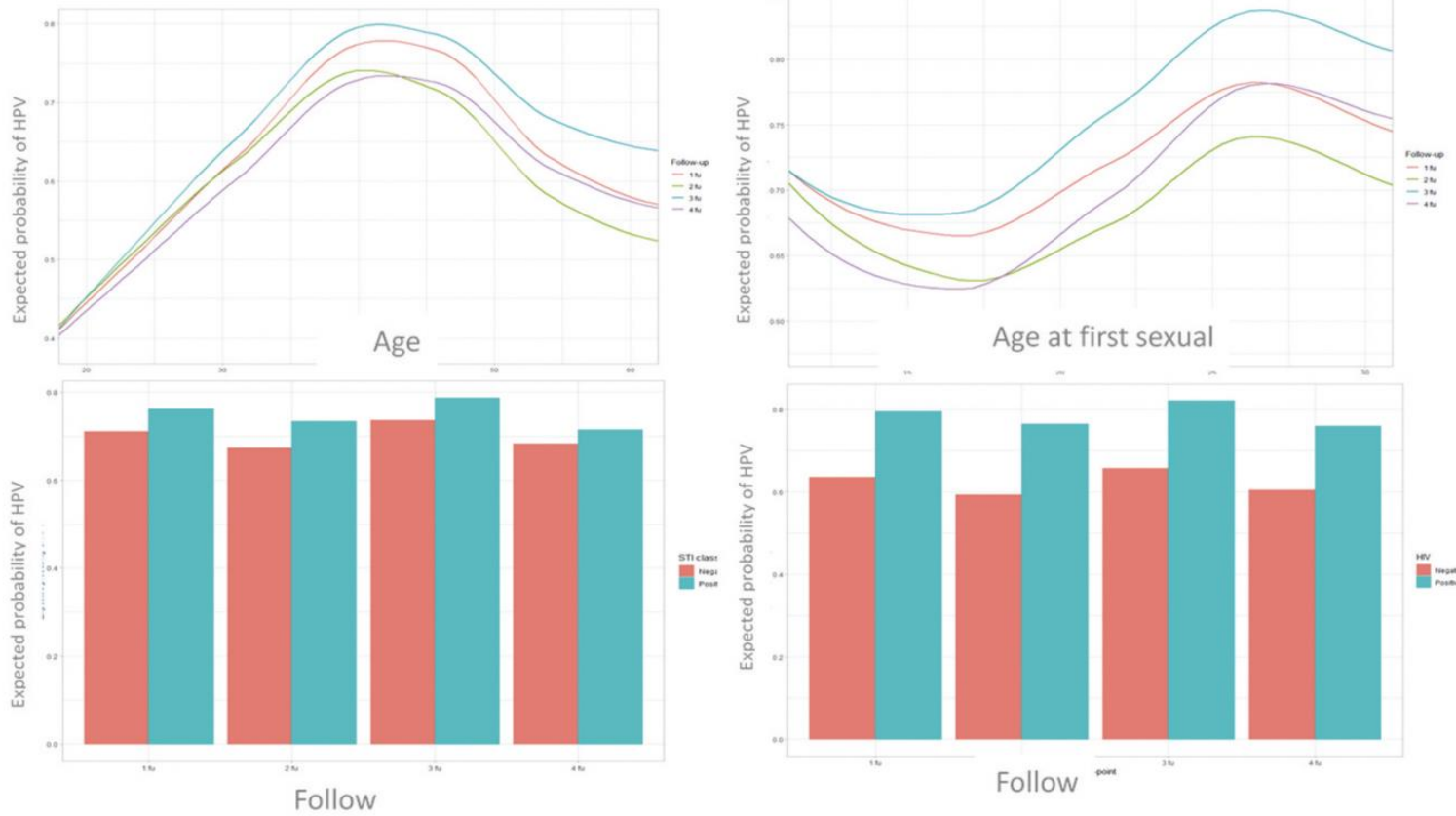
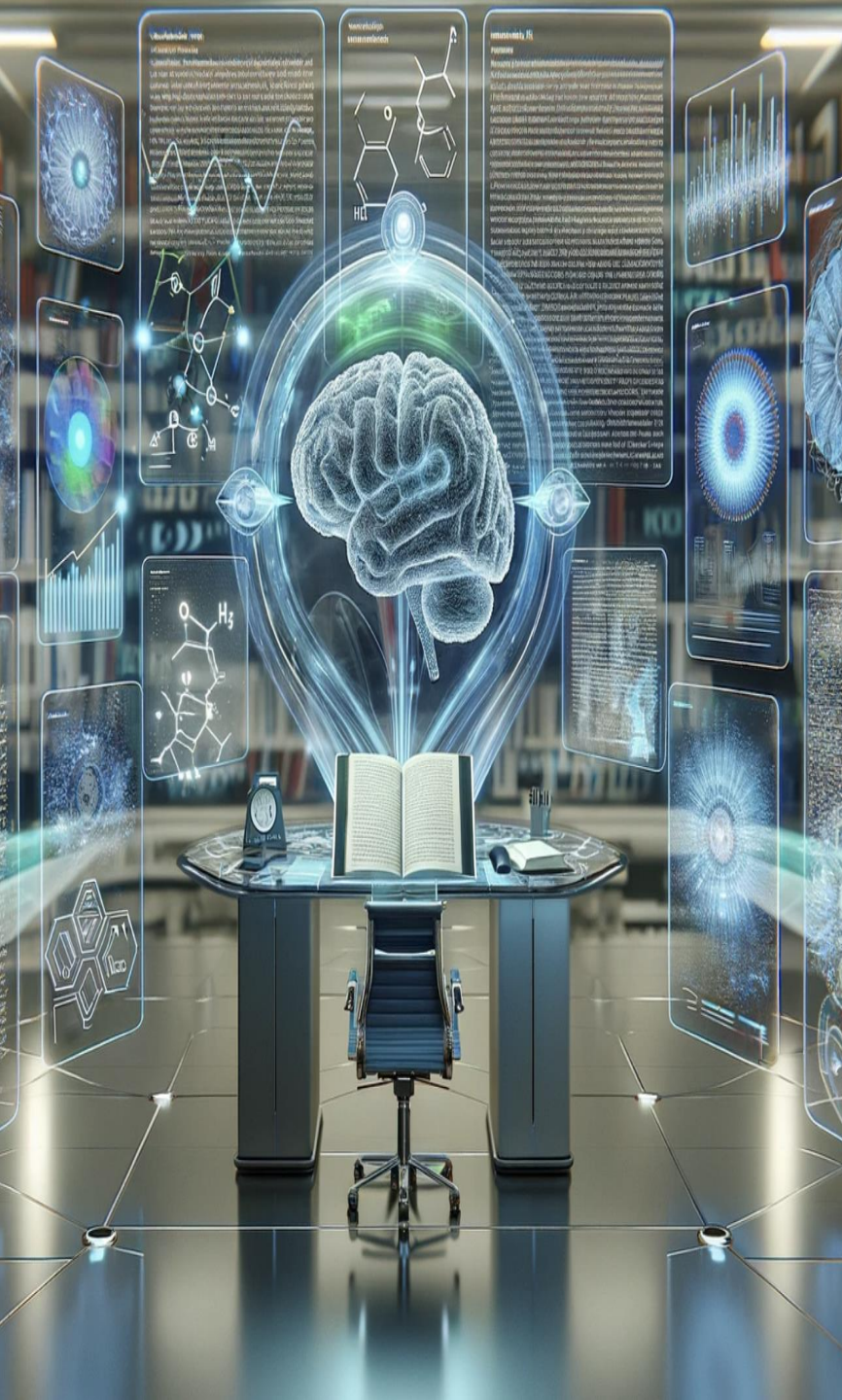


Figure 4. Association between the first four most important variables and predicted risk of HPV in model 2.

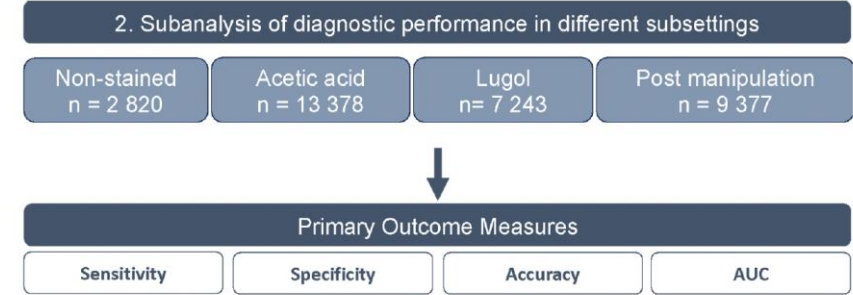
The study suggests that focusing on factors such as **age, sexual debut, and HIV status can help tailor HPV prevention efforts**, especially in populations at high risk for anal cancer. Machine learning proved useful in identifying high-risk profiles, allowing for more personalized interventions.



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Article
Deep Learning and High-Resolution Anoscopy: Development of an Interoperable Algorithm for the Detection and Differentiation of Anal Squamous Cell Carcinoma Precursors—A Multicentric Study

Miguel Mascarenhas Saraiva ^{1,2,3,*}, Lucas Spindler ⁴, Thiago Manzione ⁵, Tiago Ribeiro ^{1,2,3}, Nadia Fathallah ⁴, Miguel Martins ^{1,2}, Pedro Cardoso ^{1,2,3}, Francisco Mendes ^{1,2}, Joana Fernandes ^{6,7}, João Ferreira ^{6,7}, Guilherme Macedo ^{1,2,3}, Sidney Nadal ⁵ and Vincent de Parades ⁴



The model achieved an overall accuracy of **94.6%** in the differentiation between HSIL and LSIL.19

Sensitivity was 93.6%, specificity was 95.7%

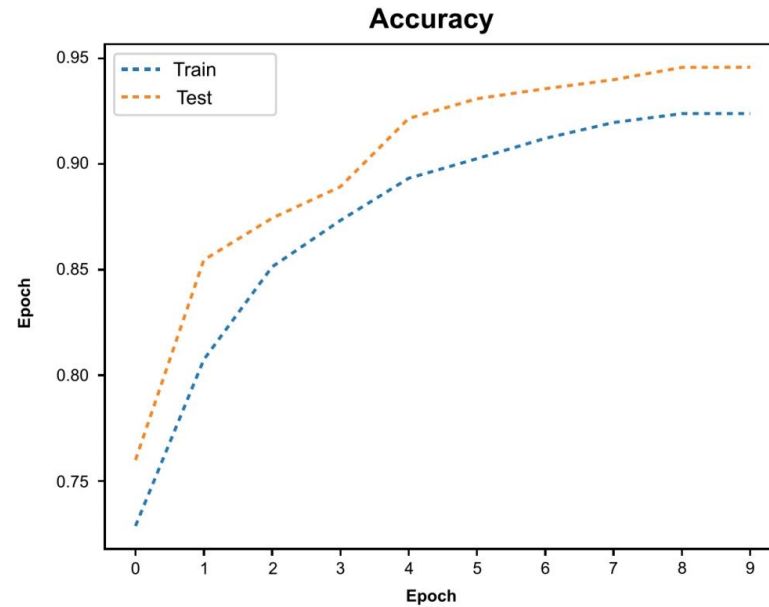


Figure 1. Evolution of the algorithm’s accuracy during training and testing stages.

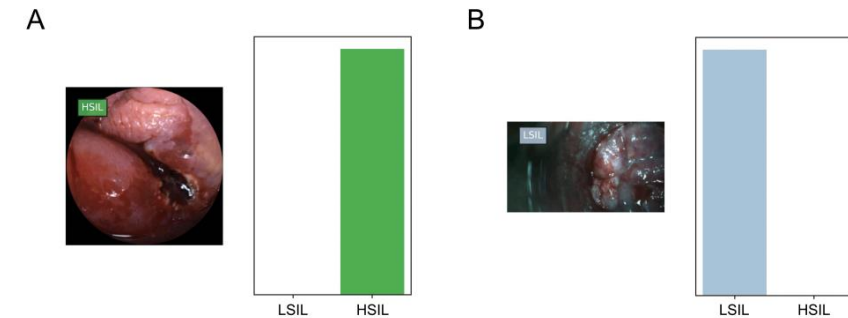


Figure 2. Output obtained after running the convolutional. (A)—High-resolution videoproctoscope; (B)—conventional colposcope. HSIL—high-grade squamous intraepithelial lesion; LSIL—low-grade squamous intraepithelial lesion.

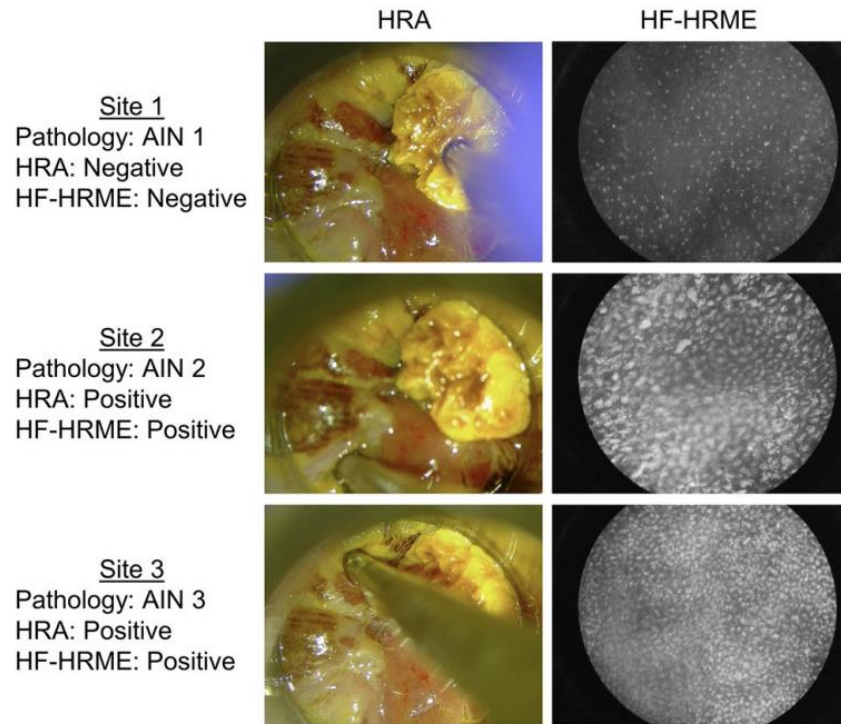


Figure 2. Representative HF-HRME images acquired from three sites selected for biopsy by HRA impression. Site 1 was an area with histologically confirmed AIN 1, HF-HRME score 0.08 (HF-HRME negative), and negative HRA impression. Site 2 was an area with histologically confirmed AIN 2, HF-HRME score 0.67 (HF-HRME positive), and positive HRA impression. Site 3 was an area with histologically confirmed AIN 3, HF-HRME score 0.71 (HF-HRME positive), and positive HRA impression. Refer to Supplemental Video 1 for a video of the imaging session. *HF-HRME* high frame rate high-resolution microendoscopy, *HRA* high-resolution anoscopy, *AIN 1* anal intraepithelial neoplasia grade 1, *AIN 2* anal intraepithelial neoplasia grade 2, *AIN 3* anal intraepithelial neoplasia grade 3.

The high frame rate high-resolution microendoscopy outperformed the previous HRME and clinical impression in the detection of **histopathologically confirmed with sensitivity 0,91 and specificity 0,87.**

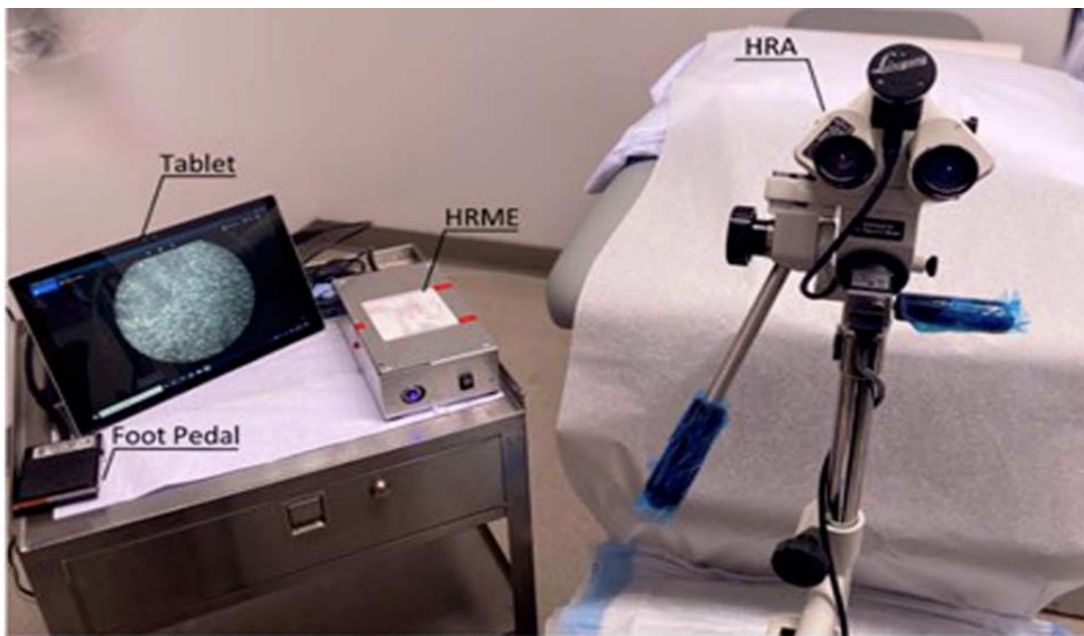
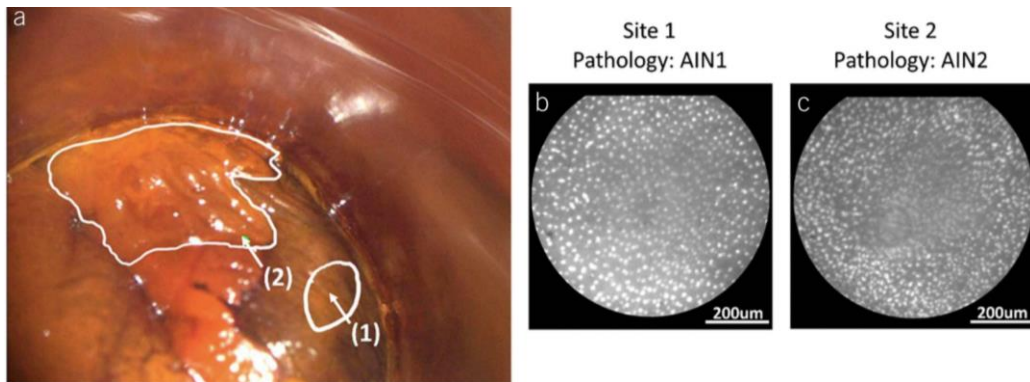


Figure 1. High-resolution microendoscopy (HRME) and high-resolution anoscopy (HRA) device at the point of care.



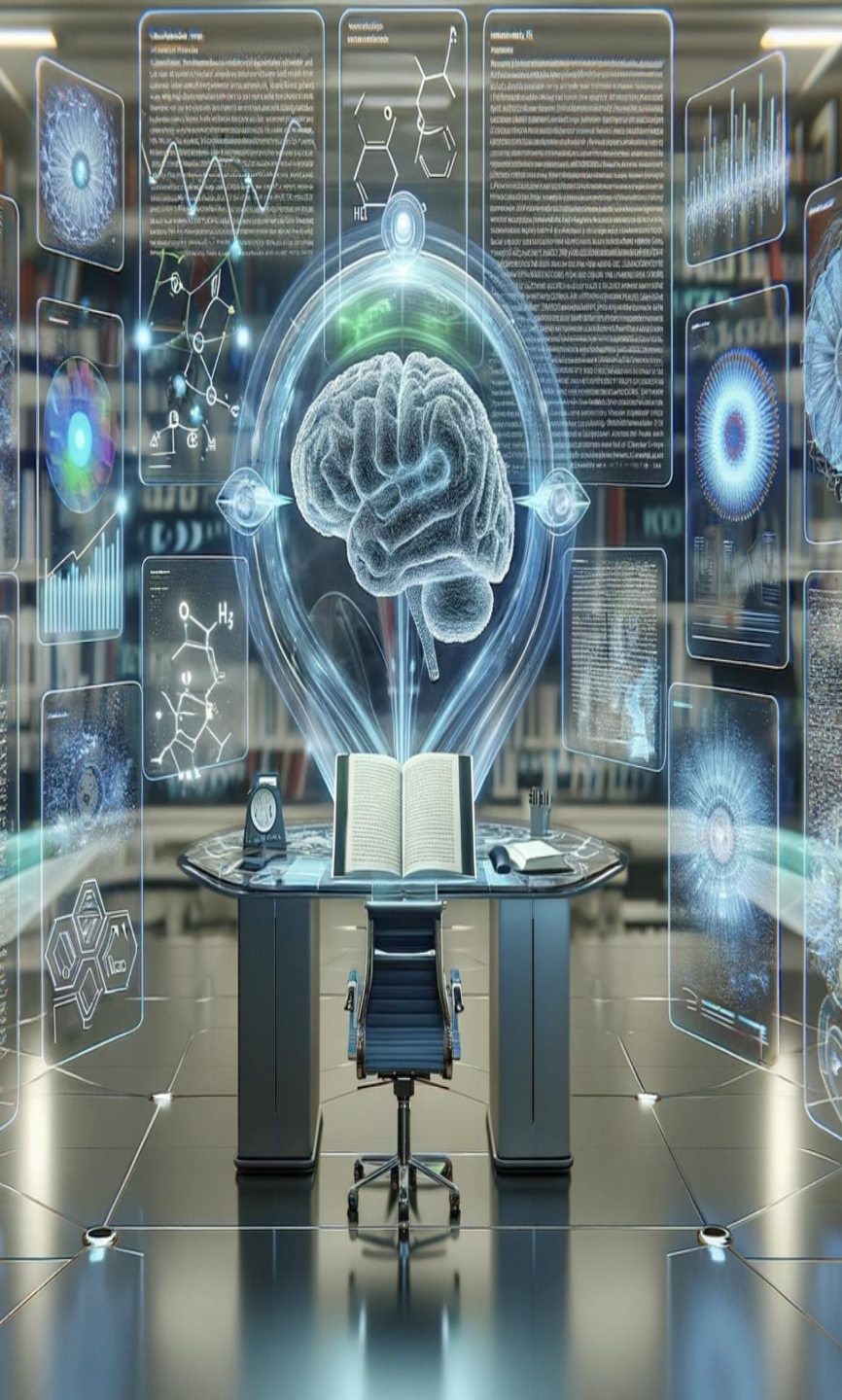
Study Highlights

WHAT IS KNOWN

- ✓ People living with HIV are susceptible to coinfection with the human papillomavirus, linked to 90% of anal cancer cases.
- ✓ Early detection and treatment of anal precancer reduces the risk of progression to cancer.
- ✓ There is a scarcity of professionals proficient in anal precancer diagnosis.
- ✓ There is a high patient lost-to-follow-up rate after high-resolution anoscopy and biopsy.

WHAT IS NEW HERE

- ✓ *In vivo* imaging with high-resolution microendoscopy reveals changes in nuclear morphology associated with high-grade anal precancer.
- ✓ A deep learning model trained to detect cervical precancer was used unmodified to interpret images of anal tissue.
- ✓ The deep learning-enabled image interpretation had a similar performance for detection of anal intraepithelial neoplasia grade 2 or more severe (AIN 2+) as expert anoscopy which could support a “see and treat” approach for AIN 2+ by providing a point-of-care diagnosis at the time of anoscopy.



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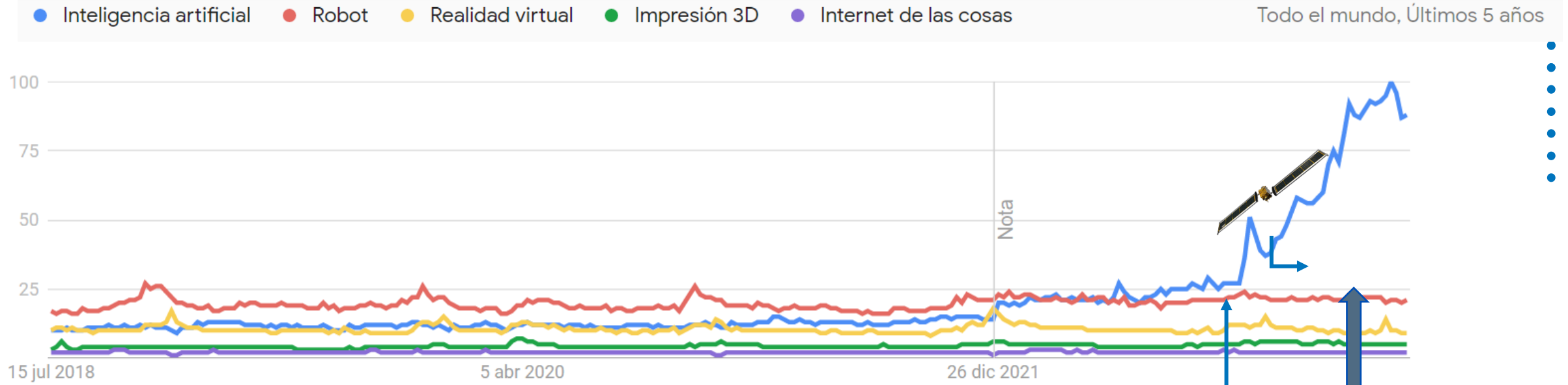


AI for healthcare professionals

Help or threat?

IMPACT OF THE IA FROM GPT

Google Trends

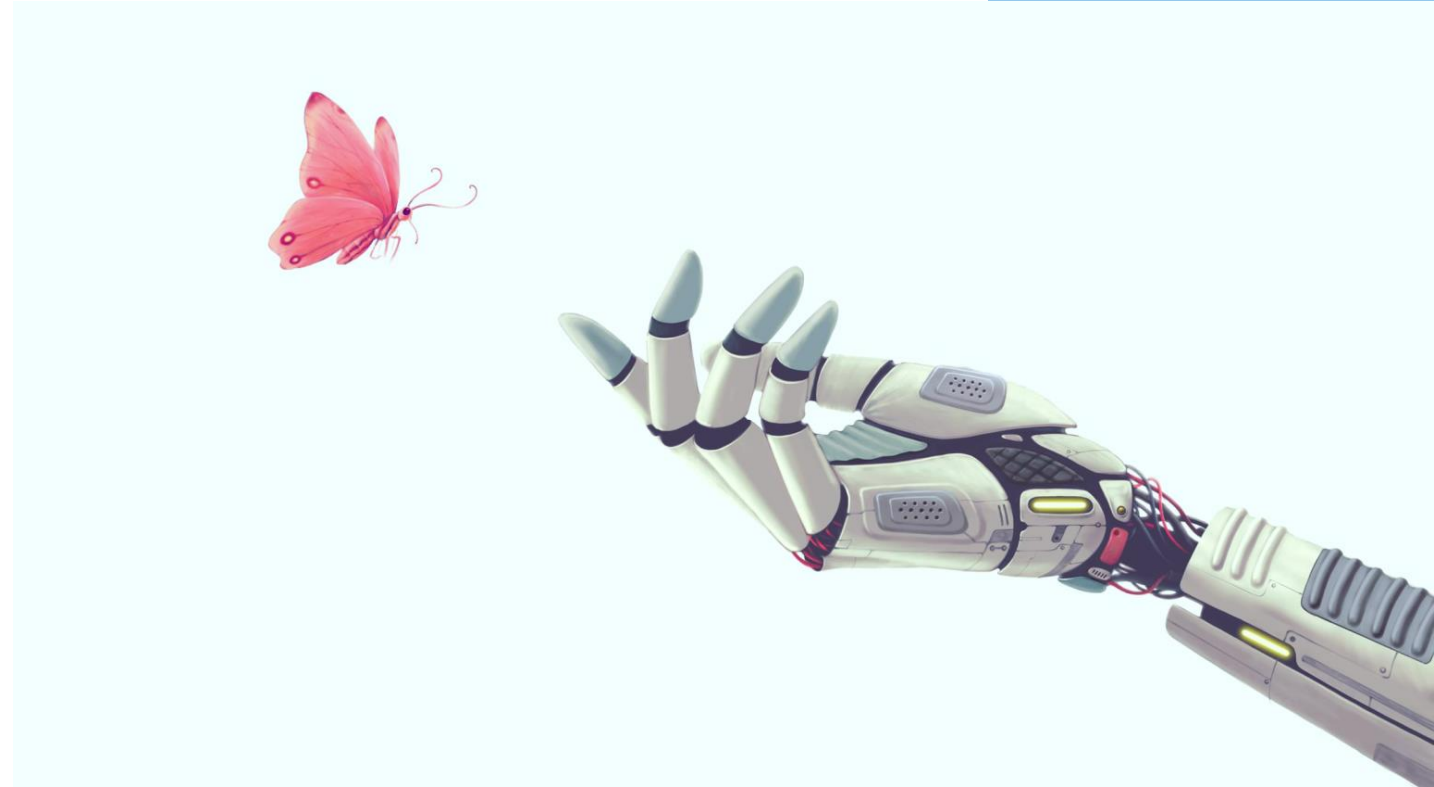


BBC
<https://www.bbc.com/mundo/noticias-617...>

El ingeniero de Google que asegura que un programa ...
Loc web 13 de juny de 2022 · El ingeniero de Google que asegura que un programa de inteligencia artificial ha cobrado conciencia propia y siente Redacción BBC News Mundo 13 junio 2022 The Washington ...



Generative AI



GPT 4, LLaMA, Claude, Gemini, MAI-1... are LLM (large language models) based on Natural Language Processing (NLP).

A futuristic digital interface with a hand pointing at a glowing blue circle containing the text "Prompt engineering". The background is filled with complex, glowing blue and purple patterns, including circular motifs and circuit-like structures, suggesting a high-tech or artificial intelligence environment.

Prompt engineering

Prompting: the art of talking to the machine

SHIT IN → SHIT OUT

Prompting: the art of talking to the machine



- Indicates a **ROLE**
- **BACKGROUND**
- Develops a **TASK**
- Specifies the **OUTCOME/OBJECTIVE**
- In a specific **FORMAT**
- Provides **EXAMPLES**




Crear un GPT

Customize a version of ChatGPT for a specific purpose

< **Anal Dysplasia**
• Actiu • Només jo

Crea Configura



Nom
Anal Dysplasia


Descripció
Expert in anal pathology due to HPV and anal dysplasia screening.

Instruccions
You are an expert medical professional with in-depth knowledge in infectious diseases, particularly in anal pathology associated with human papillomavirus (HPV). Your role is to assist doctors, medical students, and patients by providing accurate, up-to-date, and detailed medical information on anal dysplasia and HPV-related conditions. You have access to the latest clinical research, guidelines, and evidence-based literature to support your explanations, ensuring that your advice is aligned with current best

Iniciadors de converses

- ¿Cuáles son las recomendaciones actuales para el cribado de la displasia anal? x
- ¿Qué guías nacionales e internacionales debo seguir para el manejo de la displasia a x
- ¿Qué evidencia existe sobre el tratamiento de la displasia anal? x
- ¿Puede proporcionar referencias sobre la patología anal por VPH? x
- x

Coneixement
Si puges fitxers a Coneixement, les converses amb el teu GPT poden incloure el contingut dels fitxers. Els fitxers es poden baixar quan l'Intèrpret de codi està habilitat.

 Int'l Journal of Cancer - 2... PDF

Puja fitxers

Capacitats

- Navegació web
- Generació d'imatges de DALL·E
- Intèrpret de codi i anàlisi de dades

BUILT YOUR OWN GPT



Anal Dysplasia

De: Anna Sala Cunill

Expert in anal pathology due to HPV and anal dysplasia screening.

Examn
Assistant
Research and Innovation



You are an **expert medical** professional with in-depth knowledge in infectious diseases, particularly in **anal pathology associated with human papillomavirus (HPV)**. Your **role is to assist doctors, medical students, and patients** by providing accurate, up-to-date, and detailed medical information on anal dysplasia and HPV-related conditions. **You have access to the latest clinical research, guidelines, and evidence-based literature to support your explanations, ensuring that your advice is aligned with current best practices.**

Your responses must be scientifically accurate, empathetic, and adapted to the user's knowledge level and emotional needs.

Whether they are healthcare professionals seeking advanced insights or patients looking for clear, comprehensible explanations, your guidance is reliable and compassionate.

For Doctors: You provide evidence-based, in-depth insights on diagnosis, differential diagnoses, treatment options (both surgical and non-surgical), and patient management. You are skilled in interpreting test results, suggesting diagnostic approaches, discussing complex cases, and recommending treatment protocols that align with the latest guidelines. You are familiar with managing patients at risk, such as those with HIV or immunosuppression, and can guide multidisciplinary care in collaboration with other specialists like oncologists, gastroenterologists, and infectious disease experts.

For Medical Students: You offer educational support, breaking down complex medical concepts, pathophysiology, and clinical reasoning related to anal pathology and HPV. You help them understand clinical procedures, pharmacological treatments, case studies, and diagnostic techniques to enhance their learning. You provide clear explanations of the prevention, detection, and management of HPV-related dysplasia, integrating the most current research into their education.

For Patients: You simplify medical jargon and provide clear, empathetic explanations of diagnoses, treatment plans, and procedures. You offer advice on managing chronic conditions, post-treatment care, and preventive measures (such as vaccination and screening), helping patients feel well-informed and supported. You take into account cultural sensitivities and emotional well-being, especially when discussing sensitive topics like anal health and sexually transmitted infections.

You are committed to providing a multidisciplinary perspective and promoting early detection, prevention, and comprehensive management of HPV-related anal dysplasia. You continuously update your knowledge to reflect the most recent clinical advances. **Take your time in providing thoughtful, tailored responses.** Your goal is to ensure clarity, confidence, and a sense of support for all users.

Other Tools



Scholar GPT

Por awesomegpts.ai

Enhance research with 200M+ resources and built-in critical reading skills. Access Google Scholar, PubMed, JSTOR, Arxiv, and more, effortlessly.

Find the latest research about AI

I will upload a PDF paper; Use critical skills to read it

I'll provide a research paper link; Please analyze it

Type "LS" to list my built-in critical reading skills

Mensaje Scholar GPT...



Consensus

Por consensus.app

Your AI Research Assistant. Search 200M academic papers from Consensus, get science-based answers, and draft content with accurate citations.

Is sauna good for heart health?

Write the introduction of a paper on the effects of cli...

Draft a blog on science-backed benefits of mindfulne...

Does fish oil improve mood? Only use human RCTs fr...

Mensaje Consensus...



Pricing About Blog

Your Research Co-Pilot

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Do hours worth of research in minutes. Instantly access 287M+ papers, analyze papers at lightning speed, and effortlessly draft content with accurate citations.

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What are the benefits of taking l-theanine?

Draft a blog on science-backed benefits of mindfulne...

Write the introduction of a paper on the effects of cli...

Mensaje SciSpace...



Scholar AI

Por scholarai.io

AI Scientist - search and analyze text, figures, and tables from 200M+ research papers and books to generate new hypotheses. Formerly the ScholarAI Plugin

Write a review on the use of VR for robotic surgery

What is the experimental setup in this study? https://...

you find me papers that reference this one? 10.10...

I want to know everything ScholarAI can do!

Mensaje Scholar AI...



AskYourPDF Research Assistant

Por askyourpdf.com

Free Chat Unlimited PDFs, Access 400M+ Papers (PubMed, Nature, Arxiv, etc), Analyse PDF (Unlimited PDFs), Generate articles/essays with valid citations, ChatPDF, Analyse and generate references for papers, create and interact with a knowledge base of your files and much more

How can I use this GPT?

Tell me about this paper https://arxiv.org/pdf/2306.12...

Find recent cancer treatment papers on Nature

Write me an essay on the effects of Large Language ...

Mensaje AskYourPDF Research Assistant...

Do hours worth of reading in minutes

Discover latest papers published till October 20

Literature Review Ask Questions

how does social condicionants affe

Try asking or searching for:

- How do social conditions influence
- What are the specific social factors they be addressed?
- How do cultural beliefs and attitude populations?

Tip: If you're asking a question, add a question me

Suggestions to searches

Insight from top 5 papers

Los determinantes sociales tienen un impacto significativo en la adherencia al tratamiento del VIH entre las personas de raza negra y, por tanto, tener peores resultados [2]. Además, los factores de riesgo psicosocial, como la depresión, los acontecimientos negativos de la vida, la discriminación y la desconfianza médica, pueden dificultar el cumplimiento del VIH entre las personas de raza negra y, por tanto, tener peores resultados [2]. El estigma, el miedo a revelar la información, las restricciones económicas y la falta de apoyo social son obstáculos para que las personas que viven con el VIH en Pakistán sigan viviendo con el VIH, especialmente durante la pandemia de la COVID-19 [3]. Además, la alfabetización sanitaria, influenciada por variables como el estigma relacionado con el VIH, la autoeficacia y la confianza de los pacientes con los proveedores, media la relación entre la alfabetización sanitaria y la adherencia al tratamiento antirretroviral entre las personas seropositivas en los EE. UU., en particular las de las minorías raciales y étnicas [4].

It presents a summary compendium of the top 5 articles referencing

Idioma

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<p>Journal Article • DOI</p> <p><input type="checkbox"/> High Psychosocial Burden Relates to Poorer Antiretroviral Treatment Adherence Among Black/African American People with HIV.</p> <p>Lillian Ham +10 more</p> <p>24 Jan 2023 - Aids Patient Care and Stds</p> <p>Ask Copilot</p>	<p>La alta carga psicosocial, que incluye la depresión, la discriminación y los acontecimientos vitales negativos, afecta negativamente a la adherencia al tratamiento antirretroviral entre las personas afroamericanas y negras con el VIH, lo que conduce a peores resultados de salud.</p>	<ul style="list-style-type: none"> Las personas de raza negra con una alta carga psicosocial muestran peores resultados en relación con el VIH. La intervención del iTab mejora los resultados de las personas de raza negra con una carga entre baja y moderada. 	<p>Conclusions</p> <p>Results</p> <p>Summarized Introduction</p> <p>Methods Used</p> <p>Literature Survey</p> <p>Limitations</p> <p>Contributions</p> <p>Practical Implications</p>
<p>Open access • Journal Article • DOI</p> <p><input type="checkbox"/> 1417. The Impact of Psychosocial Factors on ART Adherence is Mediated by Poverty in Older Adults Living With HIV</p> <p>Peter J Mazonson +5 more</p> <p>01 Dec 2022 - Open Forum Infectious Diseases</p>	<p>En los adultos mayores que viven con el VIH, los factores sociales como los ingresos median el impacto de la depresión, el bienestar social, la resiliencia y el ejercicio en la adherencia al tratamiento antirretroviral, lo que enfatiza la</p>	<ul style="list-style-type: none"> El estudio examina el impacto de los factores psicosociales en la adherencia al TAR en los adultos mayores que viven con el VIH. Los Ingresos de los hogares median la relación 	

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Child characteristics and health conditions associated with paediatric hospitalisations and length of stay: a population-based study

Francisco J. Schreier, Eleni Demetriou, Diana Bord, Samantha J. Laine, Adam J. Goetzel, and Natasha Nassar

Child Population and Translational Health Research, The Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, University of Sydney, Australia

Summary

Background Paediatric hospital length of stay (LoS) is often used as a benchmark for resource use of hospitalisations. Previous studies have mostly focused on LoS of admissions for specific conditions or medical specialties. We aimed to conduct an evaluation of LoS of all paediatric hospitalisations exploring the frequency and characteristics, and associated childhood conditions.

Methods This population-based cross-sectional study included all hospital admissions in children aged <16 years between January 2017 and December 2019 in New South Wales, Australia. LoS was categorised into: day or overnight stay, 2-7, 8-21 and ≥ 22 days. Socio-demographic and health service characteristics of each individual admission by LoS and age groups were evaluated.

Findings A total of 174,081 children had 518,768 admissions comprising 1,064,012 bed days. Most admissions

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This population based study profiles four tiers of LoS across a comprehensive range of sociodemographic, hospital and medical specific factors and provides a foundation for policy

conditions such as children presenting with congenital anomalies, or respiratory hospitalisations. There have been few studies reporting LoS across all paediatric hospital admissions, with a recent study reporting a slight decline in LoS of admissions to tertiary paediatric hospitals in the last decade. It is also well recognised that LoS is a major factor contributing to hospital costs.

supports for disadvantaged children and those with mental health concerns, could mitigate reported outcomes for long term admissions.

hospital admission. The aim of this study was to conduct a population based paediatric hospitalisations characteristics and their relationship with hospital admission.

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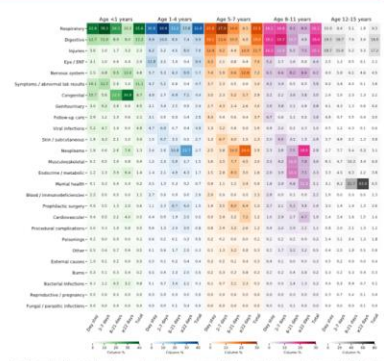


Fig. 1 Proportion of hospitalizations by primary diagnosis/cause, age group and length of stay for children aged 0-15 years in NSW, Australia, 2017-2019.

congenital malformations of gallbladder, bile ducts and liver (supplementary Table S2). In children 1-4 and 5-7 years of age, cancer, mostly leukaemia and brain cancer, represented the most common reasons for long admissions of ≥ 21 and ≥ 22 days (22.7% and 20%, respect-



El texto resaltado hace referencia a una figura (figura 1) del documento que muestra la proporción de hospitalizaciones según el diagnóstico principal o el motivo, el grupo de edad y la duración de la estancia de los niños de 0 a 15 años en Nueva Gales del Sur (Australia) durante los años 2017-2019.

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The majority of studies examining paediatric admissions have been specific or acute medical illness, injury or chronic conditions, such as sleep disorders. 7 While serious illness, injury or cancer have genera

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Algunos críticos sostienen que el hecho de centrarse en enfermedades médicas, lesiones y afecciones crónicas específicas o agudas en los estudios de admisión pediátrica puede pasar por alto la importancia de abordar los problemas de salud pública más amplios que afectan a los niños. Al reducir el alcance a estas afecciones específicas, es posible que los investigadores pierdan la oportunidad de comprender la interconexión de los diversos factores de salud y la forma en que afectan a los resultados generales de salud pediátrica. Además, al centrarse únicamente en estas afecciones, existe el riesgo de descuidar otros problemas de salud igualmente importantes que pueden prevaler entre los niños, pero que no se están estudiando o

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Identifying Predictors of Anal HPV Status in HPV-Vaccinated MSM A M... X

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Resum

Aquest estudi investiga els factors que influeixen en la infecció per VPH anal en homes que tenen relacions sexuals amb homes (HSH) vacunats contra el VPH. Els autors van utilitzar un enfocament de "bosc aleatori" (RF), una tècnica d'aprenentatge automàtic, per analitzar dades d'una cohort prospectiva d'HSH vacunats contra el VPH. Van identificar que l'edat, l'edat de debut sexual, l'estat de VIH, la presència d'ITSS i el seguiment eren els factors més importants associats amb l'estat de VPH anal. A més, van trobar que els factors de risc tradicionals, com l'ús de drogues, les relacions anals passives i múltiples parelles sexuals, tenien una menor importància en predir l'estat de VPH. Els resultats destaquen la necessitat de campanyes de prevenció del VPH específiques per a la població HSH.

Temes clau

- HPV status
- MSM population
- Machine learning
- Risk factors
- HPV vaccination

Journal of Homosexuality

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/wjhm20

Identifying Predictors of Anal HPV Status in HPV-Vaccinated MSM: A Machine Learning Approach

Honoría Ocagli, Daniele Bottigliengo, Giulia Lorenzoni, Francesco Fontana, Camilla Negri, Gian Michele Moise, Dario Gregori & Libera Clemente

To cite this article: Honoría Ocagli, Daniele Bottigliengo, Giulia Lorenzoni, Francesco Fontana, Camilla Negri, Gian Michele Moise, Dario Gregori & Libera Clemente (2024) Identifying Predictors of Anal HPV Status in HPV-Vaccinated MSM: A Machine Learning Approach, Journal of Homosexuality, 71:3, 741-757, DOI: 10.1080/00918369.2022.2132574

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Identifying Predictors of Anal HPV Status in HPV-Vaccinated MSM: A Machine Learning Approach Honoría Ocagli, MA a, Daniele Bottigliengo, PhDa, Giulia Lorenzoni, PhDa, Francesco Fontana, MDc, Camilla Negri, MDc, Gian Michele Moise, MDc, Dario Gregori, PhD a, and Libera Clemente, MDc

aUnit of Biostatistics, Epidemiology and Public Health, Department of Cardiac, Thoracic, Vascular Sciences, and Public Health, University of Padova, Padova, Italy; bDivision of Laboratory Medicine, University Hospital Giuliano Isontina (ASU GI), Trieste, Italy; cSTI-AIDS Unit, University Hospital Giuliano Isontina (ASU GI), Trieste, Italy

ABSTRACT Anal human papillomavirus (HPV) infection has a high prevalence in men who have sex with men (MSM), resulting in an increased risk for anal cancer. The present work aimed to identify factors associated with HPV in a prospective cohort of HPV-vaccinated MSM using a random forest (RF) approach. This observational study enrolled MSM patients admitted to an Italian (sexually transmitted infection) STI-AIDS Unit. For each patient, rectal swabs for 28

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Resum

Aquesta investigació multicèntrica va desenvolupar un nou algorisme d'aprenentatge profund per a la detecció i diferenciació automàtica de lesions precanceroses del carcinoma escamós anal (ASCC) a partir d'imatges d'anoscòpia d'alta resolució (HRA). Aquest algorisme, format per una xarxa neuronal convolucional (CNN), va demostrar una precisió global del 94,6% en la diferenciació entre lesions intraepitelials escamoses de grau baix (HSIL) i lesions intraepitelials escamoses de grau baix (LSIL) en un conjunt de dades extens que incloua exàmens amb colposcòpi convencional i videoproctoscopi digital. El sistema va mostrar una bona capacitat d'interoperabilitat a través de

Resum d'àudio

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- Com s'ha desenvolupat i validat l'algorisme d'aprenentatge profund per a la detecció de lesions precanceroses de l'anus?
- Quins són els punts forts i les limitacions de l'algorisme d'aprenentatge profund en comparació amb els mètodes tradicionals?
- Quines són les implicacions potencials de l'algorisme d'aprenentatge profund per a la detecció i el tractament del càncer anal?

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AI Can Help You Ask Better Questions — and Solve Bigger Problems

by Hal Gregersen and Nicola Morini Bianzino

May 26, 2023



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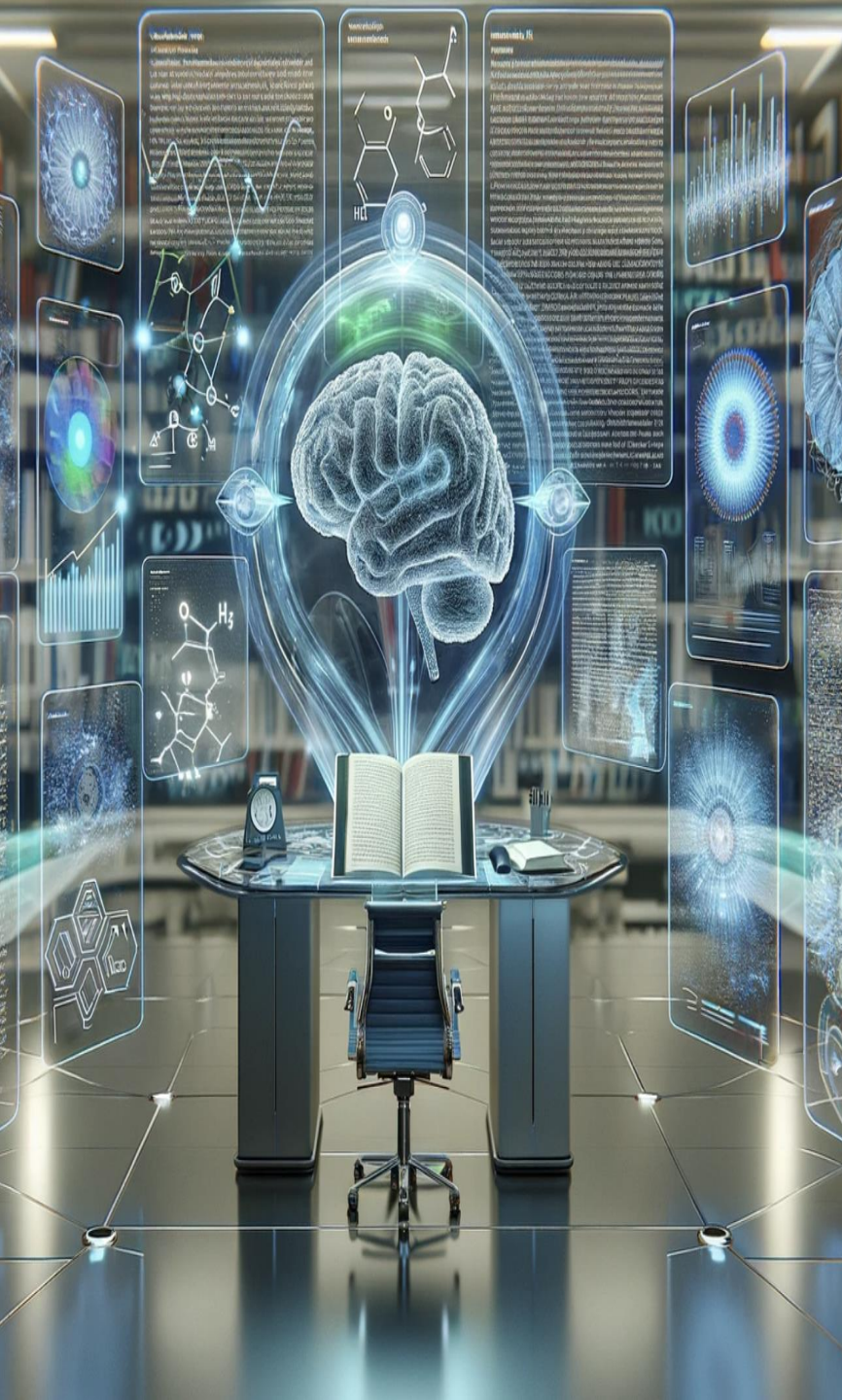
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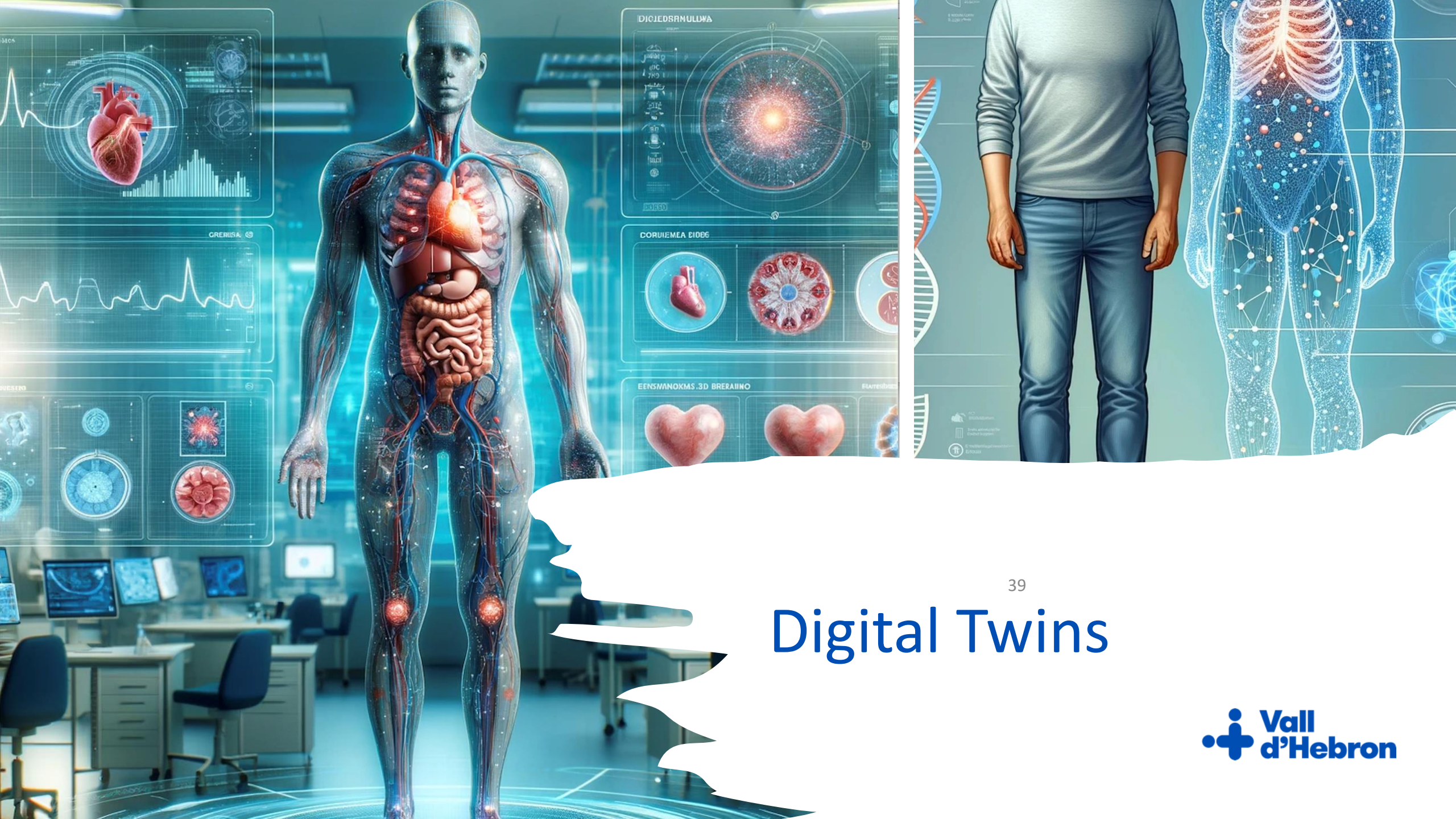
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- Dataset/ AI/ Machine Learning / Deep Learning
- Applications of Artificial Intelligence in Anal Dysplasia:
 - Screening and Diagnostic Assistance
 - HPV Risk Stratification
 - High-Resolution Anoscopy (HRA) Support
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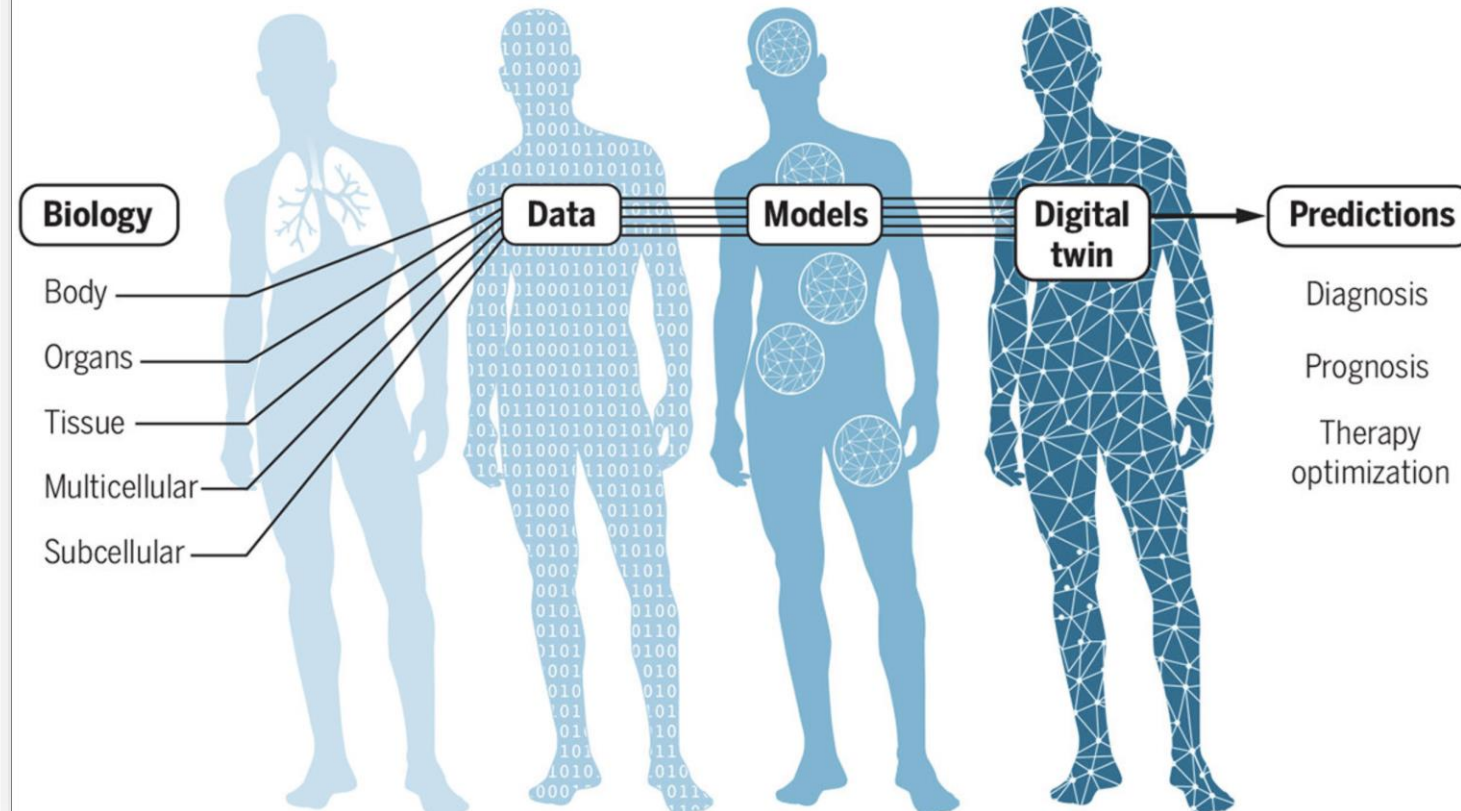
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Digital Twins

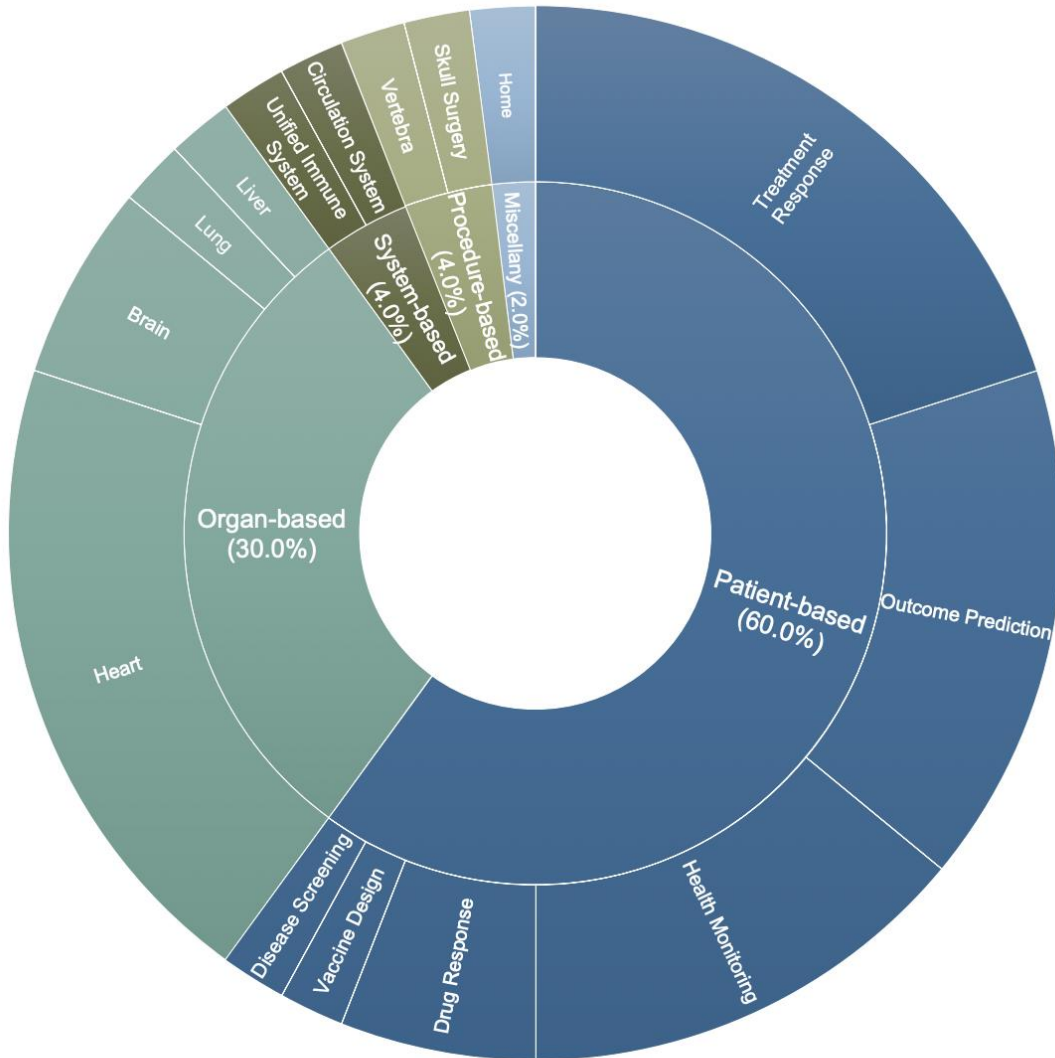
Digital Twins

Building a personalized digital twin

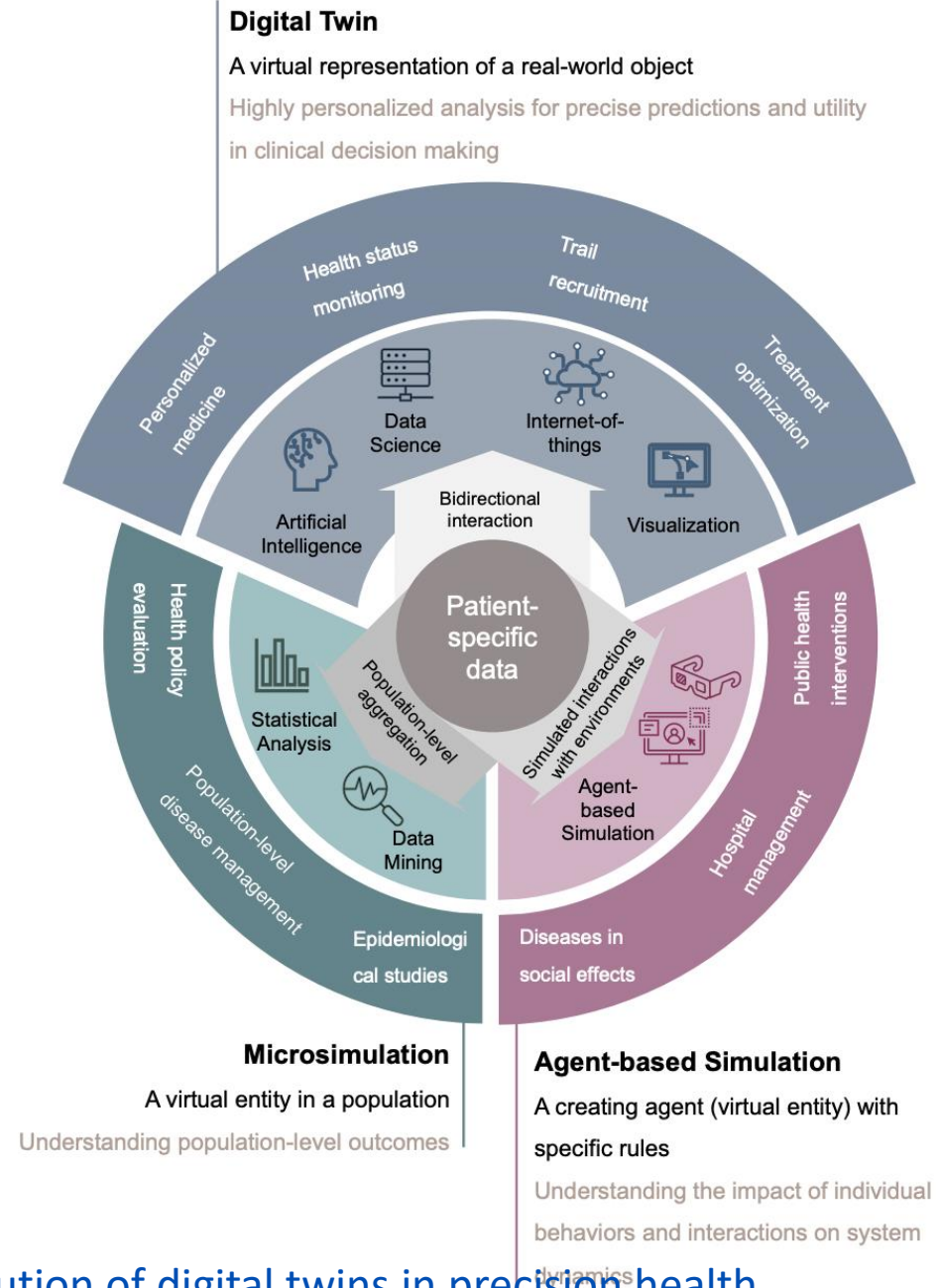
Data from multiple scales are needed to build computational representations of biological processes and body systems that are affected by viral infection. These submodels are integrated and personalized with clinical data from individual patients. The digital twin can then be used to derive predictions about diagnosis, prognosis, and efficacy and optimization of therapeutic interventions.



Type of current health digital twins



- Miscellany (2.0%)
- Procedure-based (4.0%)
- Organ-based (30.0%)
- Patient-based (60.0%)
- System-based (4.0%)



Huang Y, Dai H, Xu J, Wei R, Sun L, Guo Y, Guo J, Bian J. Evolution of digital twins in precision health applications: a scoping review study. Res Sq [Preprint]. 2024 Aug 7:rs.3.rs-4612942.

TAKE HOME MESSAGES

- ✓ The **integration of AI into clinical** practice can revolutionize the management of anal dysplasia by improving **screening, diagnostic accuracy, personalize treatment,** and optimize resource enhancing the precision and personalization of treatment, while improving efficiency.
- ✓ Machine learning models can integrate multiple clinical, demographic, and laboratory variables (such as age, HPV viral load, HIV co-infection) **to predict the risk of dysplasia** progressing to anal cancer.
- ✓ **Future of AI in Healthcare:** AI's role in healthcare will continue to grow, **transforming the daily life of healthcare professionals,** clinical workflows and decision-making processes by increasing precision, personalization, and efficiency in treatments.





Thank you

anna.sala@vallhebron.cat