

Applying AI in Research: Possibilities and Challenges

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The outline

- 1 Overview of Artificial Intelligence**
- 2 AI Revolutionize Healthcare**
- 3 AI Aid in Research**



1

Overview of Artificial Intelligence



1

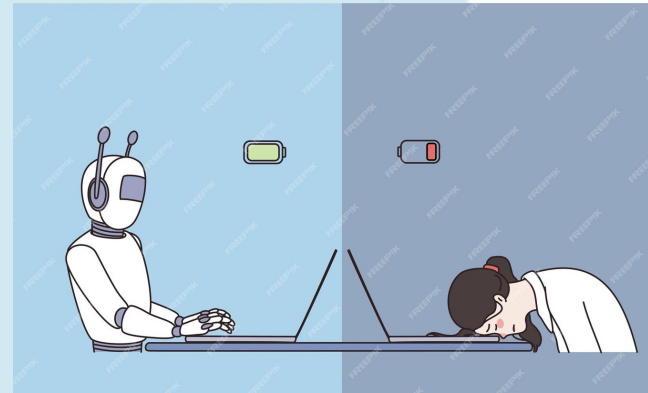
Overview of Artificial Intelligence

What is AI?

“technology that enables computers and machines to **simulate human intelligence** and **problem-solving** capabilities” IBM.

Why AI?

- Automate repetitive tasks
- Improves efficiency and productivity



Will AI replace humans?





2

AI Revolutionize Healthcare



2

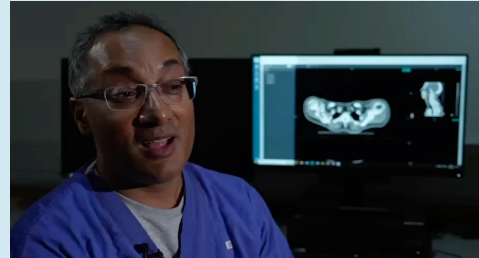
AI Revolutionize Healthcare

- Human ORGANS-ON-CHIPS



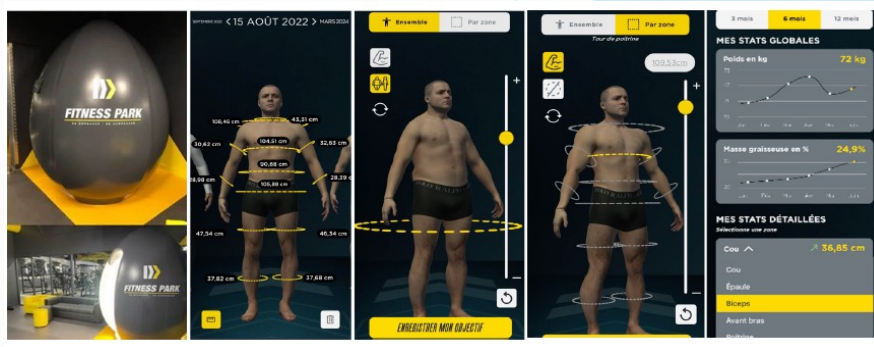
Credit: Wyss Institute at Harvard University

- OSAIRIS: AI cancer imaging tool



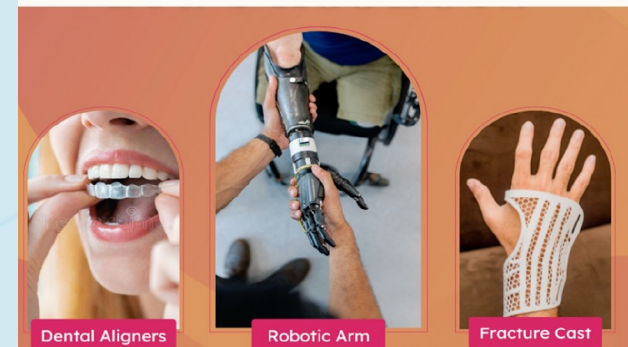
Credits: Cambridge and Microsoft

- Disease Diagnosis with Digital Twin technology:



Credits: tOOinn

- 3D printing technology

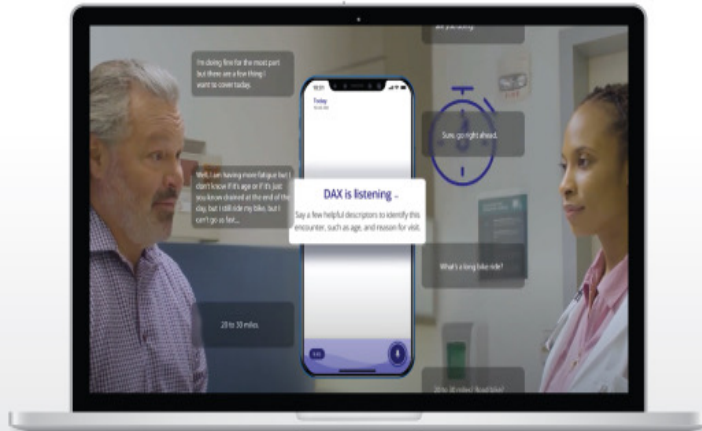


Credits: 3D creative

2

AI Revolutionize Healthcare

- **NUANCE DRAGON AMBIENT EXPERIENCE (DAX)**



- **GOOGLE VERTEX AI SEARCH for health**

pulls information from various sources like patient records, notes, and even scanned documents. Clinicians can access information, answer questions, and caption images.

- **Awesome Healthcare**



- **Azure AI**

How to use Text Analytics for health in Azure AI Language

1 Named Entity Recognition:

Key terms highlighted & labelled

| 054351 | 2/14/2001 12:00:00 AM | CORONARY ARTERY DISEASE

Date Time Diagnosis

Signed Discharge Date: 4/24/2001 ADMISSION DIAGNOSIS:

AdministrativeEvent Adminis..

2 Entity Linking: Terms linked to respective UMLS codes

open heart surgery UMLS: C01897...

TreatmentName ✓ UMLS: C0189745

CHV: 000019333

MOR: 10048935

MEDLINEPLUS: 4119

SNM: P1-31004

3 Relation Extraction:

Related terms associated together

Time of condition

2:30 am this morning of a sore throat UMLS: C0242429

TIME SYMPTOM_OR_SIGN

4 Assertion Detection:

Terms also labelled with contextual modifiers (i.e. certainty, conditionality, association)

but remains unsure if she wants to start adjunct hormonal therapy (Type1) Please hold

TREATMENT NAME

lactulose UMLS: C022951 Hospital Condition 2 diarrhea UMLS: C001881 (Type1) women

SYMPTOM_OR_SIGN CONDITION QUALIFIER



3

AI Aid in Research

3

AI Tools in Research

1. Use tools developed for the scientific fields.
2. Do not trust and depend on these tools (hallucination).
3. Knowledge cutoff (ChatGPT 4.0 April 2024).

Search engines	Literature Mapping	Reference Management	Writing and Finalising
Semantic Scholar Sourcelly SciSpace System Pro SciLynk Scinapse Perplexity R discovery Scite.ai	Litmaps Connected Papers Inciteful Lateral	Zotero Humata Mendeley Papersapp EndNote Paperpile Overleave texStudio	Moonbeam AI Writer Jenni.ai Trinka.ai Writefull Paperpal Penelope Grammarly Quillbot



3

AI Tools in Research: can not do

1. Data and source quality
2. Interpretability and explainability
3. Clinical context and human expertise
4. Data privacy and security
5. Generalization and validation
6. Regulatory approval and adoption

Should I learn AI and programming?

Basic: AI, machine learning (**Bias**), and programming (low code - no code).

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