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# AI in Healthcare

*(an update)*

**Dr. Mohamed AbdulRazaq Nasaif**

MB ChB, EBCEM, MRCEM, MRCS, MBA, PG Dip Med, PG Cert CKM, CPTD, CHSE, ABAIM

Training & Development Expert

Emirates Health Services



# Outline



Introduction to AI



Benefits of AI in Healthcare



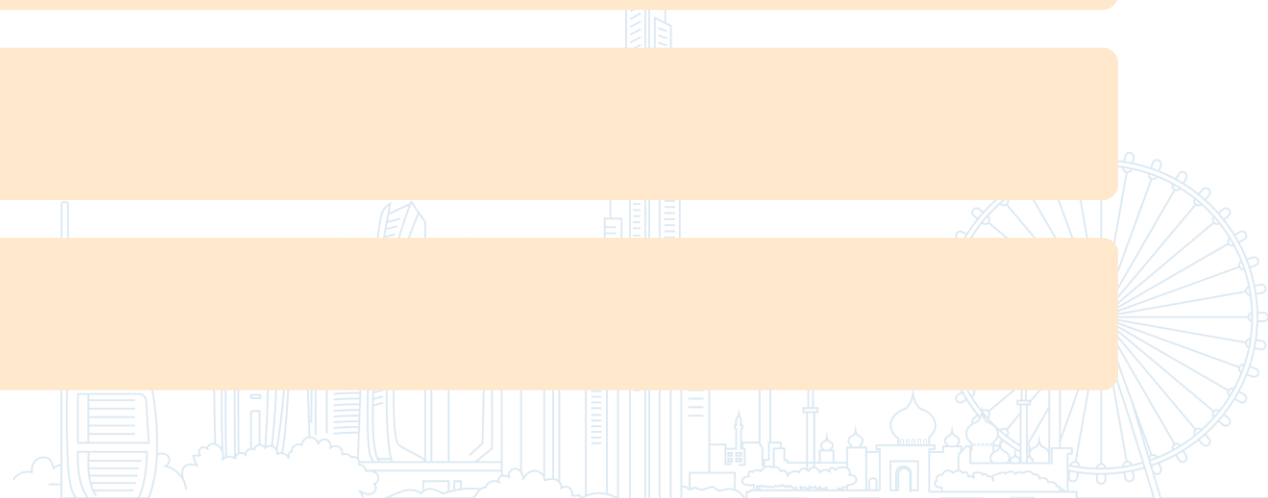
Challenges & Considerations



Will AI Replace Us?



Ending thoughts





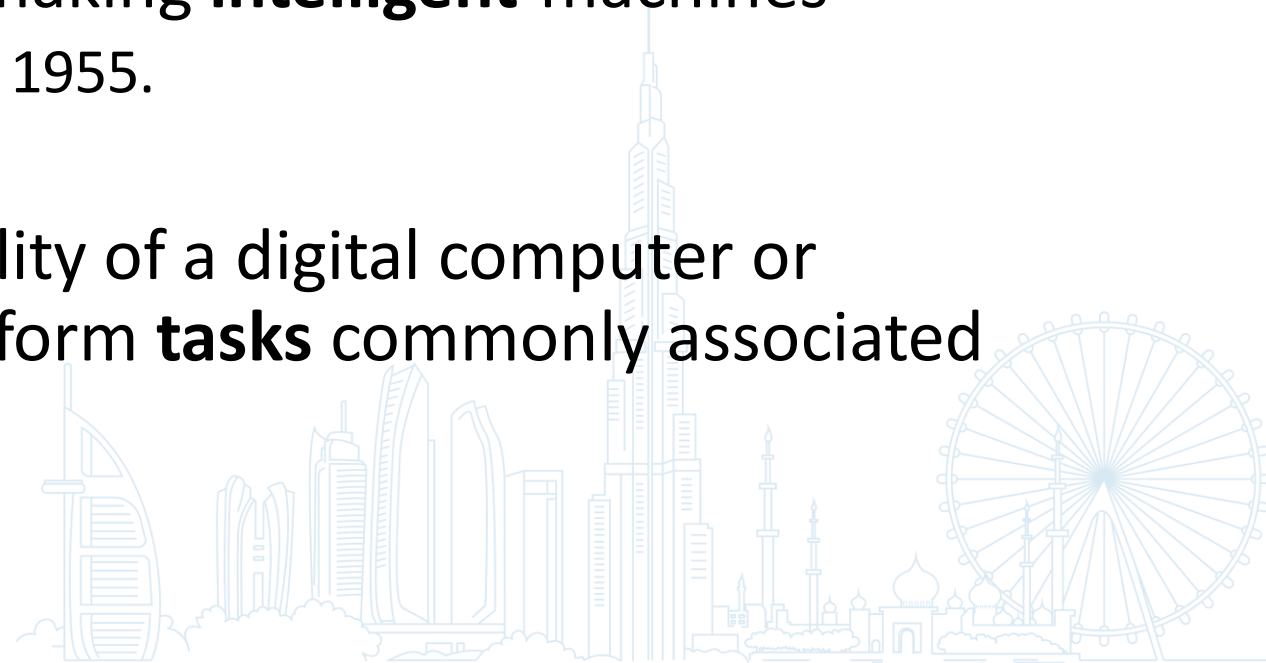
# Introduction to AI





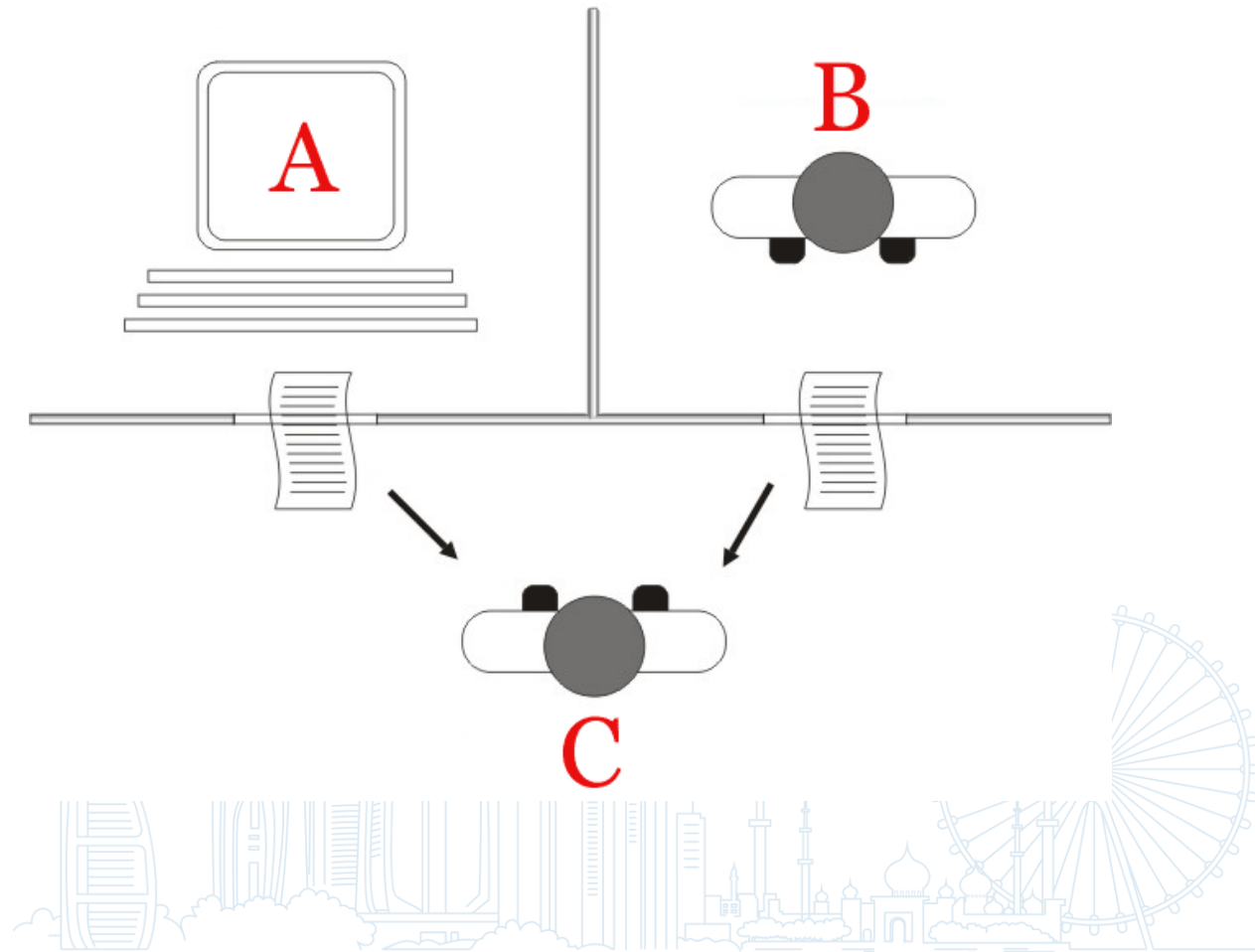
# What is AI?

- “A machine that can **learn** from experience”
  - Alan Turing, University of Manchester, 1947.
- “The science and engineering of making **intelligent** machines”
  - John McCarthy, Stanford University, 1955.
- “Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform **tasks** commonly associated with intelligent beings.”
  - Encyclopedia Britannica, 2024.



# Turing Test

- “Imitation Game”
  - 1950
- Intelligent (= AI/Human)  
vs Not intelligent (= computer)
- Test of a machine's ability to exhibit intelligent behavior **equivalent to, or indistinguishable from**, that of a human.



# Everyday Applications of AI



## Computer Vision

Face recognition

Photo enhancements / filters

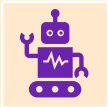


## Natural Language Processing (NLP)

Speech-to-Text (STT)

Text-to-Speech (TTS)

Google Translate



## Generative AI / LLMs

Chat GPT

Google Bard / Gemini

Microsoft Co-Pilot

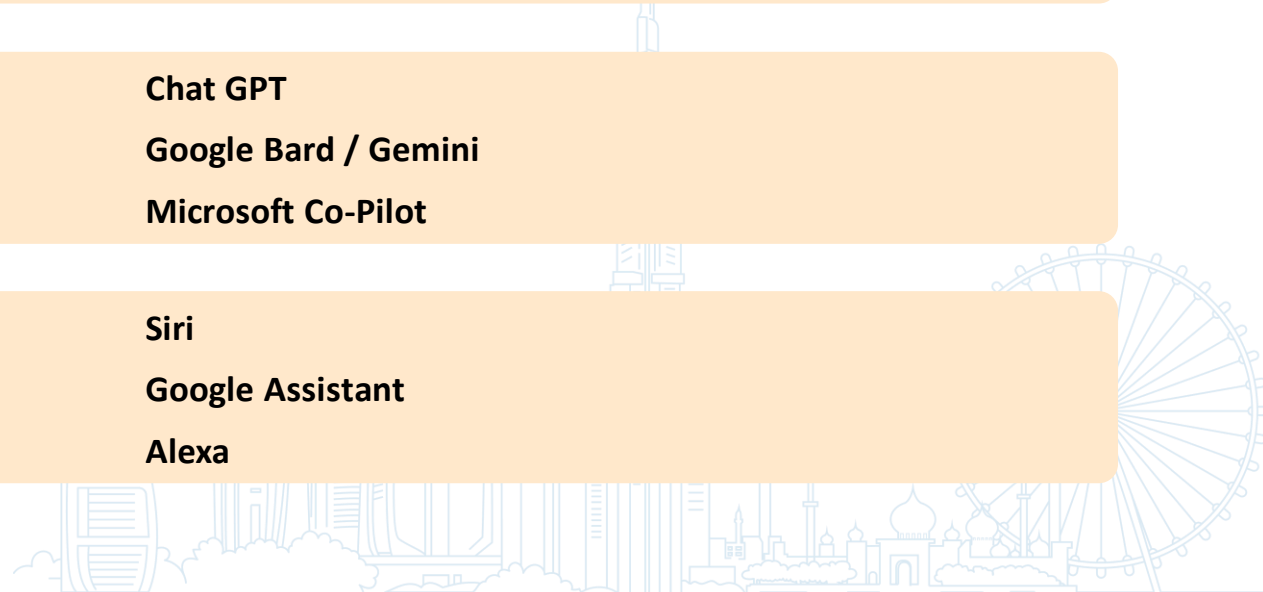


## Multiple

Siri

Google Assistant

Alexa





# Benefits of AI in Healthcare

- 5 selected benefits





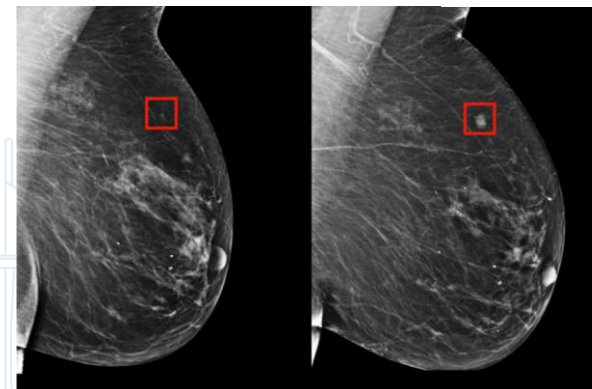
# Improved Diagnostic Skills & Screening

- Diabetic retinopathy
  - [Artificial intelligence for diabetic retinopathy screening,... : Current Opinion in Ophthalmology \(lww.com\)](#)
- CXR
  - [Commercially Available Chest Radiograph AI Tools for Detecting Airspace Disease, Pneumothorax, and Pleural Effusion | Radiology \(rsna.org\)](#)
  - [Autonomous Chest Radiograph Reporting Using AI: Estimation of Clinical Impact | Radiology \(rsna.org\)](#)
- Mammogram
  - [Performance of a Breast Cancer Detection AI Algorithm Using the Personal Performance in Mammographic Screening Scheme | Radiology \(rsna.org\)](#)
  - [Artificial intelligence-supported screen reading versus standard double reading in the Mammography Screening with Artificial Intelligence trial \(MASAI\): a clinical safety analysis of a randomised, controlled, non-inferiority, single-blinded, screening accuracy study - The Lancet Oncology](#)
- Melanoma
  - [Implementation of artificial intelligence algorithms for melanoma screening in a primary care setting | PLOS ONE](#)



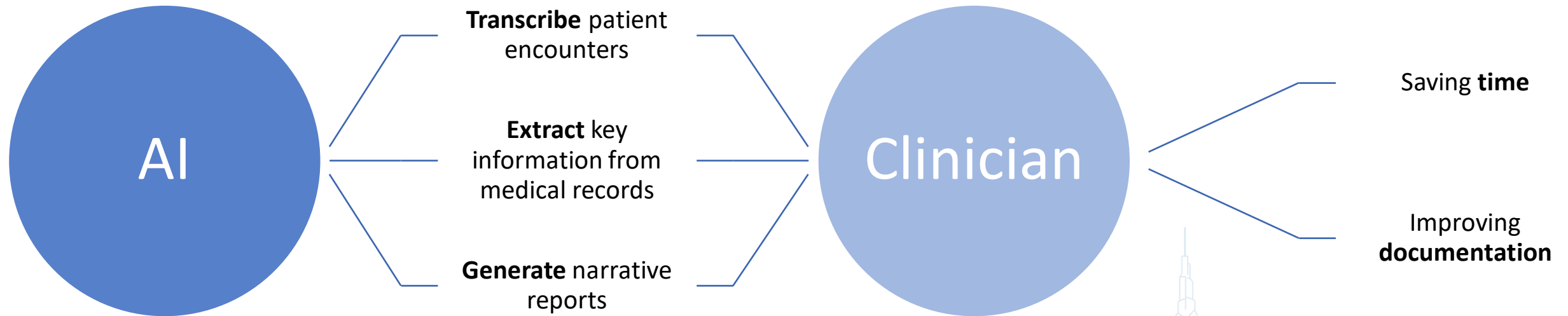
AUTOGENERATED REPORT

RADIOLOGIST WORKLIST





# Automated Documentation & Note-Taking



## The digital scribe in clinical practice: a scoping review and research agenda

[Marieke M. van Buchem](#) , [Hileen Boosman](#), [Martijn P. Bauer](#), [Ilse M. J. Kant](#), [Simone A. Cammel](#) & [Ewout W. Steyerberg](#)



# Administrative Automation

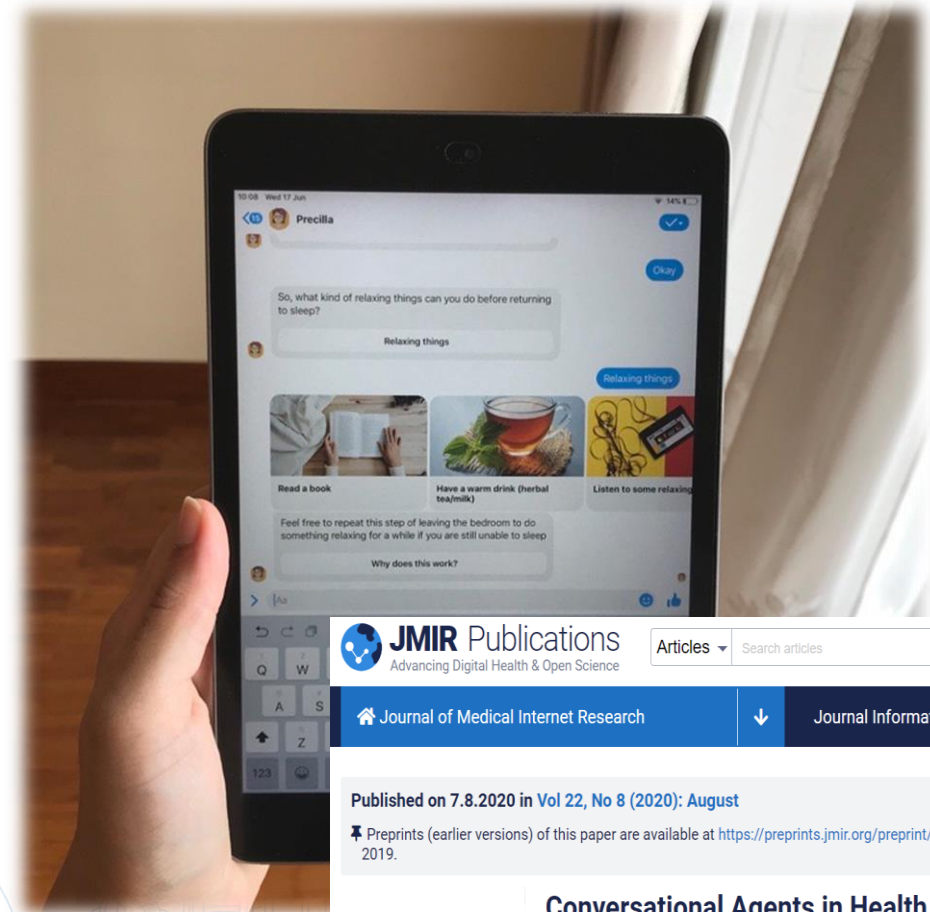


- AI can streamline / automate:
  - Coding & billing
  - Patient data management
- Reduce errors & improve efficiency
- Freeing up time to **focus on patient care.**

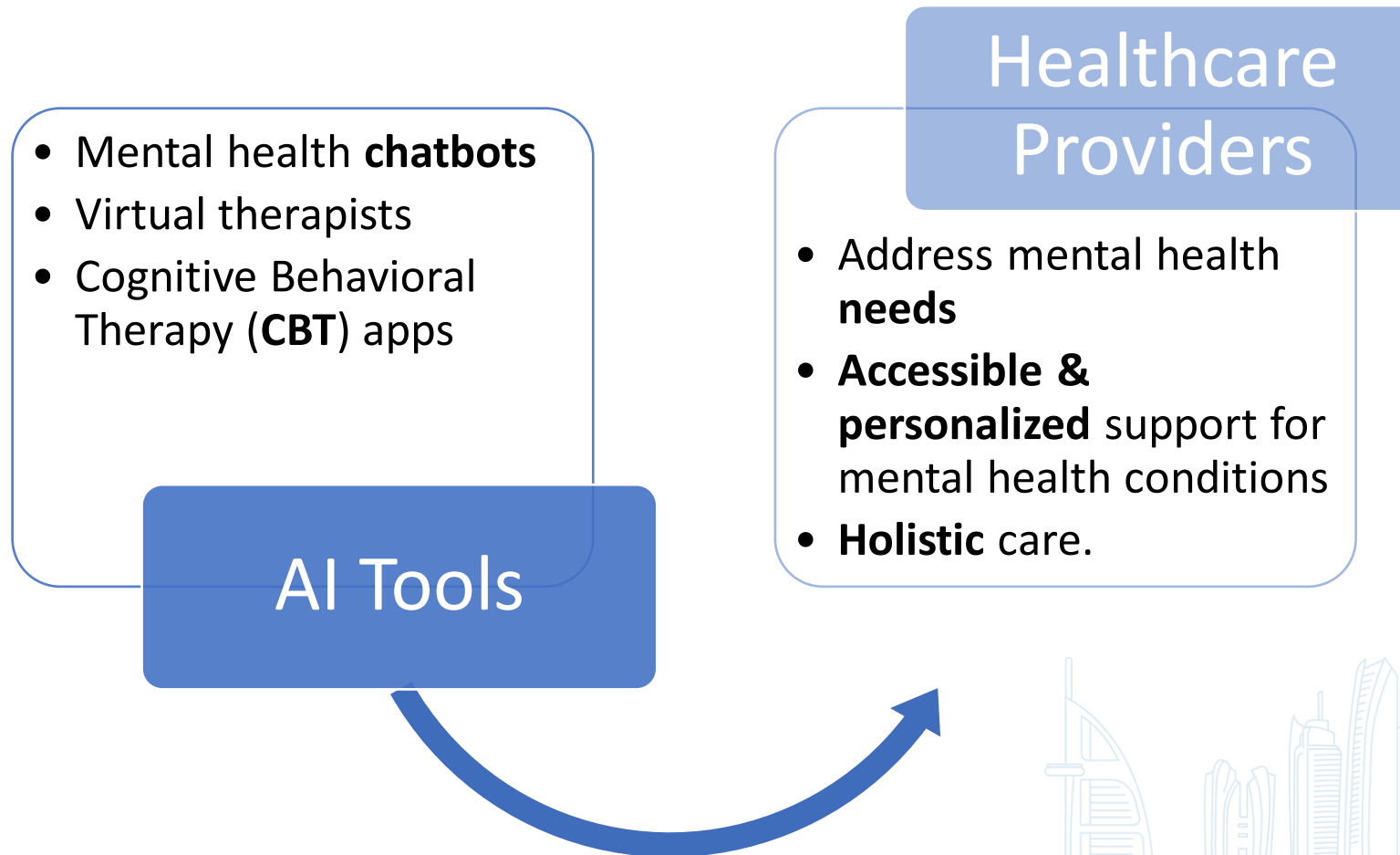


# Patient Education & Engagement

- AI-powered chatbots & virtual assistants
- 24/7 access to healthcare
  - Answering questions
  - Scheduling appointments
  - Guidance on self-care & symptom management



# Behavioral Health Interventions





# Challenges & Considerations

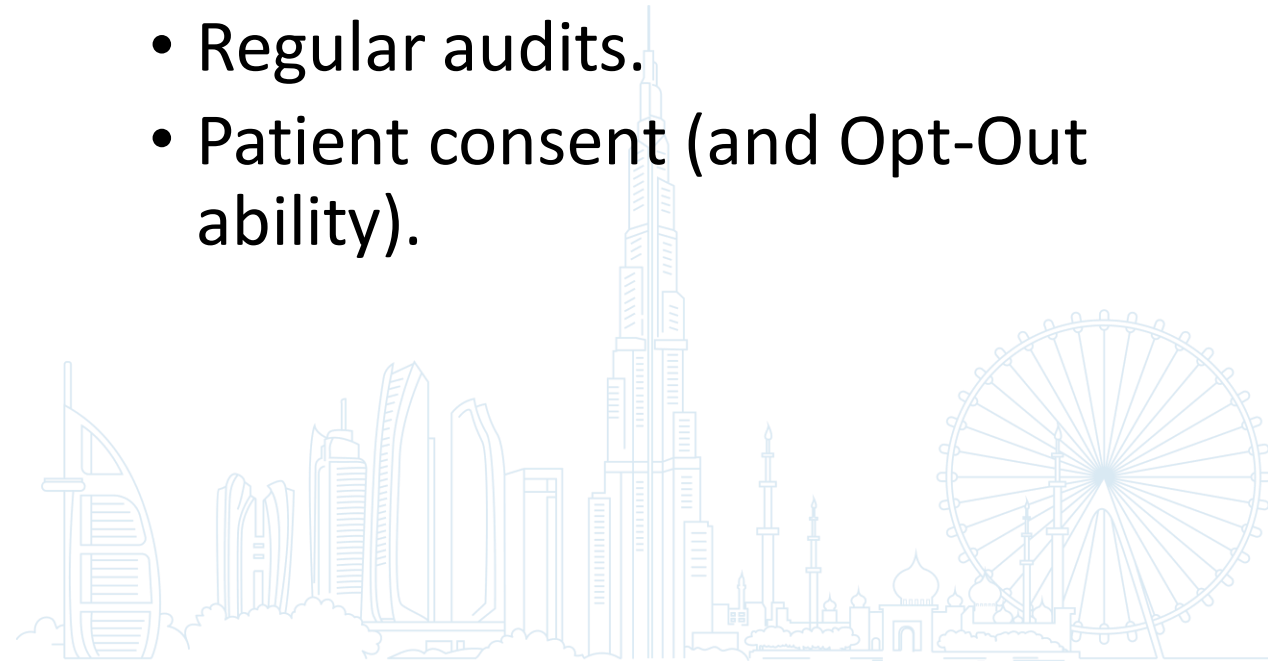
- Data privacy & security
- Biases in algorithms
- Human oversight & control
- Seamless integration into existing workflows
- Ethical considerations & transparency



# Data Privacy & Security



- Robust data governance frameworks
  - Encryption
  - Access controls
  - Regular audits.
  - Patient consent (and Opt-Out ability).



# Potential Biases in Algorithms

- **Minimize Bias:**
  - AI models trained on diverse & representative datasets.
- **Early Detection of Emerging Biases**
  - Regular monitoring and evaluation of AI models.





# Human Oversight & Control

- AI should
  - **not replace** human judgment,
  - but rather **augment** it.
- Healthcare professionals
  - should retain ultimate **responsibility** for clinical decisions,
  - with AI providing **support** and insights.
- Clear guidelines and protocols
  - should be established
  - to define the **roles of AI & humans** in the decision-making process.



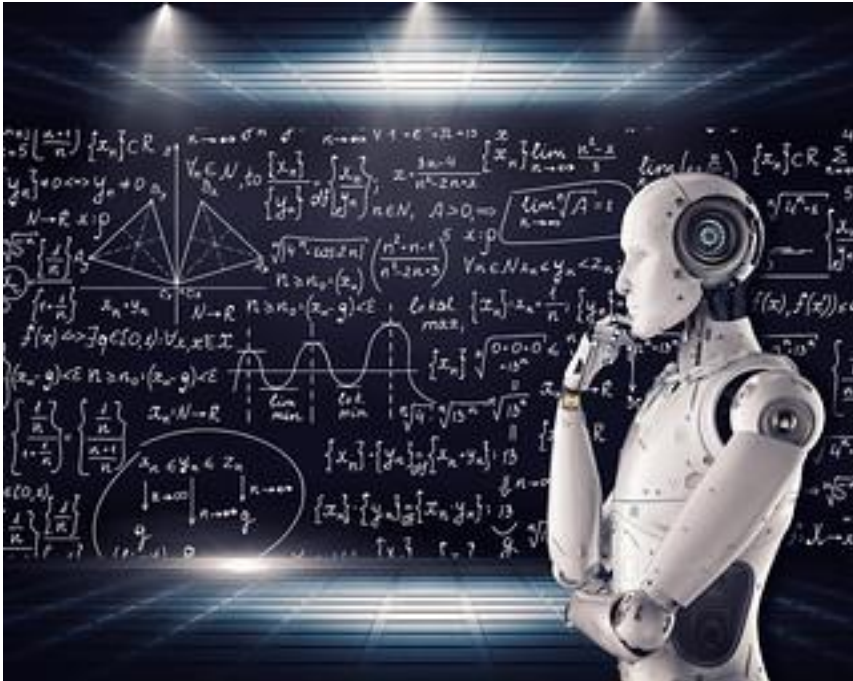


# Seamless Integration into Existing Workflows

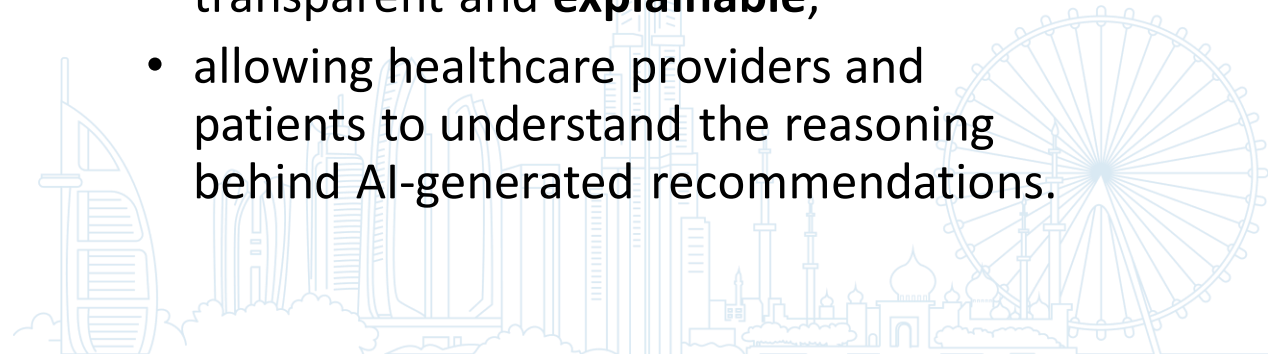
- AI integration should **not**
  - **disrupt** existing **workflows**
  - create **additional burdens** for healthcare providers.
- AI tools should be
  - **user-friendly**
  - **integrate seamlessly** into existing electronic health record (**EHR**) systems.
- **Training & support**
  - are **essential** for effective adoption.



# Ethical Considerations & Transparency



- The use of AI in healthcare raises ethical concerns regarding
  - fairness,
  - accountability, and
  - transparency.
- Clear ethical guidelines should be established to ensure that AI is used responsibly and ethically.
- AI models should be
  - transparent and **explainable**,
  - allowing healthcare providers and patients to understand the reasoning behind AI-generated recommendations.



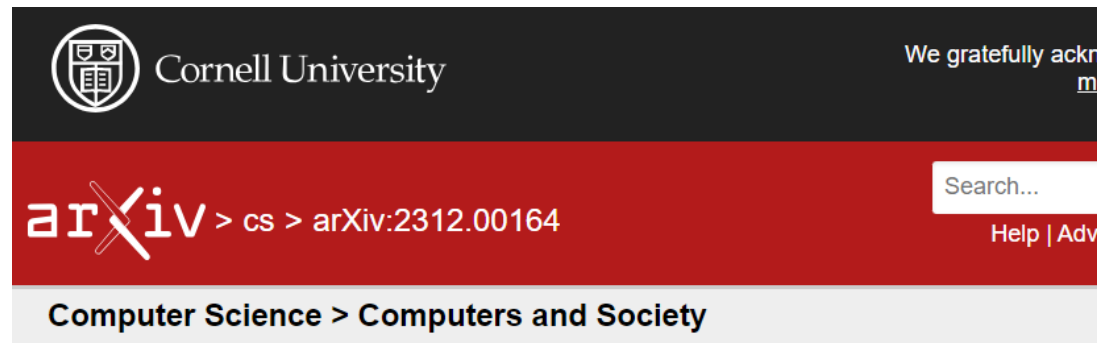


# Will AI Replace us?





# Google AMIE (Articulate Medical Intelligence Explorer)



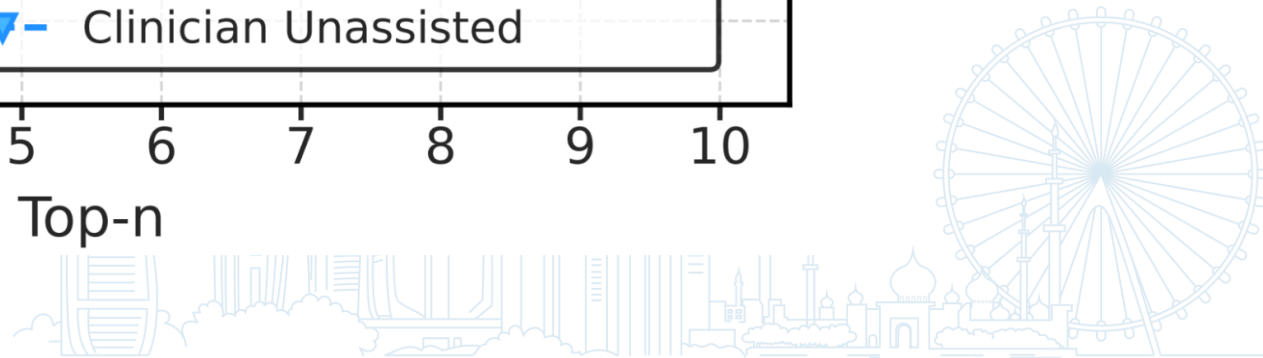
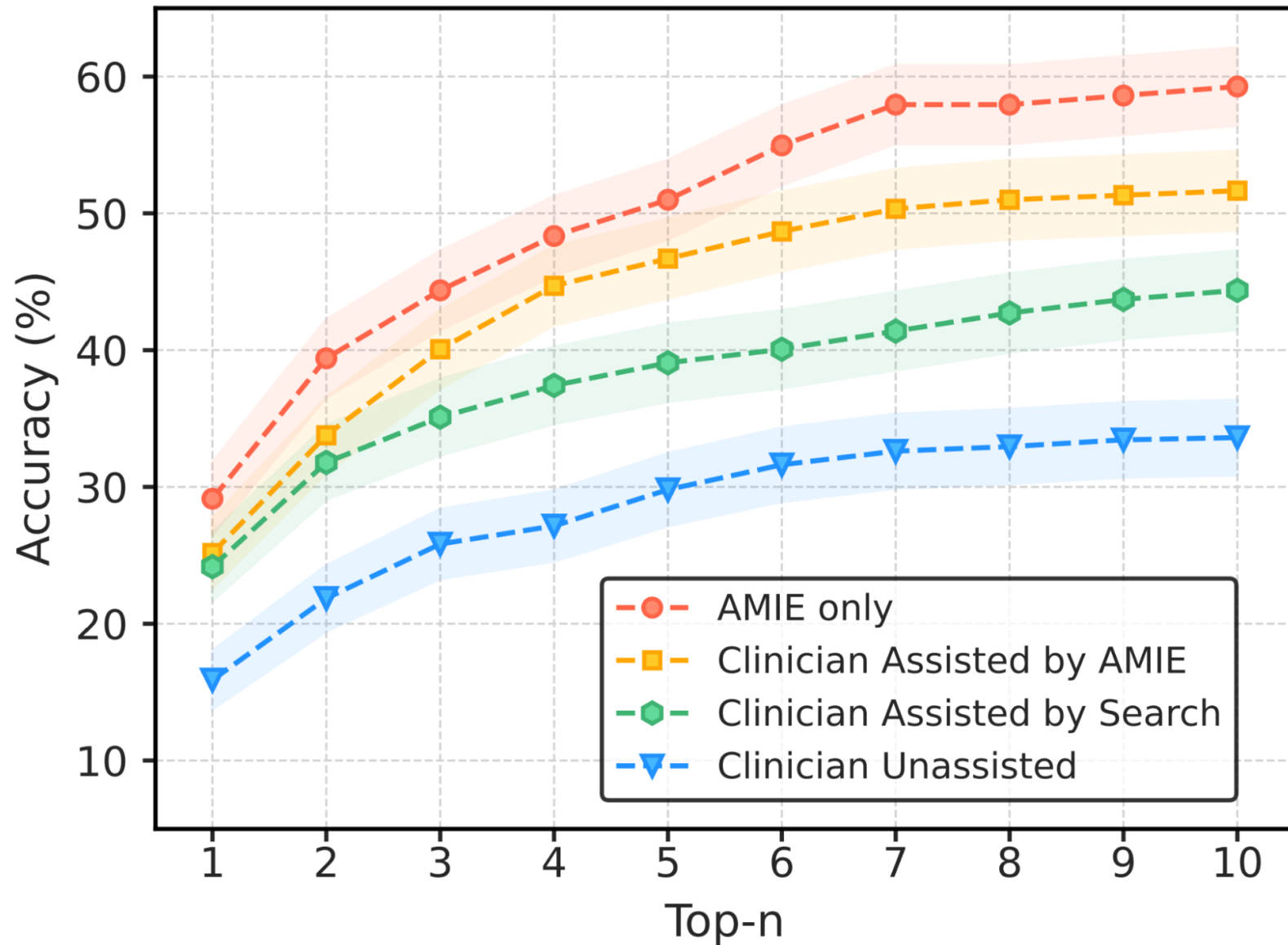
[Submitted on 30 Nov 2023]

## Towards Accurate Differential Diagnosis with Large Language Models

Daniel McDuff, Mike Schaekermann, Tao Tu, Anil Palepu, Amy Wang, Jake Garrison, Karan Singhal, Yash Sharma, Shekoofeh Azizi, Kavita Kulkarni, Le Hou, Yong Cheng, Yun Liu, S Sara Mahdavi, Sushant Prakash, Anupam Pathak, Christopher Semturs, Shwetak Patel, Dale R Webster, Ewa Dominowska, Juraj Gottweis, Joelle Barral, Katherine Chou, Greg S Corrado, Yossi Matias, Jake Sunshine, Alan Karthikesalingam, Vivek Natarajan

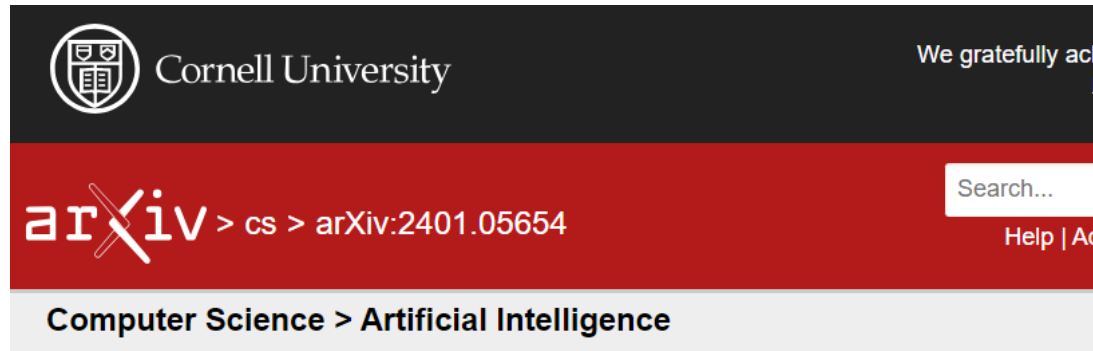
- Our study suggests that our LLM for DDx has **potential to improve clinicians' diagnostic reasoning and accuracy in challenging cases,**
- meriting further real-world evaluation for its ability to empower physicians and **widen patients' access to specialist-level expertise.**







# Who is better clinically? Who is more human?

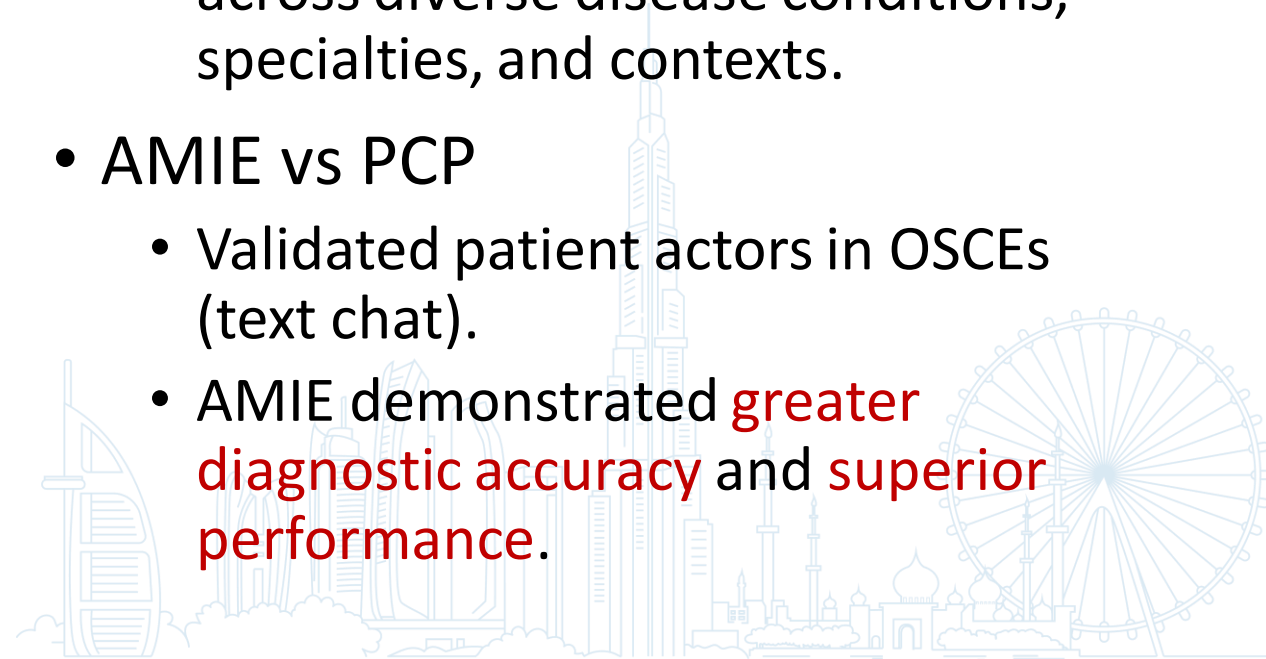


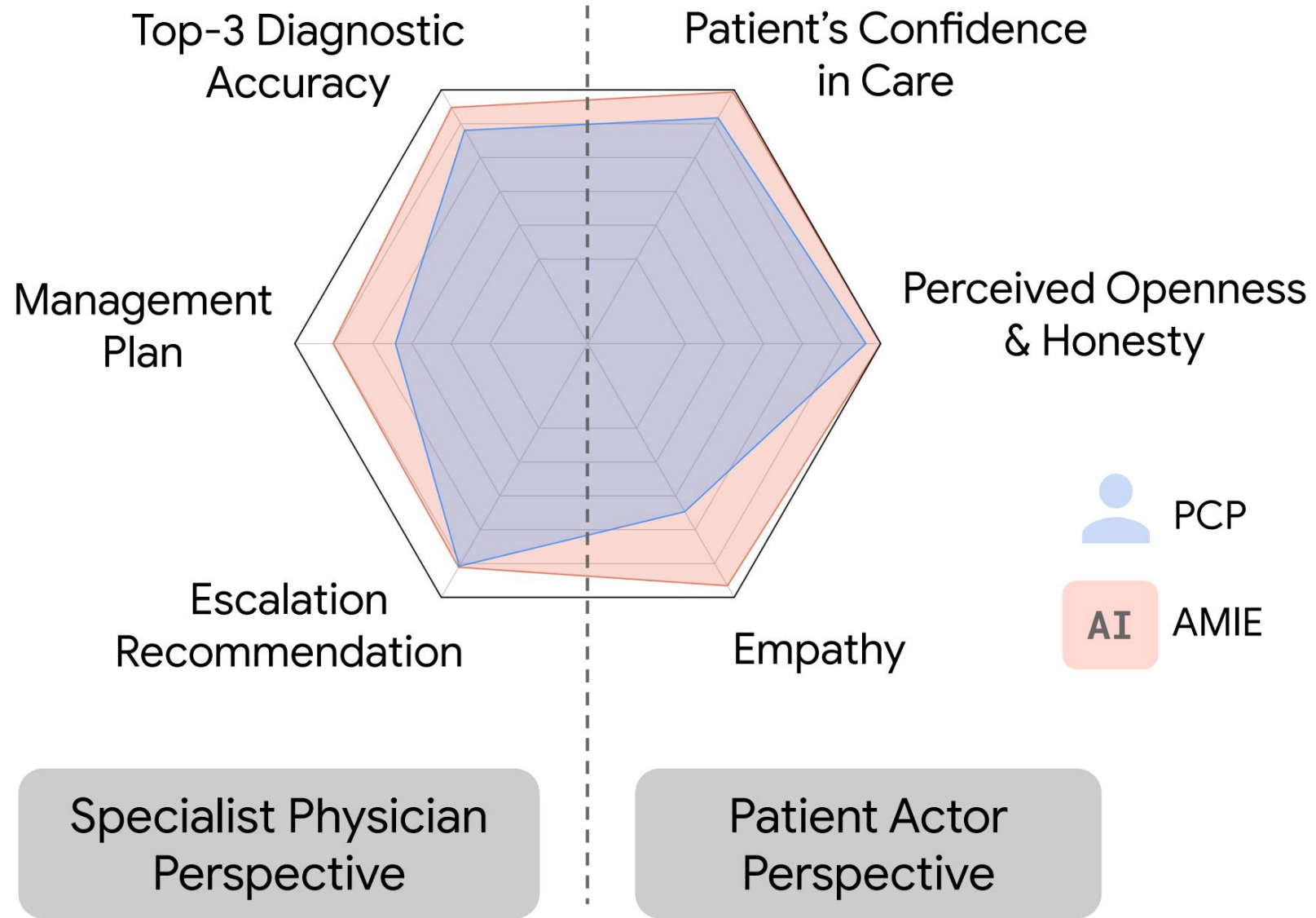
[Submitted on 11 Jan 2024]

## Towards Conversational Diagnostic AI

Tao Tu, Anil Palepu, Mike Schaekermann, Khaled Saab, Jan Freyberg, Ryutaro Tanno, Amy Wang, Brenna Li, Mohamed Amin, Nenad Tomasev, Shekoofeh Azizi, Karan Singhal, Yong Cheng, Le Hou, Albert Webson, Kavita Kulkarni, S Sara Mahdavi, Christopher Sementurs, Juraj Gottweis, Joelle Barral, Katherine Chou, Greg S Corrado, Yossi Matias, Alan Karthikesalingam, Vivek Natarajan

- AMIE uses a novel **self-play** based simulated environment
  - with **automated feedback mechanisms for scaling learning** across diverse disease conditions, specialties, and contexts.
- AMIE vs PCP
  - Validated patient actors in OSCEs (text chat).
  - AMIE demonstrated **greater diagnostic accuracy** and **superior performance**.





Specialist Physician Perspective

Patient Actor Perspective





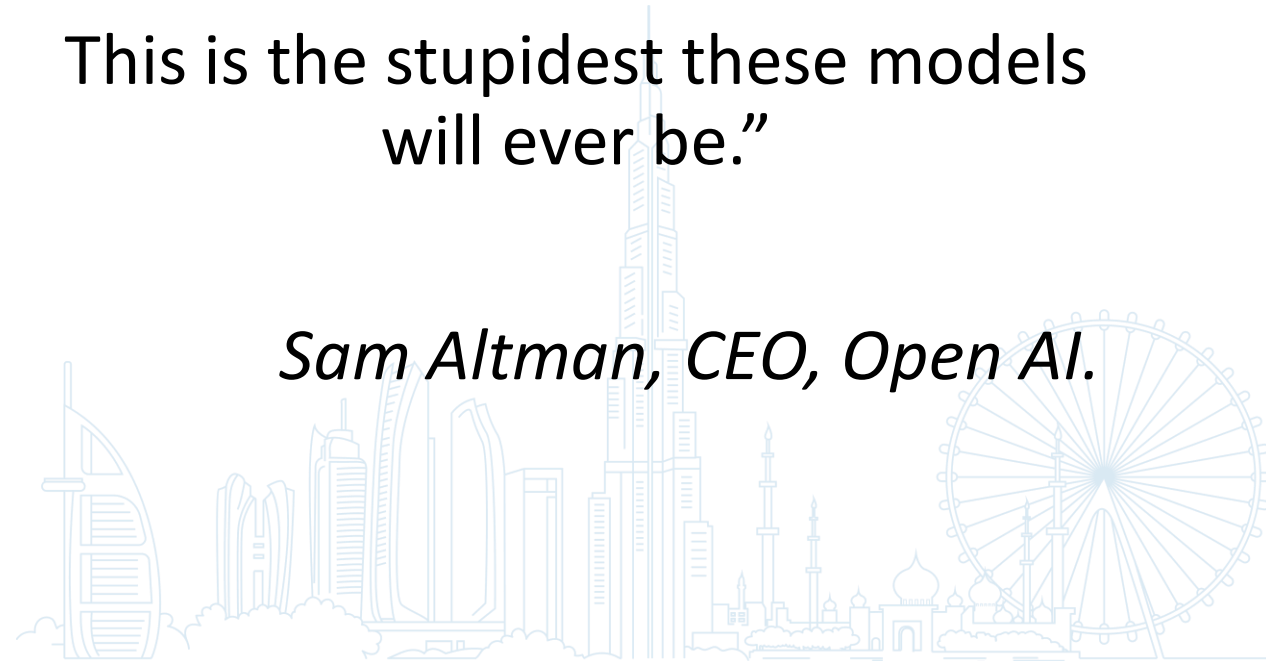
# Where is this going?



“At least for the next 5 or 10 years, we will be on a steep improvement curve.”

This is the stupidest these models will ever be.”

*Sam Altman, CEO, Open AI.*





# Ending Thoughts

- A call for active involvement
- The future is (probably) bright





# The EHR Experience

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## Death by a Thousand Clicks: Where Electronic Health Records Went Wrong

The U.S. government claimed that turning American medical charts into electronic records would make health care better, safer, and cheaper. Ten years and \$36 billion later, the system is an unholy mess: Inside a digital revolution gone wrong. A joint investigation by Fortune and Kaiser Health News.

BY ERIKA FRY AND FRED SCHULTE  
March 18, 2019 at 12:30 PM GMT-4



*“If  
you’re not cooking,  
then  
you’re on the menu”*





# The Future?



MENU **AMA** *ASSN*

DIGITAL

## Augmented intelligence in medicine

UPDATED APR 5, 2024 • 5 MIN READ



# Conclusions

- AI is already here (check your pockets).
- AI has the potential to transform healthcare.
- AI can make healthcare more humane.
- Healthcare Providers need to have a role in building this future.
- The future is (likely) bright, but we need to co-create it.





Thank you

