

AI WILL ALWAYS NEED YOU:

Healthcare



Artificial intelligence (AI) has been around since at least the mid-1950s, but in the last few years (and even weeks) the technology has developed at a rapid rate. It seems like the entire world has its eyes on AI. What can it do, who can it help, who can it hurt, and about one million additional questions, concerns, and insights have folks in both the business and policy worlds activated.

Enter our blog series: AI Will Always Need You – an AI-drafted, human-supervised blog series highlighting the pros, cons, and everything in between about the world of artificial intelligence. We'll ask ChatGPT questions about how AI can be applied across industries and shared responsibility to create ethical, helpful technology and see how it responds. Our last installment covered the financial services industry, but this time around we're diving into how this AI language model addresses healthcare.

How can AI improve early diagnosis and prediction of diseases?

AI has been in use for decades in a variety of industries, healthcare being one of the first to adopt the technology. These are certainly important ways that AI can be used for diagnosis and prediction of diseases, but it's not comprehensive! It does illustrate the wide range of ways that AI is being used already, and will likely increasingly be used, in providing new trustworthy efficiencies.

1. Medical Imaging: AI enhances accuracy in detecting anomalies in X-rays, MRIs, and CT scans.
2. Genomic Analysis: AI predicts disease susceptibility based on genetic data, fostering personalized care.
3. EHR Analysis: AI extracts insights from electronic health records, foreseeing health risks.
4. Wearables: AI-equipped devices monitor vitals and behaviors, detecting early signs of health issues.
5. Pathology: AI aids in quick and accurate analysis of tissue samples.
6. Drug Discovery: AI accelerates identification of drug targets and expedites trials.
7. Telemedicine: AI tracks disease progression remotely and signals deviations for early intervention.
8. Population Health: AI predicts epidemics by analyzing health data trends and stratifies population risks.

We should note that it is inadvisable to share personal information, including health information, with a consumer-level chatbot as those privacy protections are not as assured as of yet.

9. Chatbots: AI chatbots provide preliminary symptom assessment.

10. Research: AI synthesizes study findings and optimizes patient recruitment for clinical trials.

AI's integration promises a proactive and efficient healthcare approach, prioritizing early detection and prevention.

How might AI-driven diagnostics lead to over-reliance and potential misdiagnoses if not properly calibrated?

Over-reliance on improperly calibrated AI diagnostics can result in incorrect conclusions, like false positives leading to unnecessary treatments or false negatives that overlook real health concerns. Additionally, if AI is trained on non-diverse data, it can underperform for certain groups, exacerbating health disparities. This also raises concerns of healthcare professionals developing an over trust in the system, potentially sidelining their own expertise and experience.

AI-driven personalized medicine is already enhancing treatment outcomes today! The FDA has already permitted over 500 AI medical devices to enter the market.

An overly data-driven approach might cause clinicians to miss the larger context of patient-reported symptoms and medical histories. Finally, if the AI isn't regularly updated, it may operate based on outdated medical knowledge. It's essential to integrate AI with human expertise and ensure regular calibration to navigate these challenges.

Can telehealth and AI-driven remote monitoring improve healthcare access for rural or underserved populations? If so, how?

Certainly! Telehealth and AI-driven remote monitoring can greatly enhance healthcare access for rural and underserved populations:

1. Overcome Distance: Reduces need for long travels to access care.
2. Continuous Monitoring: AI can detect health issues early using real-time data.

The use of continuous monitoring here is interesting because a term (remote monitoring) already exists in statute for this kind of routine monitoring of real-time data and is also covered by a CPT reimbursement code.

3. Cost-Efficiency: Reduces costs for routine checks and prevents complications.
4. Triage: AI prioritizes critical cases.
5. Access to Specialists: Bridges the gap between patients and distant experts.
6. Training: Telehealth can train local health workers.
7. Data for Public Health: AI analyzes trends for informed decision-making.
8. Medication Adherence: AI reminders improve medication compliance.
9. Cultural Match: Connects patients to culturally and linguistically compatible providers.
10. Eases Hospital Load: Reduces physical facility usage for non-emergencies.
11. Mental Health: Offers discreet access to mental health services.

Challenges include data security, internet access needs, and adoption willingness.

In light of the growing health workforce shortage in the U.S., perhaps the most understated and underappreciated angle here is AI's potential for improving the caregiver experience. Kudos to ChatGPT for noting that AI can assist with workforce training and reducing hospital loads, but AI will have to be central in addressing healthcare's workforce shortage in a wide range of ways, from backend/administrative to directly assisting with diagnosis and treatment.

Could there be an increase in healthcare disparities if AI systems are predominantly trained on data from specific populations and not others? How can we ensure that AI does not inadvertently introduce biases in treatment recommendations?

When AI systems in healthcare are trained predominantly on data from specific populations and neglect others, there's a genuine risk of exacerbating healthcare disparities. Such a narrow training base can lead to AI systems that are less effective for populations not well represented in the data, potentially resulting in misdiagnoses or inappropriate treatment suggestions. Furthermore, conditions can manifest differently across different ethnic or genetic lines, and an AI unfamiliar with this diversity might miss these nuances. On top of these biological factors, ignoring socioeconomic elements can lead the AI to recommend treatments without considering a patient's broader life situation.

This is probably the surest way for AI to be an unbiased tool for "good." Investing in a diverse workforce is crucial if the United States wants to continue to lead in innovation.

To address these concerns, it's crucial to gather training data that's representative of all populations the AI will encounter. This diverse dataset ensures the AI has a holistic understanding of various conditions across different demographic groups. Additionally, the AI's algorithms should be designed to be transparent. When medical practitioners can understand how the AI reaches its conclusions, they can more effectively interpret and potentially challenge the AI's recommendations.

It's also beneficial to audit AI systems routinely, testing their performance across diverse datasets and ensuring consistent effectiveness. As the AI healthcare field evolves, ethical guidelines emphasizing fairness and equity should be foundational. Collaboration becomes key here: developers should work alongside a varied set of stakeholders, including ethicists, patients, and experts from different backgrounds. This ensures a multiplicity of perspectives are considered during the AI's development.

Moreover, creating channels for clinicians to provide feedback on AI outputs can be instrumental. This feedback not only helps refine the AI system but also builds trust among the users. Encouraging public critique and review of these tools can further ensure accountability. In some cases, rather than aiming for a universal model, it might be beneficial to have AI models tailored to specific populations or regions, ensuring each model is finely tuned to the unique needs of its target audience.

In essence, while AI has the potential to revolutionize healthcare, careful consideration and proactive measures are essential to ensure it doesn't inadvertently introduce or exacerbate biases.

ChatGPT's response here again gets at one of the most important areas that is unsettled for health AI: liability and responsibility. Again, it is vital that policies, whether in statute, regulation, or through an interpretation by a judge in a court, align with the concept of shared responsibility - that those with the ability to minimize risks based on their knowledge and ability should have appropriate incentives to do so.

How can AI assist healthcare professionals in decision-making with the help of data analytics?

We're already seeing the benefits of these solutions with member companies like Podometrics - an in-home device that helps prevent diabetic foot complications.

1. Predicting Outcomes: Foreseeing events like disease progression or readmissions.
2. Diagnostic Support: Analyzing medical images and records for more accurate diagnoses.
3. Treatment Suggestions: Offering evidence-based treatment options based on a patient's history and current research.
4. Drug Discovery: Aiding in finding new drug compounds and tailoring treatments based on genetics.
5. Resource Management: Helping prioritize patient care and resource distribution in hospitals.
6. Monitoring: Using wearables and devices to track patient data and alert professionals to significant changes.
7. Epidemiological Tracking: Identifying and predicting disease outbreaks.
8. Workflow Enhancement: Improving operational efficiency in healthcare settings.
9. Cost Analysis: Evaluating the cost-effectiveness of treatments.

Is this referring to updates to the AI/training data? Or the healthcare professionals using it? Because both AI systems and the people using them should be up-to-date.

10. Continuous Updates: Refreshing its knowledge with new data for up-to-date recommendations.

While AI provides valuable insights and efficiency, it should complement, not replace, human judgment in healthcare decisions.

How will patient privacy be maintained when vast amounts of data are fed into AI systems? What is the risk of cybersecurity breaches in AI-driven medical devices and systems?

Maintaining patient privacy when vast amounts of data are fed into AI systems is a challenge that the healthcare industry is deeply attentive to. One common approach is de-identification, where

patient data is anonymized by removing personally identifiable information before being used in AI models.

De-identification is definitely an important privacy-enhancing approach, but even it is not a total solution. Even after data is de-identified, sophisticated techniques or auxiliary information could allow malicious actors to re-identify individual data points.

This ensures that the individual data points cannot be traced back to specific patients. Encrypted data storage and transmission are also essential, meaning data is coded in such a way that unauthorized access would find it unintelligible. Consent plays a pivotal role as well; patients must be informed about how their data will be used, and they must provide explicit permission.

However, the integration of AI into medical devices and systems introduces potential cybersecurity risks. AI-driven medical devices, like any connected devices, can be vulnerable to cyberattacks. Hackers may try to gain unauthorized access to these devices to steal valuable medical data, manipulate device functionality, or use them as entry points into broader networks. Such breaches not only compromise patient data privacy but can also pose direct health risks if the operation of medical devices is altered. For instance, an unauthorized change in the dosage instructions on an AI-driven insulin pump could have life-threatening consequences.

For what it's worth, these risks aren't at all attributable to the fact that the medical device is "AI-driven." Credit to ChatGPT for saying that these risks exist for "any connected device."

The industry counters these risks through rigorous security protocols, continuous monitoring, and regular software updates to address potential vulnerabilities. Nevertheless, as AI systems become more integrated into healthcare, the continuous evolution of cybersecurity measures will be crucial to protect both patient data and their physical well-being.

Are there potential legal ramifications if an AI-driven system provides incorrect advice or treatment recommendations?

Yes, there are potential legal ramifications if an AI-driven system provides incorrect advice or treatment recommendations in the healthcare sector.

1. Negligence & Malpractice: Traditional medical malpractice laws revolve around negligence by healthcare providers. If an AI system provides an incorrect recommendation that a healthcare professional follows, leading to harm, there may be questions about who is negligent: the medical professional for relying on the tool, the creators of the AI system, or both.

Under the current federal framework, if a device or app that features AI presents enough potential risk that it is subject to the FDA's premarket approval or clearance process, the FDA reviews the potential risks to patients that the device poses. Liability is imposed on the manufacturer to mitigate those biases via the FDA's review/approval framework.

2. Product Liability: AI developers and manufacturers might be subject to product liability claims if their AI system has defects or provides erroneous advice that leads to patient harm.

The App Association and CHI are working with FDA to update its review framework so that it proactively addresses potential bias in datasets and algorithms and can properly vet device applications for those potential risks.

3. Standard of Care: The introduction of AI in healthcare might change the 'standard of care' expected of healthcare professionals. If an AI tool becomes widely adopted and is proven to be effective, not using it might be considered below the standard of care.

This isn't as easy as it might seem. When it is relevant to a treatment plan, it's going to be important for developers and users of health AI to develop their own risk-based and tailored communications and engagement plan that enables them to explain to patients the key aspects of the AI application and its performance, as well as its alignment with the latest best practices and regulatory requirements. This communication needs to be easily understood - not eight pages of size 8 font text that no one reads.

4. Informed Consent: Patients must be informed about the use of AI in their treatment. If a doctor uses an AI tool without informing the patient, and something goes wrong, there might be grounds for a claim based on the lack of informed consent.

5. Data Privacy: AI systems rely on vast amounts of data. Any misuse or breach of patient data by these systems can lead to legal actions based on data protection regulations.

6. Regulation & Oversight: Many jurisdictions are still determining how to regulate AI in healthcare. As these regulations take shape, they will dictate legal responsibilities and potential ramifications for non-compliance.

The legal landscape regarding AI in healthcare is still evolving. As AI systems become more integrated into patient care, there will likely be test cases that help establish precedents. Healthcare providers, AI developers, and manufacturers need to stay informed about legal developments and be proactive in ensuring that their AI tools are safe, effective, and transparent.