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What is artificial intelligence in medicine?

Artificial intelligence in medicine is the use of machine learning models to help process medical data and give medical professionals important insights, improving health outcomes and patient experiences.

How is artificial intelligence used in medicine?

Thanks to recent advances in computer science and informatics, artificial intelligence (AI) is quickly becoming an integral part of modern healthcare. AI algorithms and other applications powered by AI are being used to support medical professionals in clinical settings and in ongoing research.

Currently, the most common roles for AI in medical settings are clinical decision support and imaging analysis. Clinical decision support tools help providers make decisions about treatments, medications, mental health and other patient needs by providing them with quick access to information or research that's relevant to their patient. In medical imaging, AI tools are being used to analyze CT scans, x-rays, MRIs and other images for lesions or other findings that a human radiologist might miss.

The challenges that the COVID-19 pandemic created for many health systems also led many healthcare organizations around the world to start field-testing new AI-supported technologies, such as algorithms designed to help monitor patients and AI-powered tools to screen COVID-19 patients.

The research and results of these tests are still being gathered, and the overall standards for the use AI in medicine are still being defined. Yet opportunities for AI to benefit clinicians, researchers and the patients they serve are steadily increasing. At this point there is little doubt that AI will become a core part of the digital health systems that shape and support modern medicine.

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Guide

How to choose the right AI foundation model

Use this model selection framework to choose the most appropriate model while balancing your performance requirements with cost, risks and deployment needs.

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AI applications in medicine

There are numerous ways AI can positively impact the practice of medicine, whether it's through speeding up the pace of research or helping clinicians make better decisions.

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Here are some examples of how AI could be used:

AI in disease detection and diagnosis

Unlike humans, AI never needs to sleep. Machine learning models could be used to observe the vital signs of patients receiving critical care and alert clinicians if certain risk factors increase. While medical devices like heart monitors can track vital signs, AI can collect the data from those devices and look for more complex conditions, such as sepsis. One IBM client has developed a predictive AI model for premature babies that is 75% accurate in detecting severe sepsis.

Personalized disease treatment

Precision medicine could become easier to support with virtual AI assistance. Because AI models can learn and retain preferences, AI has the potential to provide customized real-time recommendations to patients around the clock. Rather than having to repeat information with a new person each time, a healthcare system could offer patients around-the-clock access to an AI-powered virtual assistant that could answer questions based on the patient's medical history, preferences and personal needs.

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AI in medical imaging

AI is already playing a prominent role in medical imaging. Research has indicated that powered by artificial neural networks can be just as effective as human radiologists

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detecting signs of breast cancer as well as other conditions. In addition to helping clinicians spot early signs of disease, AI can also help make the staggering number of medical images that clinicians have to keep track of more manageable by detecting vital pieces of a patient's history and presenting the relevant images to them.

Clinical trial efficiency

A lot of time is spent during clinical trials assigning medical codes to patient outcomes and updating the relevant datasets. AI can help speed this process up by providing a quicker and more intelligent search for medical codes. Two IBM Watson Health clients recently found that with AI, they could reduce their number of medical code searches by more than 70%.

Accelerated drug development

Drug discovery is often one of the longest and most costly parts of drug development. AI could help reduce the costs of developing new medicines in primarily two ways: creating better drug designs and finding promising new drug combinations. With AI, many of the big data challenges facing the life sciences industry could be overcome.

Benefits of AI in medicine

Informed patient care

Integrating medical AI into clinician workflows can give providers valuable context while they're making care decisions. A trained machine learning algorithm can help cut down on research time by giving clinicians valuable search results with evidence-based insights about treatments and procedures while the patient is still in the room with them.

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Error reduction

There is some evidence that AI can help improve patient safety. A recent systemic review (link resides outside ibm.com) of 53 peer-reviewed studies examining the impact of AI on patient safety found that AI-powered decision support tools can help improve error detection and drug management.

Reducing the costs of care

There are a lot of potential ways AI could reduce costs across the healthcare industry. Some of the most promising opportunities include reducing medication errors, customized virtual health assistance, fraud prevention, and supporting more efficient administrative and clinical workflows.
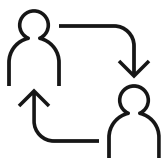
Increasing doctor-patient engagement

Many patients think of questions outside of typical business hours. AI can help provide around-the-clock support through chatbots that can answer basic questions and give patients resources when their provider's office isn't open. AI could also potentially be used to triage questions and flag information for further review, which could help alert providers to health changes that need additional attention.
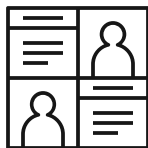
Providing contextual relevance

One major advantage of deep learning is that AI algorithms can use context to distinguish between different types of information. For example, if a clinical note includes a list of a patient's current medications along with a new medication their provider recommends, a well-trained AI algorithm can use natural language processing to identify which medications belong in the patient's medical history.

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AI-powered healthcare chatbots

Curate patient experiences that surpass patient expectations. Leverage watsonx Assistant AI healthcare chatbots to focus the attention of skilled medical professionals while empowering patients to quickly help themselves with simple inquiries.

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Artificial intelligence is being used for everything from answering patient

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