

Is AI the Future of Our Healthcare?



Is AI the future of healthcare and should we trust computers being involved in our diagnosis process? Medical experts and clinicians have been trying to integrate AI into the medical field for many different reasons. One major problem that physicians have been struggling with is the number of face-to-face interactions that physicians have with their patients, but AI can help solve this problem. AI can also help navigate away from misdiagnoses and medical errors.

AlphaFold is one organization that began using AI in their healthcare. AlphaFold is an AI model that predicts protein structures by taking the amino acid sequence in one-dimension and predicting the three-dimensional protein at an atomic level. This model has inspired many other protein prediction models, including RNA, antibodies, and picking up the missense mutations in the genome. AlphaFold can also come up with proteins that don't even exist in nature. This is just the beginning of the capabilities of AI in the medical world.

We don't speak much about the medical errors that are experienced in the medical community, but they are much more common than people realize, and these issues need to be addressed. Statistics show that all of us will experience at least one medical error in our lifetime. These errors have led to 800,00 Americans dead or seriously disabled every year. Can AI help us?

AI is currently being trained through medical photos with professionals to teach AI how to read an abnormal scan or photo when compared to a normal scan or photo. One of the largest successes of this new technology is AI being able to predict gender based off an image of a retina with 97% accuracy, which is only going to continue to improve. AI has also found cancer in chest x-rays that radiologists couldn't find. AI now knows how to read all majorly used scanning machines in hospitals, such as MRIs, CT scans, and ultrasounds. Professionals have seen and admitted that AI can do as well, if not better, as medical experts. Machine eyes can pick up things that human eyes can't see, and this is the newfound power that AI is going to have in our lives.

WHAT AI CAN FIND FROM A PHOTO OF A RETINA

01

DIABETES AND BLOOD
PRESSURE CONTROL

KIDNEY DISEASE

02

03

LIVER AND GALL
BLADDER DISEASE

HEART CALCIUM SCORE

04

05

ALZHEIMER'S DISEASE:
BEFORE ANY SYMPTOMS

PREDICTING HEART
ATTACK AND STROKE

06

07

HYPERLIPIDEMIA

PARKINSON'S DISEASE: 7
YEARS BEFORE SIGNS

08

WHAT AI CAN FIND FROM A CARDIOGRAM

01

AGE AND SEX OF THE PATIENT

EJECTION FRACTION OF THE HEART

02

03

MAKING DIFFICULT DIAGNOSES

ANEMIA OF PATIENT

04

05

ATRIAL FIBRILLATION AND STROKE RISK

DIABETES AND PRE-DIABETES

06

07

FILLING PRESSURE OF THE HEART

HYPERTHYROIDISM

08

09

KIDNEY DISEASE

WHAT AI CAN FIND FROM A CHEST X-RAY

01	RACE OF THE PATIENT
DIABETES AND CONTROL OF DIABETES	02
03	EJECTION FRACTION OF THE HEART
IVC DILATION	04
05	AORTIC STENOSIS
REGURGITATION	06
07	MITRAL STENOSIS
TRICUSPID REGURGITATION (HEART)	08
09	PULMINARY REGURGITATION (HEART)

With these machine eyes, driver genomic mutations can be defined, which account for the presence of a tumor. Machine eyes can also detect where the tumor is coming from and prognosis of the patient. This is a huge leap in medicine, as the world has been fighting the mystery of cancer for centuries. Not only can this help patients know sooner that they have cancer, but the survival rate of cancer patients will also improve.

The developments in AI have immensely helped the medical world and it is only going to get better. Some are concerned that it will now be the machines that analyze medical records and

make diagnoses, but physicians are still needed for this process, and therefore, there is no intention that machines will be taking over the jobs of doctors. The threshold of large language models (LLMs) through ChatGPT 4.0 is diagnosing individuals as well, if not better, than physicians are when people visit for an appointment.

GPT 4.0 currently has over 1 trillion connections through language, speech, and graphics. This then sets up keyboard liberation, which is what all doctors, clinicians, and patients would like to see. This allows patients and doctors to have synthetic notes that are derived from their conversation and helps the workload of data clerk clinicians. The large amount of administrative work that doctors must complete reduces the amount of time that doctors have face-to-face interactions with their patients, which is an extremely important step in visiting the doctor. When doctors see their patients face-to-face, they can determine physical symptoms of the patient, but if doctors don't have much time to do this, then it can be difficult for them to do a thorough exam. Not only that, but the lack of face-to-face interaction can also make doctors seem unempathetic, leaving patients wondering if their physician really has their best interest in mind. The integration of AI in healthcare will allow doctors to have more time with their patients, eliminating many of these problems.

Google released an LLM called Med-PaLM. This AI model was trained to perform medical questions and answers, almost like ChatGPT, but only focused on medicine. Med-PaLM was the first AI model to ever pass a U.S. medical licensing exam, with a score of 67%. Med-PaLM 2 scored in the expert level for the exam, with a score of 86%. Med-PaLM is a multimodal AI and takes many different inputs, including pictures of the skin, chest x-rays, pathology, text from radiology images, and performs multiple medical tasks. When blinded assessors analyzed this technology, they preferred the Med-PaLM report in 40% of the cases.

Multimodal AI is AI that takes data in many different forms, whether this be text, images, or numbers. Recently, AI has become really good at distinguishing normal from abnormal, which is also known as triaging. ChestLink is a medical triage system and is the first system that's received regulatory approval to be used in autonomous reports of chest x-rays. ChestLink looks for 75 different abnormalities on the chest x-ray. If it doesn't find an abnormality, then it reports the x-ray as normal. If it does find an abnormality, then it passes the x-ray back to the human radiologist. This technology has created the ability to share tasks between humans and AI.

Another problem that researchers are finding is humans' willingness to trust AI in the medical field, as well as the questioning of the empathy, reliability, and comprehensibility of this

technology. On average, humans believe that the use of AI with physicians or the use of AI alone is not as empathetic and reliable as the physicians. The use of AI may have been perceived as dehumanizing, which would explain the results that researchers have found. Participants were also concerned with the phenomenon of “uniqueness neglect,” where they were worried that AI would not understand their individual characteristics, but AI allows physicians to record all of this information and stores it for future use. Participants believe that physicians are just as comprehensive as the AI tools, but their doubt in empathy and reliability makes them uncertain about the future integration of AI in physicians’ offices.

This new technology is changing the relationship between doctors and their patients by giving doctors the gift of time. Time is a valuable part of a physician’s job, but the current workload of administrative work takes time away from doctors and their patients. Doctors are excited to integrate AI into their offices by adding more comprehension, reliability, value, and early diagnoses to patients. This technology has the ability to revolutionize medicine and medical practices, but it is important that researchers and doctors improve the trust of this technology in Americans, can give answers to their results, and continue randomized testing the same way that we test medicines to ensure the best results.

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https://www.youtube.com/watch?v=ll5LY7wI_Xc

<https://www.youtube.com/watch?v=N3wJwz97b8A>

<https://www.nature.com/articles/s41591-024-03180-7>