Automated Cancer Screenings? Robotic Surgeons? How Artificial Intelligence is Transforming the Medical Industry

By Nikhil Wuppalapati

(Image Source: Etactics)

Artificial Intelligence has been steadily sweeping the world as one of the most significant and pervasive developments in scientific history. It can write your essays, do your homework, construct your codes, and schedules, and basically do a lot of precision tasks a lot faster and, for the most part, a lot more proficiently, than most normal people. This new development has obviously caused a lot of people to back away and ask, "How far is this going to go?" Where is

How Artificial Intelligence is Transforming the Medical Industry

AI going to take up residence, and spread its influence? What aspects of human life is it going to transform?

While the answer to that question is still far from being answered, AI has started to make its way towards the medical field—with mixed reactions from the public. The Pew Research Center, in fact, found that 60% of Americans would be uncomfortable with providers relying on AI, and around two thirds of the population surveyed stated that they didn't think that AI would improve healthcare as a whole. However, the applications of AI in the medical industry have shown some promise, so, despite the misgivings of many people, there is a plausible possibility that AI can help improve some of the medical field.

Now, before we dive into how AI is going to transform the medical industry, it's important to have at least a basic understanding of how AI works. AI models, or machine learning models, come in many different forms, but the basic method by which the models work is this: The models are trained on some sort of data, such as images, records, writing, etc. The models then use this training data to make decisions and perform tasks. Depending on what they are trained on, the models are usually specialized for specific tasks.

So how would AI manifest specifically in the medical industry? Well, the goal of employing artificial intelligence in the medical industry is precision medicine. No matter how experienced and well trained a human doctor is, they're still human, and mistakes can still be made. This is especially true when it comes to interpreting visual data, such as X-Rays or MRIs. It's also true when doctors have to make a diagnosis. Depending on the information that they are given, which is usually provided by the patient, and only during checkups or appointments that the patient schedules, doctors may not be able to make an accurate diagnosis. They can run tests,

which can help them be more sure, but choosing which tests to run and when to run them based on what they see from their patients and what their patients tell them, they still may not be able to make an accurate diagnosis. Artificial intelligence can also be used in research, by locating drugs that would be able to treat specific viruses.

The latter was actually tested in a [study](#) conducted by the National Institute of Health. Different Artificial Intelligence models were trained on data sets of replicas of the ebola virus, and were then tasked with screening the Spectrum Collection of the MicroSource Library, which is a library of 2,320 different compounds. They were asked to look for compounds that could be used to treat the Ebola virus. The models that they tested were able to successfully come up with compounds that could be used to effectively treat the virus. In fact, the compounds that the model found were even more effective than the control compound. (This was assessed by how much of the compound was necessary to elicit a response. The control compound, chloroquine, required a higher concentration to elicit a response than the compounds that the model found in the library.) Additionally, the National Institute of Health stated that artificial intelligence models were also able to assess the likely trajectory of a disease with "appreciable accuracy".

In addition to assessing treatments, expediting research, and predicting the course of disease, there is also speculation of artificial intelligence being used to assist in providing healthcare. Artificial intelligence devices might be used to monitor epilepsy and seizures, as well as other neurological conditions. AI sensors can also be used to monitor care for seniors and help enhance Intensive Care Units (ICUs). Artificial intelligence promises to increase the efficiency with which doctors are able to monitor sensitive health conditions and disorders and provide treatment or make adjustments when necessary. However, it should be mentioned that,

understandably, not everyone is comfortable with the prospect of Artificial Intelligence constantly surveilling them.

Artificial Intelligence can also be used to make mundane hospital tasks more efficient. This includes more effective hand-hygiene and creating schedules. Artificial Intelligence can also analyse health records, write letters explaining the necessity of certain medical treatments, and aid in diagnosing patients. There was even a virtual nurse, named Molly, that was developed to provide follow up care to discharged patients.

So artificial intelligence can be used to enhance healthcare and bring us closer to precision medicine. But does its promise of effectiveness, efficiency, and precision, mean that it may soon make regular human doctors obsolete? The answer isn't set in stone, but as of right now, it seems unlikely that artificial intelligence will replace doctors. When tested on its ability to read mammograms, it performed only at the same level as the bottom 10% of radiologists. Artificial intelligence has the potential to run important executive functions for hospitals and expedite important, if mundane, hospital tasks, but in order to achieve the best result, it is far more likely that we'll see cooperation between artificial intelligence and human doctors in hospitals.

But is that still something to look forward to? Maybe some people think so. But there are still valid concerns about the privacy of data, the reliability of artificial intelligence, and how developers of AI models plan to correct the inherent biases that seem to exist in the data that artificial intelligence is trained on.

The Pew Research Center ran a survey of how people felt towards the possibility of Artificial Intelligence being used in their healthcare.   The survey found that the majority of US adults surveyed were uncomfortable with the possibility of their healthcare provider relying on
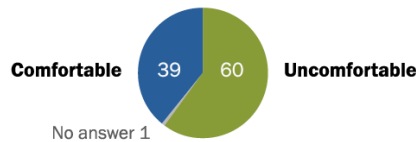
artificial intelligence to provide medical care. In addition, around two thirds of the population didn't believe that artificial intelligence would improve healthcare, and one third of the population believed that it would make healthcare worse. Negativity towards artificial intelligence is common in both men and women, but the Pew Research Center found that, for the most part, younger people and people who had received higher education (i.e. a college degree) were more open to the possibility of artificial intelligence in healthcare.

Fewer than half in U.S. expect artificial intelligence in health and medicine to improve patient outcomes

% of U.S. adults who say that thinking about the use of artificial intelligence in health and medicine to do things like diagnose disease and recommend treatments ...

They would feel __ if their health care provider relied on it for their medical care

Comfortable 39 60 Uncomfortable

No answer 1

It would lead to __ health outcomes for patients

Better 38 33 Worse

No answer 2

27

It would not make much difference
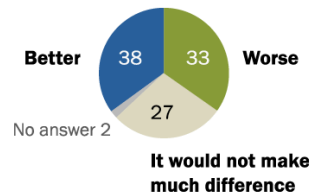
Source: Survey conducted Dec. 12-18, 2022.
"60% of Americans Would Be Uncomfortable With Provider Relying on AI in Their Own Health Care"

PEW RESEARCH CENTER

The study also considered specific applications of artificial intelligence. It found the following:

- 65%-33% of US adults definitely/probably want AI Cancer Screenings
    - 55% of US adults believe that it would make screenings more accurately
- 67%-31% of US adults definitely/probably *don't* want AI to treat pain.
- 59%-40% of US adults definitely/probably *don't* want AI powered surgery robots.
    - This opinion is similar between age groups.
- And the biggest statistic by far: 79%-20% do not want AI chatbots to provide mental health support.

The study also found that there were concerns around how racial bias in healthcare might be affected by the introduction of artificial intelligence. While some argue that artificial intelligence, being objective, wouldn't be affected by implicit biases towards different races and ethnicities. However, others argue that the data sets that artificial intelligence is trained on can be and are

inherently racially biased, and, as a result, AI may instead help perpetuate the racial biases in medical care. This concern is further corroborated by findings posted by the Guardian.

When researching how artificial intelligence might be able to screen for skin lesions, it was found that AI is less reliable and less accurate on darker skin tones. The AI model was trained on image sets showing skin lesions. There were fourteen sets that recorded the country of origin. Out of those fourteen data sets, 11 only had images from North America, Europe, and New Zealand. Additionally, out of the 106,950 images cumulative images on all of these data sets, 2,436 of them recorded skin type. Out of those 2,436 that recorded skin type, there were 10 images showing brown skin. 1,585 images recorded the ethnicity of the subject. There were no images in which the subject of the image had an African, African-Caribbean, or South Asian background.

In other words, there is reason to be concerned about racial bias in artificial intelligence. Artificial intelligence is only as good as the data that it is trained on, and if it isn't provided with accurate data that reflects the real world, then it won't be able to accurately perform tasks in the real world. While racial bias isn't new in the field of healthcare, this kind of bias in AI is a significant barrier towards the possibility of having artificial intelligence effectively assist with medical care.

Limited data is one of many limitations of current artificial intelligence models. Models have trouble accommodating the general data The National Institute of Health found that for more complex tasks, using deep learning models was more efficient than regular machine learning models. However using these models requires the adjustment of hyperparameters, which are various parameters that guide the behavior of the deep learning models. Optimizing these parameters can be a challenge that prevents the model from working efficiently. Additionally, the

results that these models provide are hard to reproduce. Finally, one of the most significant concerns around artificial intelligence as a whole, is that AI models require a lot of computational power. The amount of power that artificial intelligence consumes can be dangerous for the environment, but it is also a large expense for labs and pharmaceutical companies that may hamper their ability to use the models effectively.

So how is artificial intelligence transforming the medical industry? It's hard to say for sure. Artificial Intelligence is in its early stages, and that can make it difficult to assess just what it is capable of. However, as of right now, there are many prospects of using artificial intelligence to assess visual data, such as MRIs, X-Rays, Mammograms, or skin cancer screenings, with increased precision. It can also hopefully be used to run mundane tasks in hospitals with increased efficiency and speed, in order to save time spent on those tasks and increase the productivity of medical facilities. Additionally, it is also theorized that AI can monitor chronic and neurological conditions, and provide constant data that can help doctors make diagnoses and provide treatment more efficiently. Finally, it can help with research and development of treatment of harmful or deadly diseases. However, despite the many functions that AI models have in medical care, the public still has reservations about its use. Concerns about racial bias, data privacy, and the reliability of AI models need to be addressed before we can move forward with the implementation of artificial intelligence into something as integral and important to society as medical care.

While artificial intelligence will, and has already, radically transformed the world that we live in, how it continues to affect people as a whole depends on how it is monitored, regulated, and developed. Now is the time, before it is too late to change anything, to decide how artificial intelligence is going to change the world—whether it will make it better, or burn it down.