Future of Pediatric Practice - Artificial Intelligence Beckoning?

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Human intelligence has been the most defining quality of our species. It is this single attribute which has distinguished us from all other forms of life and enabled the advancement of civilization over the millennia. Today, the advent of artificial intelligence (AI) promises to take humankind to a new level and deliver results that would have been considered impossible hardly a few decades ago. The smart phones and other everyday gadgets we use, internet search engines, facial and voice recognition softwares, cloud kitchen services, virtual assistants like Alexa and Siri as well the digital advertising that we see while navigating the internet all use AI technologies. Driverless cars are one of the revolutionary products that are presently being developed by Google using AI. From the discernible trends, it certainly looks like life will never be the same again with AI.

From a professional perspective, healthcare is one of the fields where AI is expected to have the highest impact. Already we are seeing AI being extensively used in large hospital settings in diagnostics, records keeping and even in the performance of procedures such as robot assisted surgery. In all such cases where AI is already being used in healthcare, greater efficiency, accuracy and better success rate is seen. With AI assuming centre-stage as the most happening thing these days, with large-scale research and product development taking place backed by unimaginable levels of funds, AI-enabled tools are expected to become more economical, user friendly and widespread in all walks of life. It will not be long before AI enters day-to-day clinical practice. Hence it is high time that we become acquainted with AI and prepare ourselves to utilize its potential for delivering better quality of care to patients.

What is AI?

Intelligence is commonly understood to be the "ability to acquire and apply knowledge and skills". Being intelligent beings, humans are able to perform various 'mental' tasks like observe, infer, acquire, analyze and classify knowledge and also to learn, apply, make decisions and manipulate our surroundings to solve problems or achieve desired results. Artificial intelligence refers to the creation of machines which are endowed with the ability to carry out many of these functions autonomously and without any external inputs. Machines having AI are able to learn from their past usage and update or improve their capability to perform the same function with better efficiency during future usage. It is basically about creating intelligent machines which can think like humans and are able to make decisions.

For example, when you are reading a particular article in a particular website and develop a doubt, you may go to Google search to resolve it. At this point you may be surprised to see that even as you type the first word, Google is able to furnish the entire sentence concerning your doubt with a near cent percent accuracy. This is because the AI used in Google search engine has taken note of the article you are reading in that website and by comparing your personal profile which it has developed from your past internet usage patterns with other similar profiles, it has already decided that you are likely to search this topic. Google search engine has learnt this on its own without being prodded by anyone else working from behind the scenes.

More About AI

This extraordinary capability of information technology to process information on an unimaginably large scale is what has led to the present level of sophistication of AI. Though AI as an academic discipline was first mooted as early as in 1956, it did not really make much headway till the digital revolution and advent of the internet in the last two decades. This is when AI found its voice and began to revolutionize our lives in never before ways.

AI generally falls into two broad categories: Weak or Narrow AI, and Strong or Generic AI. Weak or narrow AI refers to machines that operate within a limited context and are able to simulate human intelligence (even basic human intelligence) to quite a high degree. Such machines are designed for performing only specific functions or tasks. Such machines cannot perform tasks that fall outside the domain they are designed for. All the currently available AI applications fall into this category. On the other hand

Strong or generic AI refers to machines which can substitute a human being and perform any task or tasks that humans are capable of and perhaps even more. This type of AI is presently not available and can be seen only in the realms of science fiction, such as the robots that we see in Star Wars movies.

Machine learning, data science, deep learning and robotics are some of the domains relating to AI. These refer to different levels of processing data and functions performed.

AI and Healthcare

Though the advent of AI cast a widespread influence on all aspects of life, its usefulness in the field of healthcare was particularly felt, thanks to its superhuman ability to process data and achieve high accuracy of result in any given task. AI began to make its presence strongly felt initially in the arena of diagnostics when new machines began to be invented in imaging and related fields. Today, AI-enabled imaging facilities can accurately recognize diseases like pneumonia or breast cancer from an *X*-ray scan even at their earliest stages when experienced doctors too might miss seeing the weak tell tale signs.

It also came to be widely applied in medical records keeping and administrative work. Voice recognition/ dictation software is an example of AI that is currently used in pediatric practice. The ability of AI to recognize, analyze and predict health trajectory will make it an invaluable tool in preventive medicine and community medicine. Wearable AI enabled devices will greatly help in monitoring patient activity and collecting useful data. AI is also making headway in surgery with the help of robotics. The availability of AI tools was one of the reasons why scientists were able to develop effective vaccines for COVID-19 in a fraction of the time that is otherwise need for developing a vaccine. The process of vaccine development could be speeded up mainly because scientists were able to collate and analyze large data quickly and efficiently to arrive at accurate conclusions.

Challenges of AI

Like all new technologies, AI too has been viewed with fear and suspicion. There is a fear that it could lead to job loss and make doctors redundant. There are horror scenarios enacting in people's mind regarding what to do if the AI goes out of human control and takes a life of its own. The famous scientist Stephen Hawking had warned

regarding humans losing control to robots, saying, "Whereas the short-term impact of AI depends on who controls it, the long-term impact depends on whether it can be controlled at all." Similarly Microsoft founder Bill Gates and Tesla founder Elon Musk too have warned that AI could pose a long term threat to humanity.

So, will AI prove to be a Frankenstein's Monster? Will it push the doctor out of the clinic? No, say most experts. At the present level of AI technology, machines still operate on the basis of manmade algorithms – albeit highly advanced algorithms – and they only perform functions that humans already do, but with greater degree of efficiency and accuracy, and that too in specific niche activities. We still need humans to back up AI for getting a 360 degree view. AI only makes our job easier and less strenuous without encroaching on any of our expertise. If anything, the efficiency and accuracy AI brings to the table makes it a boon to the patients and doctors alike. Those who see the devil in AI ignore the fact that it lacks other key human attributes like emotional and social sensitivity as well as creativity. These are unique functions that cannot be easily broken down to logic.

The more practical issues of concern with regard to AI are subjects like privacy violation, misuse of data, algorithmic bias caused by bad data and regulatory approval. But with the advantages far outweighing the cons, these issues will surely be sorted out with effective remedies. In fact, UNICEF's Office of Global Insight and Policy has launched a major project to better understand how AI systems can protect, provide for, and empower children, as also for exploring how to embed child rights in the governing policies of artificial intelligence. Every great change calls for a corresponding change in human mindset. AI is a revolutionary new change that is sweeping the world. It is a positive change that can transform healthcare into a more vibrant and successful discipline. Hence, it is time for the medical fraternity to embrace this change by understanding AI and making the best use of it.

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