The Incredible World of AI and Medicine

The development of artificial intelligence (AI) is changing the way we approach life: from the way we make grocery lists, to how we code. However, one application of AI often gets lost in the mix—the application of AI to the world of medicine.

AI is changing how we advance the world of medicine. This was evident even in 2004, when AI was not nearly as advanced as it is today. Applications of neural networks, fuzzy expert systems, evolutionary computation, and hybrid intelligent systems, while not fully developed, had a clear direction and purpose.

However, for the purposes of this short form article, the medical applications of AI will be reviewed in two parts: first the virtual applications of AI and then the physical applications of AI.

Part 1: Virtual Applications of AI

It is in the virtual applications of AI that machine learning takes the forefront. Machine learning continues to enable new discoveries in genetics and molecular medicine, by helping scientists contend with the implications of large datasets. A main example of this is the protein-protein interaction algorithms that help in everything from predicting drug-drug interactions to finding novel therapeutic target discoveries (Yang et al. 2021).

AI is also being adapted to help in the development of treatments for chronic mental diseases, particularly in problematically complex ecosystems. AI's unique ability to contend with large datasets have made it especially useful in identifying patients with unique characteristics such as a family history of a hereditary disease or the risk of a chronic disease as well as in keeping track of infections for epidemiological research and planning.

AI can also be used to construct psychotherapeutic avatars, physical versions of themselves in the past and present. This technology could be the future of mental health treatment, allowing patients to interact with versions of themselves to deal with unmitigated trauma. A 2020 study by Ghaznavi et al. found that almost 85% of patients found their childhood photorealistic avatars more relatable than their childhood pictures. However, usage in this format is relatively new and therefore untested. I can only imagine what else these avatars can be used for in the future.

Part 2: Physical Applications of AI

The physical applications of AI are much more theoretical, though it should be noted that preliminary versions of these applications of AI in medicine are already in usage. "Carebots", and robots utilized as assistant-surgeons are commonplace in some parts of the world. Particularly in areas with a great number of an aging population, like East Asia, these "carebots" can help the elderly live more independent lives by assisting them with daily tasks. Of course, the usage of these bots is limited, and they are still in development (Cornet 2013).

Another future application of AI is in helping describe the effectiveness of a particular course of treatment. Doctors often rely on patients to help inform them of the efficacy of a particular course of treatment, but these reports can be inaccurate and biased. Even in instances when there is machinery to assist the doctor, it may be difficult for doctors to quickly identify the subtle changes in the machine's output that may indicate the efficacy of the treatment. AI can help in these instances, providing consistency, specificity, and detail to this often-subjective metric (Hamet 2017). By being able to quickly analyze data, AI may be able to help doctors make better decisions about their patients' treatments.

AI can also help in providing treatment, not just as surgeon-assistants, but in nanotechnology. AI's implementation in nanobots means that a normally risky procedure will both carry less inherent risk and be more effective (Ramesh et al. 2004). However, the technology needs more testing and has not yet been perfected. Once perfected, this technology could help treat everything from heart disease to cancer, extending patient lives and maybe even providing cures for the previously incurable.

The future of AI in medicine is constantly expanding as we develop technology more and more. The surface of AI's application to medicine has barely been scratched and I'm confident that, in years to come, AI will continue to transform the field of medicine as we know it.

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