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Editorial

Beyond the sophomoric promises of artificial intelligence in medicine

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The field of artificial intelligence has witnessed three major waves; each wave came with overhyped expectations and remarkable fanfare. The first wave involved pre-programmed applications with planned conditional scenarios; the scenarios were coded by human experts in the form of "If so then do this." The applications of such technologies were rather limited, however, successful in a small number of problems. However, in most cases, the programmed scenarios were inefficient or not practically feasible.[1]

The second wave started around the 2000s, backed by the revolution of big data, faster hardware, and powerful parallel computing. The hallmark of the second wave was the ascent of machine learning and computers that learn from data how to perform certain tasks with little human intervention. These advances led to some outstanding applications such as personal assistants on smartphones, handwriting recognition, and self-driving cars. Besides, the wave is spreading through multiple disciplines such as education and e-commerce. Computers achieved their first milestone surpassing humans in 1997 when Deep Blue defeated Kasparov in a chess game. Lately, computers were able to win a Go game for the first time against a world champion, a victory that was unthinkable few years ago. The recent accelerating development was fueled by the latest advances in deep learning and other related algorithmic improvements.[1,2]

The third wave is approaching; although yet unclear, the goals would probably be to further extend the AI implementations to a broader array of applications. Future, AI systems might be trained to take the initiative and construct models, explain things, and develop their own systems with no human intervention.

Enthusiasts of computers' role in medicine have speculated that computer-aided diagnosis will soon be a reality. Others have conjectured that algorithms would offer reliable solutions to real life clinical issues, would cure cancer and dementia, find new drugs and help extend life. The hype evolved to threats; AI will take away medical jobs, will transform hospitals and might even make them a thing of the past. The high hopes and the widespread optimism kept flowing through the years but never materialized.[3-6] The only fact that we are aware of, insofar, that hype never stopped and probably will never do.

There is nothing wrong with high hopes, or big dreams. Dreamers have been the drivers of modern civilization. However, the sophomoric AI hype needs to connect to reality, understand the human nature and the complexity of clinical diagnosis. When the sanctity of human life is at stake, the veracity of algorithmic extrapolations should be taken seriously and judged with extreme caution. Transparency is another largely forgotten issue in machine learning, most algorithms work as a black box, and little can be known about why and how they work. A problem made worse by the proprietary software solutions and the companies' relentless quest to capitalize on human ailments.

The ethical challenges are rapidly piling up, that it behooves us to rethink the ethical frameworks governing our approach to data collection, storage, transfer, usage, and validation. Questions regarding human control and agency in using their data are mostly unanswered in many contexts.[7] These questions, as well as many emerging others, need to be urgently addressed. Similarly, algorithmic decisions should follow strict ethical standards and the public needs to have the capability to question their assumptions and audit their methodology. The past year has witnessed a massive wave of large-scale security breaches that it became clear that no computer-based infrastructure is immune to hackers and malevolent manipulation. The tough question is how far algorithms would control that might fall into the hands of the malicious. Accountability for AI decision-based diagnosis is another barely addressed issue. The extent of responsibility of

the algorithm makers, users and maintainers should be clear. Therefore, concerned stakeholders can pinpoint the source of medical mismanagement and be able to audit the process.

AI is far from disrupting the status quo of healthcare as it currently stands, and the prospects of future advancements are unclear. The initial signs are unsatisfactory to those dreaming of robotic healthcare services, nonetheless promising to those who want to build tools that will make diagnosis easier, simpler, and faster.

References

1. Biegel B, Kurose JF. The National Artificial Intelligence Research and Development Strategic Plan. Washington, DC: White House; 2016. p. 8-40.
2. Saqr M, Fors U, Tedre M. How learning analytics can early predict under-achieving students in a blended medical education course. Med Teach 2017;39:757-67.
3. Bennett CC, Hauser K. Artificial intelligence framework for simulating clinical decision-making: A Markov decision process approach. Artif Intell Med 2013;57:9-19.
4. Chang AC. Big data in medicine: The upcoming artificial intelligence. Prog Pediatr Cardiol 2016;43:91-4.
5. Ramesh AN, Kambhampati C, Monson JR, Drew PJ. Artificial intelligence in medicine. Ann R Coll Surg Engl 2004;86:334-8.
6. Schwartz WB, Patil RS, Szolovits P. Artificial intelligence in medicine. Where do we stand? N Engl J Med 1987;316:685-8.
7. Saqr M. Big data and the emerging ethical challenges. Int J Health Sci (Qassim) 2017;11:1-2.