

Accepting The Potential Of Ai: Integrating Personalised Care Into The Transformation Of Healthcare

M. SANTHI BABU, S. VASU, V. BANGARU LAKSHMI,
R. SUNDARA RAO

Department of Computer Science, K.B.N. College (Autonomous),
Vijayawada, Andhra Pradesh, India.

Abstract

The advancement of digital technology is powering a new era in medicine, fueled by the richness of data from cutting-edge modalities such as genomics and imaging, as well as emerging sources like wearables and the Internet of Things. We've been able to understand more about the biology of disease and how it affects people thanks to this data flood, which has paved the way for the creation of individualized targeted therapies. Incorporating artificial intelligence (AI) is essential for producing precise forecasts for customized treatments to realize the full promise of these developments. However, important difficulties including explaining ability, liability, and privacy concerns must be addressed if AI is widely used in healthcare. To address these issues, creating comprehensible algorithms and including

KEY WORDS: Deep learning, Machine learning, Artificial intelligence.

INTRODUCTION

Healthcare workers today must deal with numerous technological developments and a vast amount of data. Doctors and nurses are under a great lot of stress as a result of the information overload brought on by infusion pumps, vital sign monitors, laboratory testing, molecular testing, medical imaging, and computerised medical records [1] [2]. Making decisions from this much information requires skill and individualization. Modern innovations like artificial intelligence (AI) have the natural capacity to draw insightful conclusions from a range of data sources, potentially offering a solution to these issues. Healthcare practitioners may make more precise and well-informed judgements

because to AI's ability to analyse and comprehend big datasets. Healthcare professionals may make sense of the complexity of data and use it to improve patient care and outcomes by utilising AI.

DIGITIZATION OF HEALTHCARE

Due to the abundance of information being created on diseases, treatments, and technologies, the healthcare industry is undergoing a significant transformation. The Health Information Technology for Economic and Clinical Health (HITECH) Act's passage in 2009 has led to the widespread adoption of Electronic Health Records (EHRs). The use of electronic health records (EHR) increased from 9.4% in 2008 to 83.8% in 2015 as a result of financial incentives and stiffer penalties for breaking security and privacy laws [3] [4].

The digitisation of medical records has accelerated the growth of medical knowledge. By 2020, it's anticipated that medical knowledge would double every 73 days [5]. A doctor would need to spend 29 hours per day learning new medical information to be up to date given the enormous amount of information available today.

It is impossible to keep up with the creation and dissemination of new medical knowledge given the capability of the human brain and the limited time available.

The possibility of customising medical care to the unique needs of individuals and small patient groups seems promising in the age of digital technology. We can learn more about how diseases show themselves and how patients feel them on a daily basis as more data is acquired, stored, and processed. This discovery, along with developments in molecular science and diagnostic techniques, will fundamentally alter how we do research, generate and approve new treatments, and decide on payment schemes. Additionally, it will change how patients and their doctors determine whether, when, and how best to treat particular illnesses.

NEW DATA RESOURCES

We are able to compile reliable information from various sources for each patient as our understanding of medicine,

illnesses, and science continues to grow. Additionally, this data can be linked to information from sizable patient databases, enabling thorough analysis [6] [7]. We can better understand the biology of the illness and how it presents in specific patients as a result [8]. Patients are becoming more knowledgeable and informed as a result of easier access to information, giving them greater clout to demand cutting-edge and successful treatments. Our understanding of health and disease is being actively enhanced through various innovations. These include the utilization of real-world evidence [9], analysis of molecular data from next-generation sequencing [10] [11], extraction of data from wearable devices [12] and mobile apps [13], as well as the implementation of novel clinical trials [14] [15]. Realising the full potential of the digital healthcare ecosystem will require teamwork; no one organisation can accomplish it alone. New forms of collaboration are developing [17] [18] to ensure that we move closer to value-based, personalised patient care.

Healthcare AI

By leveraging technology like artificial intelligence to filter through vast volumes of data and produce analytical information to enhance decision-making, the digitization of healthcare has opened up new opportunities

Since Sir Alan Turing's seminal work was published in 1950 [19], AI has advanced significantly in a number of fields, including Natural Language Processing (NLP) [20], Machine Learning [21], Deep Learning [22], Speech Recognition [23], Virtual Agents [24], and AI-optimized Hardware [25] collectively contribute to various areas of artificial intelligence research and development.

Currently, AI is being employed in healthcare [26]. For instance, it helps to reduce the expenses associated with medical transcribing [29], improve physician workflow to lessen fatigue [30], facilitate robotic surgery, resulting in shorter hospital stays and less blood loss [31], and forecast death rates for patients with sudden heart failure [32]. Additionally, it helps lessen the number of false-positive breast cancer screening findings [27, 28].

The most crucial healthcare stakeholders in the past, patients, usually received similar treatments for a variety of illnesses, which left experts perplexed as to why some drugs

worked for some people but not others. When it comes to making advancement, modern scientists

When it comes to identifying, diagnosing, and treating diseases on a case-by-case basis. AI can play a significant role in this process because of its unique ability to recognise subtle disease-specific patterns from various sources, including molecular diagnostics, patterns that people could overlook.

CURRENT MEDICINE

The application of machine learning programmes, a subset of artificial intelligence that can incorporate data from all cutting-edge diagnostic equipment and other sources, increases the likelihood of success.

Now more than ever, individualised medical treatment is available to everyone. It will be shown what AI can and cannot achieve when integrated with all of these new technologies by an overview of two specific medical disciplines.

REFERENCES

116. J. A. Hazelzet, "Can fuzzy logic make things more clear?," *Crit. Care*, vol. 13, no. 1, 2009.
- Big Data in Healthcare: Promise & Challenges | NEJM Catalyst." [Online]. Accessible at: catalyst.nejm.org/big-datahealthcare. [Viewed: 26 November 2019].
- [3] "U.S. Non-Federal Acute Care Hospital Adoption of Electronic Health Record Systems: 2008-2015." [Online]. Available: <https://dashboard.healthit.gov/evaluations/data-briefs/non-federalacute-care-hospital-ehr-adoption-2008-2015.php>. [Retrieved: 25 November 2019].
- [4] "Electronic health record adoption in US hospitals: the emergence of a digital 'advanced use' divide," *J. Am. Med. Informatics Assoc.*, vol. 24, no. 6, pp. 1142-1148, Nov. 2017. J. Adler-Milstein, A. J. Holmgren, P. Kralovec, C. Worzala, T. Searcy, and V. Patel.
- P. Densen, "Challenges and Opportunities Facing Medical Education," *Trans. Am. Clin. Clim. Assoc.*, vol. 122, p. 48, 2011.
- [6] P. Deshpande and colleagues, "Big Data Integration Case Study for Radiology Data Sources," 2018 IEEE Life Sciences Conference (LSC), pp. 195–198.
- [7] "Healthcare IT: Integration of consumer healthcare data and electronic medical records for chronic disease management," 2014 IEEE International Conference on Granular Computing (GrC), pp. 310-315.

- [8] M. R. S. Rao and President, "Disease biology in the next decade(s)," *Ann. Neurosci.*, vol. 19, no. 4, Oct. 2012.
- [9] K. N. Sanders, V. B. Katkade, and K. H. Zou, "Real world data: an opportunity to supplement existing evidence for the use of long-established medicines in health care decision making," *J. Multidiscip. Healthc.*, vol. 11, pp. 295–304, 2018
- [10] "Review of Clinical Next-Generation Sequencing," *Arch. Pathol. Lab. Med.*, vol. 141, no. 11, pp. 1544–1557, Nov. 2017. S. Yohe and B. Thyagarajan.
- [11] "Systematic review of next-generation sequencing simulators: computational tools, features and perspectives," *Brief. Funct. Genomics*, vol. 16, no. 3, p. elw012, April 2016. M. Zhao, D. Liu, and H. Qu.
- Wearable activity monitors in oncology trials: Current application of an emerging technology, G. Gresham et al., *Contemp. Clin. Trials*, vol. 64, pp. 13–21, Jan. 2018.
- [13] "Mobile Medical Apps and mHealth Devices: A Framework to Build Medical Apps and mHealth Devices in an Ethical Manner to Promote Safer Use - A Literature Review.," *Stud. Health Technol. Inform.*, vol. 235, pp. 363-367, 2017.
- [14] "Novel Methods and Technologies for 21st-Century Clinical Trials," E. R. Dorsey, C. Venuto, V. Venkataraman, D. A. Harris, and K. Kiebert, *JAMA Neurol.*, vol. 72, no. 5, p. 582, May 2015.
- [15] B. Freidlin and E. L. Korn, "Adaptive Clinical Trials: Benefits and Drawbacks of Different Adaptive Design Elements," *JNCI Journal of the National Cancer Institute*, vol. 109, no. 6, June 2017.
- "Software as a Medical Device (SaMD) | FDA." [Online]. Available:
<https://www.fda.gov/medical-devices/digital-health/softwaremedical-device-samd>. [Viewed: 25 November 2019].
- [17] K. A. Phillips and G. S. Ginsburg, "Precision Medicine: From Science To Value," *Health Affairs*, vol. 37, no. 5, may 2018, pp. 694–701.
- [18] "Personalised healthcare in the era of value-based healthcare," *Perioperative Medicine*, vol. 10, no. 3, pp. 285-293.