The Impact of Artificial Intelligence in Healthcare: Potentials and Challenges

Daniel Luna

Departamento de Informática en Salud. Hospital Italiano de Buenos Aires. Buenos Aires, Argentina

The convergence between science and technology is redefining our understanding of healthcare. Algorithms are experiencing a significant boom, challenging and reshaping how medical professionals and patients interact in healthcare.

Before moving on, let us define what we mean by Artificial Intelligence (AI). This technology refers to the branch of computer science aimed at developing algorithms that seek to emulate the intellectual processes typical of human beings, such as logical-mathematical reasoning, the generalization of concepts, and the discovery of meaning.

The concept of AI goes back 70 years when, Alan Turing made the earliest forays into the field. This tool's history typically features periods of "winter" and "summer" marked by significant advances followed by stagnation or downturns in its development. These terms reflect the cyclical nature of care and its progress over time. Winters" are often associated with skepticism and lack of progress, and "summers" represent periods of renewed optimism, technological advances, and increased investment. Today, we could say that we are facing a "summer" thanks to technological advances in computational processing and the abundance of data. In the present era, massive data generation is essential to feed intelligent algorithms; in healthcare, we have a wealth of data -- both structured (demographic census data) and unstructured (medical images, evolutions, etc.) -- which drive the development and application of this novel technology.

POTENTIALS OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

One of the main benefits of this exponential technology lies in its ability to analyze and process vast amounts of data quickly and accurately. This feature is invaluable in interpreting medical images; the application in this field has transformative potential to improve accuracy and speed in diagnosing pathologies. Through intelligent analysis of radiological images, such as CT and MRI scans, AI can identify subtle patterns, detect anomalies, and facilitate image interpretation[1]. This approach streamlines the process, enabling faster and more accurate medical care.

On the other hand, the advancement of this discipline has made it possible to create support systems for clinical decision-making based on data and machine learning algorithms. These systems are potentially of great value as tools for healthcare personnel in their daily practice, such as the expert systems based on knowledge bases that have become fundamental components in contemporary health information systems[2].

La irrupción de ChatGPT con los grandes modelos de lenguaje (Large Language Models, LLM) abrió un abanico amplio de aplicaciones. Esta categoría de modelos de IA entrenados para comprender y generar texto de manera avanzada incluyen desde el procesamiento del lenguaje natural hasta la generación de texto creativo y el análisis de datos. Estos modelos poseen un potencial sustancial en el ámbito de la salud, ofreciendo diversos beneficios para todos los participantes del sistema de salud. For example, they can speed up the production of clinical reports, such as medical consultation evolutions and hospital discharges. And by integrating with automatic human voice processing, they lay the groundwork for the next generation of conversational assistants.

Finally, the development of person-centered multimodality will be a fundamental factor in transforming our health and wellness towards a new paradigm in Medicine: Algorithmic Medicine. Combining clinical, biological, genetic, imaging, clinical reporting, social, and other such data will complete the shift from a patient-centered to a patient-driven model of care such as we have never seen before.

Author for correspondence: daniel.luna@hospitalitaliano.org.ar, Luna D.

Received: 11/09/23 Accepted: 11/14/23 Online: 12/29/2023

DOI: http://doi.org/10.51987/revhospitalbaires.v43i4.323

How to cite: Luna D. The Impact of Artificial Intelligence in Healthcare: Potentials and Challenges. Rev. Hosp. Ital. B. Aires. 2023;43(4):171-172.

ISSN (Online) 2314-3312

CHALLENGES OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE.

The implementation of AI in healthcare is not without challenges. One of the most significant is ensuring the privacy and security of data. The collection and use of this data raise ethical and security concerns. Ensuring that patient data, which rightfully belongs to them exclusively, is handled securely, preserves its integrity, and complies with privacy standards is essential.

In addition to the above, the quality of collected data becomes crucial in an AI context. The ability to design an effective data acquisition process and discern the validity and reliability of each piece of data ceases to be a straightforward task, especially in an environment where data sources proliferate exponentially, reaching volumes that challenge human comprehension. The proper collection and subsequent processing of this data play a pivotal role in the ongoing paradigm shift, emerging as one of the most consequential and complex challenges we face.

On the other hand, we must consider that we are in a situation in which technology is advancing faster than the development of regulations.

Establishing clear and updated regulatory frameworks is essential to ensure safe and ethical use of technology in a healthcare setting. Moreover, incorporating AI tools into clinical practice presents a noteworthy challenge. That involves addressing how to seamlessly integrate these tools into existing information systems and the day-to-day workflow of healthcare professionals.

CONCLUSION

AI is emerging as an integral tool in healthcare. This resource, powerful in its capacity, can optimize diagnoses, personalize treatments, and transform medical research as long as we use it responsibly and ethically. However, AI regulation is becoming imperative, with personal data protection as a cornerstone. Avoidance of bias is a priority to prevent disparities in medical care. In this era of AI, it is critical to remember that, in healthcare, technology is a means, not an end in itself.

Acknowledgments: Equipo del programa de Inteligencia Artificial y Ciencias de datos en Salud (pIASHIBA)-Depto. de Informática en Salud-Hospital Italiano de Buenos Aires.

REFERENCES

1. Mosquera C, Díaz FN, Ricci Lara MA. Inteligencia artificial en imágenes médicas: de la teoría a la aplicación. Buenos Aires: Hospital italiano de Buenos Aires; 2020.
2. Chung K, Boutaba R, Hariri S. Knowledge based decision support system. Inf Technol Manag]. 2016;17(1):1-3. https://doi.org/10.1007/s10799-015-0251-3.
3. Tully J, Selzer J, Phillips JP, et al. Healthcare challenges in the era of cybersecurity. Health Secur. 2020;18(3):228-231. https://doi.org/10.1089/hs.2019.0123.
4. Petersen C, Subbian V; Section Editors Special Section on Ethics in Health Informatics of the International Medical Informatics Association Yearbook. Special section on ethics in health Informatics. Yearb Med Inform. 2020;29(1):77-80. https://doi.org/10.1055/s-0040-1702014.
5. Bernardi FA, Alves D, Crepaldi N, et al. Data quality in health research: integrative literature review. J Med Internet Res. 2023;25:e41446. https://doi.org/10.2196/41446.