

EDITORIAL

Artificial Intelligence (AI) – Some Basics!

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Artificial intelligence (AI) is a “branch of computer science dealing with the simulation of intelligent behavior in computers”.¹ The term “artificial intelligence” was first used in 1956 at the summer workshop at Dartmouth College in Hanover.² AI represents the machine’s capacity to mimic the cognitive functions of human. It can be subdivided into - Artificial narrow intelligence, where a computer can perform a very specific task as well as or better than humans. Artificial general intelligence, where a computer goes beyond specific tasks to perform higher-order syntheses, emulating human thought processes.³

Artificial intelligence (AI) technique in imaging:

An algorithm is programmed with predefined criteria, which is supplied by experienced radiologists. The large amounts of data of medical images in the imaging domain from PACS systems are offered.

These rules are hardwired into the software and enable it to perform straightforward clinical tasks.⁴

Uses of Artificial intelligence:

With advancement of technology AI are using in many sectors like –

- Healthcare technology
- Self-driving cars
- Voice recognition
- Chatbots
- Online shopping
- Factory and warehouse system
- Streaming services

In Healthcare technology, AI is becoming a major constituent of many applications, including medical diagnostics and imaging, drug discovery, remote patient monitoring, risk management, virtual

assistants and hospital management.

Artificial intelligence (AI) in medical imaging:

The primary goal of AI in medical imaging is to increase efficacy and efficiency in clinical care. Radiological imaging data continues to grow at a disproportionate rate in comparison with the number of trained readers. It has contributed to a significant increase in radiologists’ workloads. With these demand a radiologist must interpret one image every 3–4 seconds in an 8-hour workday.⁵ Image interpretation is a visual perception as well as decision making under uncertainty.⁶ So, under such constrained conditions errors are inevitable. Here with this imaging workflow AI component would increase efficiency and reduce errors. AI can achieve objectives with minimal manual input by providing trained radiologists with pre-screened images and identified features.

Examples of application areas of artificial intelligence in medical imaging:

- Radiation oncology
- Thoracic imaging
- Abdominal and pelvic imaging
- Colonoscopy
- Mammography
- Brain imaging
- Radiation oncology

Future perspectives:

Artificial intelligence cannot replace Radiologists. However, radiologist’s working lives will undoubtedly be changed by artificial intelligence. Many of the single routine tasks in the radiology workflow will be performed faster and better by AI algorithms. The role of the radiologist is a complex one, focused on solving complex clinical problems.⁷ The real challenge is

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not to oppose the incorporation of AI into the professional lives but to embrace the inevitable change of radiological practice along with AI in the radiological workflow.

There is danger of undue use of AI and radiologists can avoid this by educating themselves. Future AI colleagues in collaboration with researchers should ensure that it is use in a safe, and meaningful way and always directed primarily towards the patient's benefit. In this way, AI can enhance radiology, and allow radiologists to continually improve their relevance and value.

References

1. Adams M, Murphy A. Artificial intelligence. Radiopedia, (accessed on 27 Jan 2022). DOI:<https://doi.org/10.53347/rID-56457>
2. European Society of Radiology (ESR). What the radiologist should know about artificial intelligence – an ESR white paper. *Insights Imaging* 2019;10-44. <https://doi.org/10.1186/s13244-019-0738-2>
3. Brink JA, Arenson RL, Grist TM, Lewin JS, Enzmann D. Bits and bytes: the future of radiology lies in informatics and information technology. *Eur Radiol*, 2017;27:3647–3651 <https://doi.org/10.1007/s00330-016-4688-5>
4. Hosny A, Parmar C, Quackenbush J, Schwartz LH, Aerts HJWL. Artificial intelligence in radiology. *Nature reviews. Cancer*, 2018;18(8) 500–510. DOI: 10.1038/s41568-018-0016-5
5. McDonald RJ, Schwartz KM, Eckel LJ, Diehn FE, Hunt CH, Bartholmai BJ, Erickson BJ, Kallmes DF. The effects of changes in utilization and technological advancements of cross-sectional imaging on radiologist workload. *Acad Radiol*. 2015; 22(9):1191–1198. doi: 10.1016/j.acra.2015.05.007
6. Fitzgerald R. Error in radiology. *Clin Radiol*, 2001, Dec; 56(12):938-46. DOI: 10.1053/crad.2001.0858
7. Kohli M, Geis R. Ethics, Artificial Intelligence, and Radiology. *J Am Coll Radiol*, 2018; 15:1317–1319. <https://doi.org/10.1016/j.jacr.2018.05.020>