ARTIFICIAL INTELLIGENCE: A BOON OR A BANE FOR MEDICINE?

Abstract

In the dynamic intersection of Artificial Intelligence (AI) and medicine, the question of AI's role as a boon or bane unfolds. AI's omnipresence in daily medical practices, from record-keeping to drug discovery, is explored, portraying it as a transformative force in healthcare. The narrative navigates through the historical evolution of AI in medicine, spotlighting its pivotal role in diagnoses, treatment decisions, and outcomes predictions. However, the tale takes a nuanced turn, shedding light on the environmental impact, high costs, ethical concerns, potential unemployment, and the risk of AI-induced laziness and emotionlessness. Yet, amidst these challenges, the narrative accentuates AI's symbiotic relationship with human doctors, particularly in surgical devices and diagnostics. The conclusion urges an increased focus on controlled programs and research studies to unravel AI's full potential in medicine. As the twenty-first century unfolds, the intricate dance between man and machine in healthcare continues to shape the narrative of medical progress.

Authors

Avi Mittal
Author
MBBS 2021 PGIMS
University of Health and Sciences
Rohtak Haryana India

Avneet Kaur
Author
MBBS 2021 PGIMS
University of Health and Sciences
Rohtak Haryana India

Dilawar Panjeta
Author
MBBS 2021 PGIMS
University of Health and Sciences
Rohtak Haryana India

Chahak Garg
Author
MBBS 2021 PGIMS
University of Health and Sciences
Rohtak Haryana India

Bharti Surya
Author
MBBS 2021 PGIMS
University of Health and Sciences
Rohtak Haryana India

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I. INTRODUCITON

A very intelligent, smart and fast behavior and critical thinking which is being comparatively equal to human beings and simulated by the computers and technology is called Artificial Intelligence (AI). Currently this AI is being used a lot in our daily medical practices and medical centers for records maintaining, check ins, follow up calls and reminders. This is being used in radiology in computer assisted diagnosis which is well known. AI helps us to check and get information on the patients as by their records and how to treat them and how much time we should be devoting to them as by this factor the AI is growing too much in public health sector and impacting a great effect on public health care. As in this time we are trying to discover new drugs in pharmaceuticals industries which consumes a huge time which can be reduced by uses of AI [1].

Other than medical practices AI is also helpful in medical research purposes like it is very useful in - genome analysis, epigenome analysis, proteome analysis, multi-omics analysis, radiology reports analysis, pathology report analysis, literature search system, skin image analysis, pathological image analysis, fund us image analysis etc. [2]

So, let's discuss the whole scene needs and advantages and disadvantages everything in an elaborated manner.

II. WHAT WE UNDERSTAND FROM AI

AI is a product mixture of computer, technology and science that can conduct and execute analysis on complicated medical data. It is described as a field of science and engineering dealing with both the computational understanding of what is sometimes referred to as intelligent activity as well as along this the creation of things that display such behavior also. AI is truly intelligent activity in a computer as its tendency to accomplish cognitive activities which are at levels of humans only. It has the ability to exploit important relationships within a collection of data for use, in diagnosing the problem, treatment of the problem, and it can predict the outcomes with a better and efficient manner with clinical aspects. AI has capacity to learn from previous precedents, analyze nonlinear data, and handle imprecise information has made it a particularly appealing analytical tool in the area of medicine.[3]

III. REQUIRMENTS OF TECHNOLOGY IN MEDICAL FIELD

We are seeing a change in smart healthcare, as the time and generation and technology is advancing by combing a new form of computer science technology. We are experiencing new technologies and see the new changes every day. We are seeing a revolution in smart healthcare as technology advances, which includes a new model of science and computing powers and information technology.[14]

Machine-based tech has acquired a lot of traction in the recent age of the Corona Virus Disease – 19 (COVID-19) epidemic. We have lately seen a surge in interest in a technology which is based on computer, internet, and processes depending on web; the rise in techniques which are depending on artificial intelligence (AI)in our daily lives. The range of ways in which AI technology may alter our views towards screening and diagnosis. Currently, the surgeries which are fully automated and done by robots own their own does not

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exist, and no use is feasible in the near future. By taking a good and strong interest in modern Artificial Intelligence technology, with its all capabilities and all the advancement which are linked with medical specialties, will greatly help using better patient treatment in a variety of clinical and hospitals settings, as well as future research prospects.[15]

IV. ROLE OF AI IN MEDICAL

In the past two decades, artificial intelligence has played a huge role in the medical industry. Gunn initially researched its use when he was working in a new generation of surgery in 1976, when he was investigating the possibilities and trying to identify the reasons of acute pain in the abdomen using the computer-based analysis technology. AI-enabled programs have aided all physicians in the formulation and reconfirming of the diagnoses, treatment choices and decision making, and predicting the outcomes with these treatment options and diagnoses made. They are intended to assist healthcare staff in their daily jobs by assisting with data and knowledge manipulation tasks.[3]

In medical sciences Artificial Intelligence have a great role in matching the patient's symptoms to the appropriate and recommended physicians, making diagnoses, checking on prognosis, and helping in drug discovery, a smartbot assistant that helps in translating languages for physicians and patients, organizing all important and non-important images and files in a very sorted manner, transcribing the notes for easy understanding, instantly determining which physicians are on duty and on call and can attend patients, and helping in scheduling a next available appointment for the patient according to their need and convenience, and many more.

It may also help in searching several scheduling system and database across different hospitals network, answer the prescription-related inquiries by physicians such as medicine availability, and assist clinicians in searching for hospital protocols, a list of accessible tools, and pharmaceuticals through a mobile application. As a result, it aids with the entire workflow of a hospital.[4]

Parallel to medical monuments, AI is also being used effectively for image analysis in radiology, dermatology, and pathology with great diagnostic speed and accuracy. Combining machines with medical expertise consistently improves performance. Thus, AI may enhance the treatment trajectory of chronic illness patients, minimize medical mistakes, extend scientific literature, identify precision therapeutics for complicated diseases, and boost subject enrolment in clinical trials, among other things.[5]

V. IS AI NEEDED IN MEDICAL FIELD?

In the Fourth Industrial Revolution Era, AI is making life simpler in every industry, and the medical profession is no exception. It has made significant progress in the medical profession and is widely appreciated since it reduces effort and improves the effectiveness of hospital nursing and management personnel. Major hospitals are already adopting AI-enabled systems and making considerable progress in treating and caring for patients. Because AI has a big database, it may help physicians make better decisions by incorporating all of the most current research and studies on the subject. AI is the key instrument for societal improvement in our age. AI can not only aid in medical care, but it may also provide patients with a new

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life or a higher standard of living. Thus, AI is not an option, but rather a trend that an organisation should embrace in order to stay competitive and in this race of growth. [7]

VI. IS AI TRUSTWORTHY?

In today's world, AI has achieved remarkable success in the field of health and medical sciences. AI has aided in patient diagnosis and has reduced health risks. But the subject of whether AI is trustworthy is a hot topic these days.[8,9] There is still much to be done in the time of AI. According to studies, in the healthcare industry AI has a poor methodological quality and a significant bias risk.[9] It is deficient in cyber security, data ownership, data integrity, and privacy issues.[7] It was shown that AI can produce high-quality content that can trick anybody but can only be recognized with sufficient training and research.[8] There is still a need to concentrate on characteristics such as morality, legitimacy, and robustness, and AI has a long way to go to improve trustworthiness and reduce the development of bogus medical papers.[9]

VII. APPLICATIONS OF AI

It includes evolutionary computation, fuzzy expert systems artificial neural networks, and hybrid intelligent systems. [3]

1. **Artificial Neural Networks (ANN):** The most widely used AI technology in health care and medicine is ANN. These are tools which are based on biological nervous system and help in computational analysis processes. They are made up of linked computer processors known as "neurons" that may do parallel calculations for data processing, knowledge representation, and other purposes. Recognising that diagnosis, treatment, and outcome prediction in various clinical situations are all dependent on a complex interaction of clinical, biological, and pathological variables, there is a growing demand for analytical tools like ANN that can exploit the intricate relationships between these variables. They've been employed in clinical diagnosis, image analysis in radiology and histology, waveform analysis, data interpretation, and other applications. They are also used to interpret plain radiographs, ultrasound, Computer Tomography (CT), Magnetic Resonance Imaging (MRI), and prognosis, as well as to diagnose cytological and histological specimens. They may also help predict the fate of lung and prostate malignancies.[3]

2. **Fuzzy Expert Systems:** Fuzzy logic is a branch of logic that acknowledges and applies real-world phenomena in reasoning, thinking, and inference. It outperforms multiple logistic regression technique in detecting lung cancer using tumour characteristics. It also aids in the diagnosis of acute leukaemia’s, breast cancer, and pancreatic cancer. They also help to characterise breast ultrasound pictures, liver ultrasound and CT scan images, and MRI images of brain tumours. They can also predict survival in breast cancer patients. These are also intended for the administration of vasodilators to lower blood pressure prior to surgery and anaesthesia in the operating theatre.[3]

3. **Evolutionary Computation:** It is a catch-all phrase for a variety of computer strategies based on the natural evolution process that apply the principle of natural selection and survival of the fittest to real-world challenges. They are used for a variety of activities

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such as diagnosis, prognosis, signal processing, medical imaging, planning, and scheduling.[3]

4. **Hybrid Intelligent Systems:** The benefits of neural networks for learning, fuzzy logic, and evolutionary computation may be coupled to create hybrid intelligent systems that can function in tandem. Their combination enables hybrid systems to handle raw data, apply human-like reasoning procedures, cope with uncertainty and imprecision, and so on. ANNs for constructing fuzzy systems, fuzzy systems for designing ANNs, and genetic Algorithms for autonomously training and developing neural network designs are some examples of these hybrid systems. It is used to diagnose breast cancer, coronary artery stenosis, analyse micro calcification on digital mammograms, measure myocardial viability, and manage the depth of anaesthesia, among other things.[3]

VIII. DISADVANTAGES OF ARTIFICIAL INTELLIGENCE

The most serious difficulty with AI from an environmental standpoint is that it is not environmentally friendly. It creates e-waves that are not biodegradable and, if discharged, will release hazardous heavy metals and reduce soil fertility.[7]

1. **High Cost and the Risk of Breakdown:** AI costs a lot of money since extremely sophisticated software and hardware equipment is utilised to create it, which is pricey. AI upkeep is likewise quite expensive. The most serious fear concerning AI is the potential of failure. It's like spending a million dollars on a vehicle to drive from point A to point B only to have it break down the next day. Similarly, Artificial Intelligence is all about easy work, but the possibility of failure casts a shadow over the whole image. [6,7]

2. **No Ethics:** Humans understand their ethics and moral principles, but when it comes to AI, the first issue for its application is its ethics and morals. is it morally OK to manufacture human replicas? Do our moral ideals enable us to do so? After all, intelligence is a natural talent. It may not be appropriate to put it into a machine or robot for our benefit.[7]

3. **Unemployment:** Because machines can operate like people and achieve greater results. If robots begin to replace humans in all fields, it is likely that many people would lose their jobs. People will be out of work. Because there was no AI in ancient times, all labour was done by people, but this is no longer the case. Previously, people were utilised to handle issues at the help centre, but in the present day, AI has replaced our employment, and problems are now addressed through chat box. [7]

4. **Lack of Creativity:** Being creative is a quality shared by all humans. Every human being has some level of creativity, as a result of which job is completed efficiently. However, when it comes to AI, the programmer's ingenuity is crucial. It operates on the basis of programme configuration; it cannot generate anything on its own. Do you believe robots will flourish in this field? Is it acceptable to have a robot do surgery? As machines function by gathering information from individuals who have similar symptoms. If there is a data shortage, AI may produce an inaccurate diagnosis. If we want to boost performance, we must tweak the command. [6, 7]

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5. **Makes Human Lazy:** Men in the present period are fully reliant on technology and utilise them for everything, which makes them sluggish. As a result, one should not rely only on these solutions. Because of these contemporary procedures, we are more prone to lifestyle disorders, which may be dangerous.[7]

6. **Emotionless:** To complete a job in a systematic manner, collaboration and emotional value are required. The robot, on the other hand, is emotionless. Machines can only accomplish the tasks that they are intended to do; anything else causes them to produce irrelevant results or to crash, which may be disastrous. Aside from all of these difficulties, there is a worry of robots taking our place! Humans should ideally be the masters of machines. If things go the other way, the globe will be in disarray. AI may be beneficial, but what if the order provided to the machine is negative? This might be harmful to the society. Artificial intelligence may eventually outperform mankind. The day when machines will govern humans is not far away; they may enslave us and begin dominating the globe. As a result, the moment is approaching when all effort done with these technologies will result in the extermination of mankind. Man's selfish ingenuity might threaten humanity.[6,7]

IX. AI IN HEALTH CARE AND HUMAN DOCTORS

A branch of science or we can say that a new part of science which can stimulate and copy the power of computations of human beings is called AI:[11] and is being increased by adding the humans intelligence power comma human feeling and expressions to machines as to make them looking like human is so fascinating to us. AI has some strong areas to work in like it can analyse the data very smoothly and easily in an effective manner and it can recognise the interactions in between programs and humans and it can create and develop all new algorithms with its need[12].

AI is being very helpful to healthcare services like by getting involved and programmed in surgical devices and services where it can help in making diagnosis and by improving treatment accuracy and by this it is helping surgeons so much like by helping them in making risk per patients decisions.[11].

In comparison of the conventional approach the AI enabled systems have much high accuracy. Al models predicts the outcomes of postoperative case easily and help the medical setup. For example, A algorithm under supervision, which learn from humanised labelled data, which classify and predicts the data and any prediction on new or any unseen data; It is found that it is very effective to predict the sepsis conditions before one day of its onset with a very impressive receiver operating characteristic curve. Health management systems can be improved very efficiently and fairly with use of AI. Clinical texts and reports can be analysed with the help of this technique. It can help to make a new diagnosis and add to the current diagnosis on the basis of its capability of analysing all the finest and smallest information it can access and by accessing the clinical records and reports and by gathering a history of patients with all type of past infections diagnosis and diseases he have been suffered through, it can inculcate all the side effects and family history type information which was used in previous diagnosis and treatment he have been through. Delivering the drugs to specific targets is called target specific drug delivery so the nanobots and softbots which are based of new high-tech technologies are being used for this kind of work, the work and actions of these bots are predefined and pre-programmed in them by the agencies according to the user

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need and they work on their on and are very effective. This technology can also find and assess the early features of emotional disturbances can prevent bigger problems in youths as being psychotherapeutic avatars.[12,13]

Computer vision (CV) is another important and very emerging application of Al. Which involves processing of images, recognition of patterns, and response. CV is still being explored to reduce the colorectal cancer-related mortality rates by using a fully convolutional, standard network to yield a better diagnosis; than it tries to use conventional approach of the visual assessment of polyp malignancy. There are chances that Al can replace and take place and can take over the humans and their activities in such medical activities; but, such a replacing humans with machines is not a perfect and hundred percent self-working and a good idea. Human physicians will continue to serve patients with their talent and the capabilities augmented by Al to make it more efficient. As it is evolving more and more, some more clearer guidelines will emerge on its integration with medical practice and the field of health and sciences. [13] Al enabled services and devices in health care setup, no matter how advanced it is, it will always and should be guided by the core principles of humanity and patient centred care.[13]

X. CONCLUSION

There are several AI approaches that can help with a wide range of healthcare concerns. A large no of evidences suggests that in this twenty first century the artificial intelligence based medical technology can help the physicians to offer a better and more effective health care to the patients. Despite previous anticipation, AI technology has not been completely used in medical sciences. As a result, so with this the demand of conducting more and more programmes and researches and studies on this field is rising and we should increase number of controlled programmes which can effectively prove the usefulness of the AI in this field of medicine . [3]

REFRENCES

[1] Amisha, Malik P, Pathania M, Rathaur VK. Overview of artificial intelligence in medicine. J Family Med Prim Care. 2019 Jul;8(7):2328-2331. doi: 10.4103/jfmpc.jfmpc_440_19. PMID: 31463251; PMCID: PMC6691444.

[2] Hamamoto R. Application of Artificial Intelligence for Medical Research. Biomolecules 2021;11:90. https://doi.org/10.3390/biom11010090.

[3] Ramesh AN, Kambhampati C, Monson JR, Drew PJ. Artificial intelligence in medicine. Ann R Coll Surg Engl. 2004 Sep;86(5):334-8. doi: 10.1308/147870804290. PMID: 15333167; PMCID: PMC1964229.

[4] Basu K, Sinha R, Ong A, Basu T. Artificial Intelligence: How is It Changing Medical Sciences and Its Future? Indian J Dermatol. 2020 Sep-Oct;65(5):365-370. doi: 10.4103/ijd.IJD_421_20. PMID: 33165420; PMCID: PMC7640807.

[5] D Douglas Miller, Eric W BrownThe American journal of medicine 131 (2), 129-133, 2018

[6] Shukla Shubhendu, S., & Vijay, J. (2013). Applicability of artificial intelligence in different fields of life. International Journal of Scientific Engineering and Research, 1(1), 28-35.

[7] Dewangan A. Artificial intelligence: A Privilege or A Disadvantage. Available at SSRN 4442456. 2023 May 9.

[8] Lee D, Yoon SN. Application of Artificial Intelligence-Based Technologies in the Healthcare Industry: Opportunities and Challenges. International Journal of Environmental Research and Public Health [Internet]. 2021;18:271. Available from: http://dx.doi.org/10.3390/ijerph18010271

[9] Májovský M, Černý M, Kasal M, Komarc M, Netuka D. Artificial Intelligence Can Generate Fraudulent but Authentic-Looking Scientific Medical Articles: Pandora's Box Has Been Opened. J Med Internet Res. 2023 May 31;25:e46924. doi: 10.2196/46924. PMID: 37256685; PMCID: PMC10267787.

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[10] Albahri AS, Duhaim AM, Fadhel MA, Alnoor A, Baqer NS, Alzubaidi L, et al. A systematic review of trustworthy and explainable artificial intelligence in healthcare: Assessment of quality, bias risk, and data fusion. Information Fusion [Internet]. 2023 Aug 1;96:156–91. Available from: https://doi.org/10.1016/j.inffus.2023.03.008
[11] Reddy S, Allan S, Coghlan S, Cooper P. A governance model for the application of Al in health care. J Am Med InformAssoc. 2020 Mar 1;27 (3):491-497. doi: 10.1093/jamia/ ocz192. PMID: 31682262; PMCID: PMC7647243.
[12] Rimmer L, Howard C, Picca L, Bashir M. The automaton as a surgeon: the future of artificial intelligence in emergency and general surgery. Eur J Trauma Emerg Surg. 2021 Jun;47(3):757-762. do: 10.1007/s00068-020-01444-8. Epub 2020 Jul 26. PMID: 32715331.
[13] Abdullah Shuaib, Husain Arian & Ali Shuaib (2020) The Increasing Role of Artificial Intelligence in Health Care: Will Robots Replace Doctors in the Future?, International Journal of General Medicine, 13:, 891-896, DOI: 10.2147/IJGM.S268093
[14] Singla D, Singh SK, Dubey H, Kumar T. Evolving requirements of smart healthcare in cloud computing and MIoT. InInternational Conference on Smart Systems and Advanced Computing (Syscom-2021) 2021 Dec 25 (pp. 102-109)
[15] Darbari A, Kumar K, Darbari S, Patil PL. Requirement of artificial intelligence technology awareness for thoracic surgeons. The Cardiothoracic Surgeon. 2021 Dec;29(1):1-0

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