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ARTIFICIAL INTELLIGENCE – CREATING THE FUTURE : A REVIEW

Dentistry

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ABSTRACT

The term "artificial intelligence" (AI) refers to the idea of machines being capable of performing human tasks. The emergence of artificial intelligence (AI) as a tool for better health care offers unprecedented opportunities to improve patient and clinical team outcomes, reduce costs and impact health of population. With the software for computation of this data has become a necessity. From data processing and finding relevant information to using neural networks for diagnosis and to the introduction of augmented reality and virtual reality in dental education, Artificial intelligence has found a number of applications in the field of medicine and dentistry.

KEYWORDS

Artificial intelligence, Covid – 19, Machine learning, Neural networks, Virtual reality

INTRODUCTION

The human brain is an inimitable structure composed of networks of interlinked neurons which transmit signals throughout the body. This nature of human brain has always made researchers and scientists inquisitive from time immemorial. Artificial intelligence (AI) is a breakthrough in the field of technology which is rapidly progressing and has captivated the minds of researchers across the globe.[1] An enormous amount of modern computer and technologies were inspired by Aristotle's early attempts to formulate the logic and thinking through his syllogisms (a three part deductive reasoning). In1950, a British mathematician, Alan Turing devised a machine that could decode encrypted messages; this could be called the 1st breakthrough in the history of super computers. He devised the "Turing Test" which is designed to determine whether a computer exhibits intelligence. Today, we know a similar function as "artificial intelligence "(AI). Artificial intelligence (AI) is defined as 'a field of science and engineering concerned with the computational understanding of what is commonly called intelligent behaviour and with the creation of artifacts that exhibit such behaviour'.[2]

KEY ASPECTS OF ARTIFICIAL INTELLIGENCE

Machine learning is part of AI, which depends on algorithms to predict outcomes based on a dataset. The purpose of machine learning is to facilitate machines to learn from data so they can resolve issues without human input.

Neural networks are a set of algorithms that compute signals via artificial neurons. The purpose of neural networks is to create a network that function like the human brain.

Deep learning is a component of machine learning that utilizes the network with different computational layers in a deep neural network to analyze the input data. The purpose of deep learning is to construct a neural network that automatically identifies patterns to improve feature detection.[3]

CONCEPTS OF AI

The difference between human and AI is still a huge one. AI still bases mainly on the algorithms that rely on step by- step reasoning, similar to the human brain solving a puzzle or making logical deductions.[4,5] That is the reason why more difficult tasks require huge computer resources. In order to cope with the situation, researchers have created the methods and algorithms able to process uncertain and incomplete information, involving the concepts of the probability theory. In contrast to machines, humans employ intuitive decision- making to resolve a large number of problems and do not always employ their thinking skills and probability consideration and reasoning (consideration of all possible situations; in computer science commonly called the brute force method). AI tries to get as close as possible to this "sub symbolic" way of thinking.[6-8]

The ability to learn and acquire new knowledge is an essential component of AI. AI has to be able to decide whether and in what degree the obtained pieces of information are true (correct), but also to learn to cope with false information, without endangering the aspect of the whole of applied resources. AI primarily utilizes several basic forms of logic: mathematical logic, the statements of which can be true or false.[9]

In the processes of artificial reasoning, an essential part of AI are artificial neural networks, as an alternative to traditional analytics. Artificial neural networks are modelled based on the discovery of biological mechanisms of operation of the human brain. The concept itself is similar to the transmission of neural signals and operation of the human brain.[10]

APPLICATION OF AI IN DENTISTRY

AI has been used mainly in dentistry to make the process of diagnosis more accurate and efficient, which is of utmost importance in achieving best results to the treatments provided along with superior quality patient care. Dentists need to use all their acquired knowledge to diagnose and decide the best treatment option. They are also required to predict the prognosis where they need accurate clinical decision-making skills. However, in some cases, dentists do not have enough knowledge to make the right clinical decision in a limited period. AI applications can serve as their guide so that they can make better decisions and perform better. Since its inception in the 1980s, the field of intelligent tutoring systems has come a long way. Both these systems, augmented reality and virtual reality are being used widely in the field of dental education to create situations that simulate clinical work on patients and eliminate all the risks associated while training on a live patient.[11] Besides these, AI software enables us to create a complete virtual database for every patient, which can be extremely detailed and extremely accessible at the same time.[12]

Some of these tasks include:

1. Booking and coordinating regular appointments according the convenience of the patients and dentists.
2. Alerting the patients and dentists about checkups whenever any genetic or lifestyle information indicates increased susceptibility to dental diseases. (eg: periodontal screening for patients with diabetes and oral cancer screening for those who habitually use smoked or smokeless tobacco)
3. Managing the paperwork and insurance.

4. Assisting the clinical diagnosis and treatment planning.
5. Alerting the dentist before every appointment about any allergies that the patient may have.
6. Alerting the dental healthcare provider about any relevant medical history (eg: use of prophylactic antibiotics in those patients who have had cardiovascular surgeries)
7. Setting up regular reminders for patients who are on tobacco or smoking cessation programs. etc.
8. Providing emergency tele-assistance in cases of dental emergencies when the dental health care professional cannot be contacted.[13]

The Role Of Artificial Intelligence In Tackling COVID- 19

In this worldwide health crisis, the medical industry is looking for new technologies to monitor and control the spread of COVID-19 (Coronavirus) pandemic. AI is one such technology which can easily track the spread of this virus, identifies high-risk patients and is useful in controlling this infection real-time. It can also predict mortality risk by adequately analyzing the previous data of the patients. AI can help us to fight this virus by population screening, medical help, notification and suggestions about the infection control.

Main applications of AI in COVID-19 pandemic
I) Early detection and diagnosis of the infection
II) Monitoring the treatment
III) Contact tracing of the individuals
IV) Projection of cases and mortality
V) Development of drugs and vaccines[14-16]

CONCLUSION

The next decade will prove if this time the expectations for tangible AI applications are met by actual outcomes or if once again an AI-winter buries hopes and excitement. In particular in healthcare, the stakes are high. There is reasonable concern about data protection, data security and about handing over critical medical decisions to computers. However, AI has the potential to revolutionize healthcare and, with it, dentistry; AI may assist in addressing the weaknesses harshly criticized in conventional dental care. Dentistry and, specifically, dental research, has a role to ensure that AI will make dental care better, at lower costs, to the benefit of patients, providers and the wider society.

REFERENCES

1. Kalappanavar A, Sneha S, Annigeri RG. Artificial intelligence: A dentist's perspective. J Med Radiol Pathol Surg 2018;5:2-4
2. Dr Sunali S Khanna , Prita A Dhaimade. Artificial Intelligence: Transforming Dentistry Today. Indian Journal of Basic and Applied Medical Research 2017;6:161-7.
3. Sanjeev B. Khanagar. AliAl-ehaideb. Prabhadevi C.Maganur. Satish Vishwanathaiah. ShankargoudaPatil. Hosam A.Baeshen. Sachin C.Sarode. ShilpaBhandi. Developments, application, and performance of artificial intelligence in dentistry- A systematic review, Journal of Dental Sciences, 2021;16:508-22.
4. Russell S, Norvig P. Artificial intelligence: a modern approach. 3rd ed. New Jersey: Pearson Education; 2010.
5. Poole D , Mackworth A, Goebel R. Computational intelligence: a logical approach. New York: Oxford University Press; 1998.
6. Wason C, Shapiro D. Foss B. Reasoning. In: Foss B, editor. New horizons in psychology. Harmonds worth: Penguin; 1966.
7. Kahnemand, Slovic P, Tversky A. Judgment under uncertainty: Heuristics and biases. New York: Cambridge University Press; 1982.
8. Lakoff G, Núñez R. Where mathematics comes from: How the embodied mind brings mathematics into being. New York: Basic Books; 2000.
9. Moconja S. Mathematical Logic in Computer Engineering - Tasks 1. Belgrade: Faculty of Mathematics; University of Belgrade; 2011
10. Khajanchi A. Artificial Neural Networks: The Next Intelligence. Los Angeles: University of Southern California, Technology Commercialization Alliance; 2012
11. Murray T, Authoring intelligent tutoring systems: an analysis of the state of the art. International Journal of Artificial Intelligence in Education; 1999, 10: 98-129.
12. Lavrac, N.. Selected techniques for data mining in medicine. Artificial intelligence in medicine, 1999,16(1), 3-23.
13. Kannan P. V., Artificial Intelligence, Applications in healthcare, Asian hospital and healthcare management.
14. Haleem A, Javaid M, Vaishya. Effects of COVID 19 pandemic in daily life. Curr Med Res Pract 2020.03.011.
15. Bai HX, Hsieh B, Xiong Z, Halsey K, Choi JW, Tran TM, Pan I, Shi LB, Wang DC, Mei J, Jiang XL. Performance of radiologists in differentiating COVID-19 from viral pneumonia on chest CT. Radiology 2020.
16. Hu Z, Ge Q, Jin L, Xiong M. Artificial intelligence forecasting of COVID-19 in China. Arxiv preprint arxiv:2002.07112. 2020 Feb 17.