BSSS Journal of Computer: ISSN (Print) - 0975-7228, E-ISSN - 2582-4880, Vol. XIV, Issue-I (2023), pp 23-27Dr. Manoj Patidar: Understanding the Diseases through Computers: Future of Artificial Intelligence
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UNDERSTANDING THE DISEASES THROUGH COMPUTERS: FUTURE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT:
A crucial stage in the discovery and development of new drugs is understanding the pathophysiology of the disease and how it will develop in the future. Even while many R&D projects are aimed at improving human health, there are still significant gaps in our knowledge. For instance, infectious diseases, like COVID-19, might quickly spread throughout the world and become pandemics. It is crucial to have some methods that can swiftly anticipate the development of diseases, the likelihood that they will become epidemics, and the identification of possible therapeutic targets. This problem can be solved by artificial intelligence, which could lighten the load on the scientific community. The development of new drugs and early diagnostics are the possible benefits of artificial intelligence. The machines may be programmed to look for pathogens, and their mechanism of spreading. This article is an attempt to explore the possibilities of implementing artificial intelligence in health sectors.

Keywords: Artificial Intelligence, Disease, Pathogenesis, Drug target

1. INTRODUCTION

The simulation of intelligence processes of human beings by machines or computers is known as artificial intelligence. It is the incorporation of the intelligence process of humans by humans into non-human objects like computers/robots. The process involves the analysis of data patterns, understanding behaviours, correlation with various events, and predicting future aspects. It is believed that the introduction of the human intellect in machines would be beneficial for human beings as it can be used for disease diagnosis to treatment. Various algorithms, software, and devices are available to help the healthcare sector. Automatic samples, as well as data collection, documentation, patient monitoring, analysis of x-ray or MRI images, and device optimizations, are a few examples(Miller, 2018).This technology can be better utilized for the correlation of symptoms, evaluation of biomarkers, analysis of medical images or electronic records, and identification of diseases(Combi, 2016).

Apart from improving the healthcare ecosystem, artificial intelligence is assumed to reduce the cost burden as well. It is proposed that the successful implementation of artificial intelligence would save approximately $150 billion/year (B. J. , 2017). Due to its proactive nature, more concentration on health management, and focused approaches might be the reasons for its being economical. It is also beneficial for a large number of populations as it can reduce the visit of patients to doctors, have fewer medicines, and have longer treatments. Therefore, the artificial intelligence-based healthcare market is thought to be growing rapidly and might achieve $6.6 billion in the next few years(Kirch, 2017).

Tuberculosis, cancer, HIV, Malaria, and many other diseases are increasing the demand for healthcare experts, and the COVID-19 like pandemics, are making the situation worse. To keep pace, governments and healthcare departments are adapting technology-based approaches and

investing a lot in the satisfaction of patients. Nearly every pocket has a smartphone and thus we need to transform health practices into e-health practices as much as possible. For example, the inclusion of a health-tracking app for the promotion of individual-based healthcare, remote consultancy, and availability of online doctors at any time might be revolutionary. If such can be done, we can handle COVID-19 like contagious diseases, without any direct contact with patients or people from endemic areas.

It is recommended that artificial intelligence should help the health professionals, but not try to replace the healthcare staff. In 2018, Forbes magazine argued for the introduction of artificial intelligence in the areas like administrative tasks, analysis of image/MRI, online assistance, surgeries with robots, and virtual decision makings(B. M. , 2018). Further, the regulation of dosage and the security of patient confidential data were suggested by the Accenture report in the same year(Kalis B, 2018). Similarly, the importance of personalized medicine, device connections, and electroceuticals were advocated by the report of McKinsey in the year 2019(Singhal S, 2019).

2. Methodology

2.1 Search criteria

The available literature on the internet especially in Pubmed and Pubmed Central Databases were systematically explored. The information related to artificial intelligence, data science, machine learning, and their role in the healthcare sector were extracted from the published articles. The search criteria were restricted to the artificial intelligenceand healthcare sector.

2.2 Inclusion criteria

Only published articles were explored for the study. The reports having experimentally proved data on various models with ethical guidance were prioritized. The collected data were systematically analyzed and represented in this article. When the necessity for clear representation figures and tables were also made and included in the manuscript.

3. Results

3.1 Internet is full ofinformation related to artificial intelligence

Table 1 depicts that a lot of information in the form of research and articles related to artificial intelligence, data science, machine learning, and their role in the healthcare sector are available on the Internet. When the keyword “artificial intelligence” was searched, Pubmed gave 138386results and Pubmed central gave 87961results (Table 1).

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Table 1: Availability of artificial intelligence and health-related literature on Pubmed and PubMed central.

Sr. No	Searched Keyword	Results	
		Pubmed	Pubmed Central
1	Artificial Intelligence	138386	87961
2	Artificial Intelligence And Healthcare	8335	23957
3	Artificial Intelligence And Health	28343	54160
4	Artificial Intelligence And COVID	2346	9359
5	Data Science Artificial Intelligence	17299	50133
6	Data Science	566768	2159955
7	Health Data Science	219438	1284486
8	Biomedical Data Science	48753	328896
9	Big Data Science	12720	155940
10	Data Science COVID	9425	58528
11	Machine Learning	69893	154896
12	Machine Learning And Health	18804	93637
13	Machine Learning And COVID	1827	11244
14	COVID-19	180087	207632

3.2 Rise in research related to artificial intelligence

The critical analysis of published research articles suggests a significant rise of focus of the scientific community in given areas. Figure 1 depicts the data for the last decades. For example, the number of published research articles was 841 and 1296 between 2000-2005 on PubMed and PubMed central respectively for the keyword "Artificial Intelligence and Health". Interestingly, the numbers hike between 2016-2021 to 15503 and 29512 which suggest that researchers understand the importance of artificial intelligence for many sectors including healthcare.

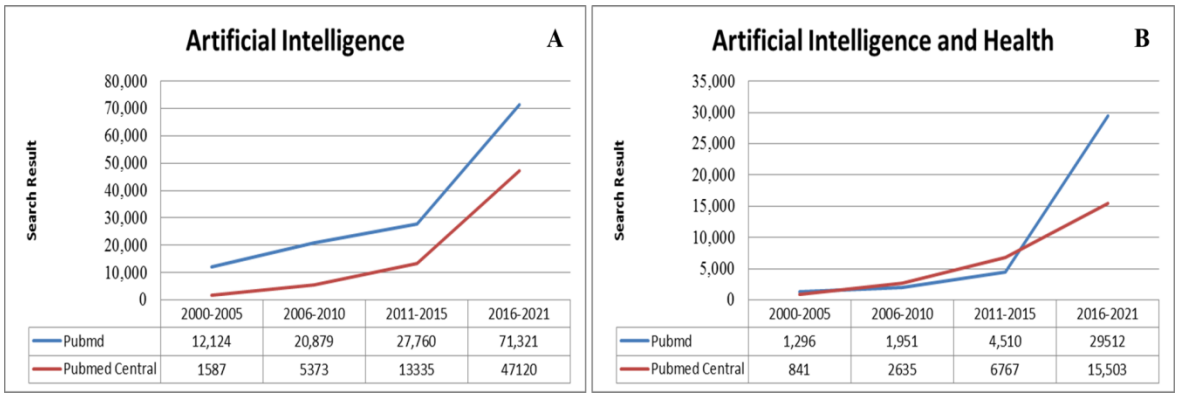

Figure 1: Rise in research related to artificial intelligence

3.3 Artificial intelligence and Image analysis

Medical imaging like X-rays/MRIs provides reliable data and authenticates information about the health conditions of patients and is routinely used for the identification of disease. Researchers are trying to adopt artificial intelligence techniques for the visualization of more information from ultrasounds, CT scans, magnetic resonance imaging, and positron emission tomography, etc. The

automation of image analysis is desired and artificial intelligence might make the process more reliable. Special addition of features like fuzzy and rough sets, analysis of uncertaintyand optimization for multi-objective visualization can be beneficial. Although one cannot deny the positive outcomes of artificial intelligence, making it feasible like the development of tools for individual assessment is costly and tedious to code.
It can be utilized to improve the quality of the image obtained, reconstructions of left segments, image storage, digital comparisons with available data, extraction of hidden data, and for the analysis of several images simultaneously(Lavecchia, 2019).

3.4 Artificial intelligence and Drug Development

The development of drugs is a very tedious, laborious, time-consuming, and costly process. It requires a lot of scientific inputs, precisions, and efficiency. Apart from making the drug for a specific disease, focusing on any type of its side effects is similarly important. Many times, this process needs more than 10 years from lead identification to its final approval. Therefore,the inclusion of bioinformatics and artificial intelligence-like approaches can be helpful in the quick identification of specific drug candidates, checking for their effectiveness as well as for any possible side effects. Artificial intelligence can be useful in this era because the amount of available data is huge on the databases like ChEMBL and PubChemand the systematic analysis of such data might be revolutionary for humankind(J P Hughes, 2011). People are trying to retrieve the desired information through various algorithms like neural networks and vector machines. We have also utilized the in-silico approaches for the development of therapeutics and tried various permutation combinations by computational approach for the prediction of best-suited candidates for our research(Patidar, 2018)(Manoj, 2017). The identification of the physicochemical parameters including the half-life of the proposed molecules can be checked by online available tools. Similarly, the rate of drug absorption, its distribution, metabolism, efficacy, and finally excretion rate can be predicted by machine learning approaches. DeepTox and MoleculeNet like algorithms are being used for the toxicity prediction of the molecules available in the drug pipeline(Mayr A., 2016). We have also used various tools like AutoDock, DOCK etc. for the prediction of the binding of the ligands to their receptors (Patidar, 2018)(Manoj, 2017).

3.5Artificial intelligence in disease diagnosis

Diagnosis of the disease requires an accurate, efficient, and repeatable approach. Possible human errors might be overcome by the introduction of artificial intelligence in the workflow of disease diagnosis. As the diseases are changeable therefore it is difficult, not only for common practitioners but for experts/specialists to trace their frequencies. Unavailability of doctors, physical restrictions, economic challenges, fear of breaching confidentiality, and lack of proper guidance are the factors that limit the diagnosis of the disease. Meanwhile, the disease progresses and evolves continuously. Therefore, the technology-based approaches might have relevance for accurate diagnosis and timely treatment.Artificial intelligence can be utilized for the identification of rare diseases. Currently, these approaches are adapted for the diagnosis of congenital disorders of glycosylation by predicting the Glycosylation Sites and Golgi Proteins(Mirbabaie, 2021).

4. Conclusion and future perspective

We are living in the era of “big data” and smartphone in each hand. This provides us with the opportunity for systematic analysis of data and retrieval of fruitful data from it. The Artificial intelligence-based approaches might be utilized as individual-based assistance particularly for healthcare sectors. Several published types of research provide strong proof that Artificial intelligence platforms can become more suitable for handling diseases and can make the tasks related to healthcare better. Nowadays, quick detection of tumours is also possible through

advanced radiological techniques. But we should employ these algorithms with precautions as they should not try to replace humans.

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Conflict of interest statement
None.

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