The Role of Artificial Intelligence in Disease Diagnosis and Treatment

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ABSTRACT

The ability of a machine to mimic intelligent human behavior is a key component of artificial intelligence. Artificial intelligence using a variety of algorithms, made possible by the exponential increase in computing power, is assisting medical professionals in providing better diagnosis and treatment. Humans use AI for supervised and unsupervised learning to help them reach their goals, which they first map out in their minds. Artificial neural networks, k-nearest neighbors, support vector machines, decision trees, classifiers based on regression analysis, Bayesian networks, random forests, and discriminant analyses are just few of the methods utilized in AI. Artificial intelligence (AI) has many applications in the medical field, including faster interpretation and diagnosis in the fields of cardiology, psychiatry, gastroenterology, surgery, ophthalmology, etc., and in the diagnosis and staging of breast cancer in a whole-slide images histopathology study of patients with lung adenocarcinoma and squamous cell carcinoma. AI can be a helpful adjunct for clinicians in designing treatments, but it will never replace therapy by humanistic ways because of its lack of a holistic approach to management.

KEYWORDS: Artificial Intelligence, Diagnosis, Treatment of Diseases

1.Introduction

The capacity of the human brain is limited when it comes to dealing with vast amounts of data. Acquired wisdom and experience must be incorporated into the learning process. Silicon chips have made it possible to access, gather, and store huge amounts of medical data for later analysis [1, 2]. The foundation of AI is the use of these massive data stores for training purposes. Algorithms used in software allow computers to learn much faster than humans do, allowing them to amass vastly more experience in a shorter length of time. The term "artificial intelligence" (AI) refers to a machine's ability to mimic human intelligence. Artificial intelligence (AI), often known as machine intelligence, is "a branch of computer science mimicking the human mind and its process." Sixty years ago, during a Turing test, Alan Mathison invented the term artificial intelligence (AI). The test's premise was that a machine may be considered intelligent if a human mind could not discern whether the machine or person was responding [3, 4]. Despite Turing's proposal of the concept of AI in 1950, a clear definition of AI has yet to emerge. No one can agree on a single definition of artificial intelligence, but we do know that it is a branch of computer science that draws from a wide range of academic disciplines. Medical diagnosis, treatment, risk prediction, clinical care, and drug development are just few of the areas where AI has the potential to be a transformative therapeutic approach. Artificial intelligence (AI), especially as it pertains to healthcare and related technologies like artificial neural networks, Bayesian networks, and hybrid intelligent systems, had a boom in the 1980s and 1990s [5, 6]. When compared to other industries, healthcare received a disproportionate share of the AI research budget in 2016. Different strategies for solving mathematical problems and geometric equations were developed throughout the subsequent decades. As the processing power and storage capacity of computers increased exponentially, software titans turned to artificial intelligence algorithms to gain a deeper understanding of consumer behaviour, futuristic computer vision, natural language processing, and robotics to aid medical experts in increasing their efficiency [7]. Natural language processing, content extraction, machine learning (especially deep learning), machine translation, question answering with text generation, visual applications like image recognition in diagnostics, machine vision, speech recognition, and robotics are just some of the ways AI is being used in medical therapeutics. Figure 1 comprising the application of the AI in the novel drug discovery.

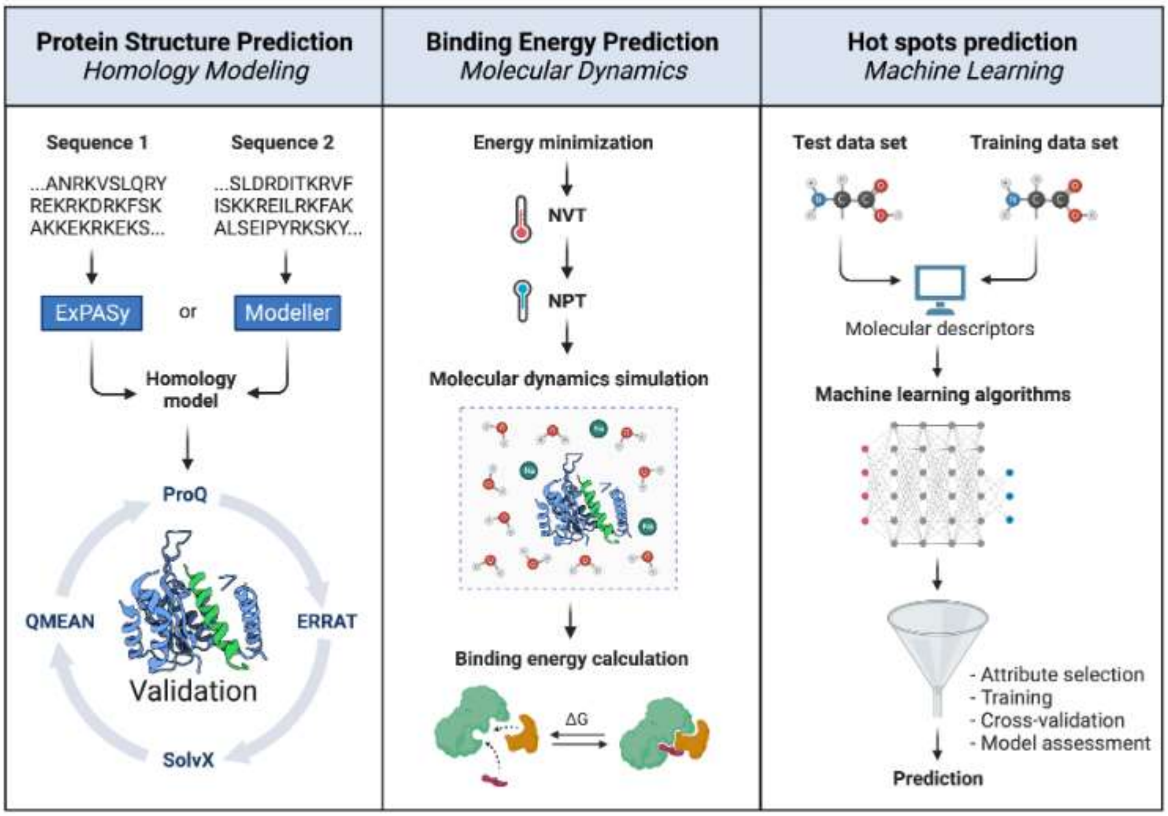

Figure 1: Application of the AI in the novel drug discovery

Understanding how AI helps in the diagnosis and prediction of a disease requires an appreciation of the use and applicability of various techniques, such as SVM, KNN, Naive Bayes, Decision Tree, Ada Boost, Random Forest, K-Mean clustering, RNN, Convolutional neural networks (CNN), Deep-CNN, Generative Adversarial Networks (GAN), Long short-term memory (LSTM), and many others for various disease detection systems [8, 9]. To further understand how machine and deep learning models can be used in disease detection, we performed a comprehensive survey. This research project reviews the use of AI in the diagnosis of a wide range of disorders. This article provides explanations for the following four research questions: What is the current state of artificial intelligence (AI) studies pertaining to disease diagnosis? What are the numerous ailments that AI is used to treat? Third, what new restrictions and difficulties have been raised in the literature for this field of study? In healthcare, where do you see AI being most useful in the near future? The remaining chapters are divided up into distinct parts [10]. First, a quick summary of the role of AI in healthcare and how it is being used to diagnose diseases with the help of various machines and deep learning methods. Disease symptoms and diagnostic difficulties, a disease detection modeling framework for AI, and several healthcare-related AI applications. Included in this section are reports of work done across multiple diseases, as well as a comparison of various techniques applied to the same dataset, including the results of machine and deep learning methods' computations of parameters like accuracy, sensitivity, specificity, area under the curve, and F-score. The discussion section addresses the questions raised in the research section. The work that guides researchers in selecting the most effective technique to identifying diseases concludes with an outlook on its future scope [11, 12].

2. AI Systems Relevant to Healthcare

Instead of referring to only one specific technology, the term "artificial intelligence" refers to a broad category of technologies. Even while the healthcare business may reap the benefits of many of these technologies right away, the scope of the activities and employment that they make possible is quite extensive. We provide definitions and descriptions of some AI technologies that have particular application in the medical field. Figure 2 comprising the application of the AI in the hot spot prediction on the proteins [13, 14].

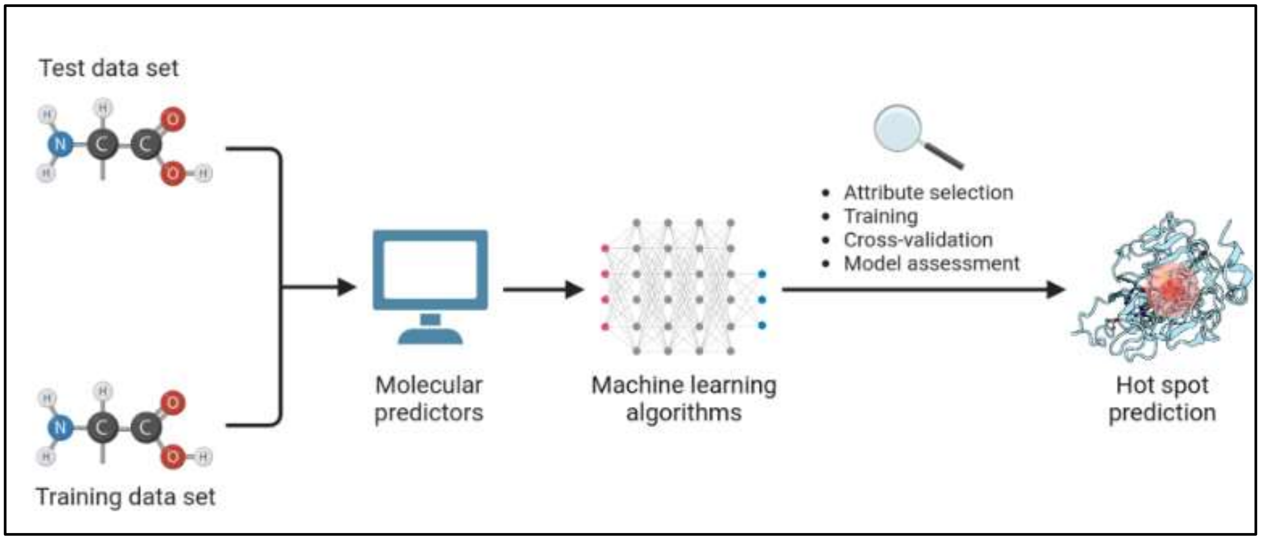

Figure 2: Application of the AI in the hot spot prediction on the proteins

3. AI Applications for Diagnosis and Therapy

Artificial intelligence has become heavily used in disease detection and treatment at least since the 1970s, when Stanford's MYCIN was established for identifying blood-borne bacterial diseases. 8 These alongside other early systems based on rules did, however, show promise in clinical practise, but they were never adopted. They weren't noticeably superior to people diagnosticians, and they didn't fit in with physician operations or electronic medical records very well. Due to its use in precise medicine, especially in the area of cancer study and therapy, IBM's Watson has recently gained attention. Natural language processing and machine learning are both used by Watson [15]. As customers understand how difficult it is to train Watson to handle certain tumours and to incorporate Watson into current care processes and systems, their initial optimism has subsided. Watson is not a singular product but rather a suite of API-accessible 'cognitive services' that may be used for many purposes, such as speech and language processing, image recognition, and data analysis using machine learning. Despite widespread agreement that Watson APIs are technically capable, most commentators agree that the aim of curing cancer was too lofty. Watson and other proprietary programs have also been impacted by the availability of free 'open source' alternatives from some providers, such as Google's Tensor Flow [16]. Implementing AI has proven challenging for many healthcare facilities. Despite their prevalence, rule-based systems within EHR systems can't compete with the precision of more algorithmic, machine learning-based solutions. Even in the NHS, this is true. It is challenging to update these rules-based clinical decision support systems as medical knowledge advances, and they frequently fall behind the data and information boom brought on by genomic, proteomic, metabolic, and other "omic-based" approaches to patient care. The tide is turning, but so far only in academic institutions and IT companies, not in actual clinical settings. Almost every week, a new lab announces that it has found a way to use artificial intelligence (AI) or big data to diagnose and treat a disease with the same or better accuracy than human practitioners. Some of these discoveries use other types of imaging, like retinal scanning or genomic-based precision medicine, although the most majority are based on analysis of radiological images. Evidence and probability-based medicine is on the rise as a result of these types of studies, and while this is generally seen as a good thing, the fact that it is founded on statistically-based machine learning algorithms raises many ethical and patient-clinician relationship concerns [17].

4.Use of Artificial Intelligence in Healthcare Administration

Many healthcare administration programs exist as well. While the revolutionary potential of AI in this field is lower than in patient care, significant efficiency can still be gained by employing the technology. The average US nurse, for instance, devotes 25% of their time to regulatory and administrative tasks, highlighting the need for such tools in the healthcare industry. To achieve this goal, RPA is the most promising piece of technology [18]. It has many potential healthcare uses, such as claims processing, clinical recording, revenue cycle management, and medical records administration. In addition, some hospitals and clinics have tried using chatbots for telehealth, mental health services, and patient contact. Simple tasks, such as ordering refills or scheduling appointments, could benefit from these NLP-based applications. A poll of 500 people in the United States who have used the top five healthcare chatbots found that patients were worried about sharing personal information, addressing complex health concerns, and the chatbots' poor usability. Machine learning is another form of artificial intelligence that could be useful in claims and payment processing since it enables probabilistic matching of data across databases. The onus is on insurers to ensure the accuracy of the millions of claims they receive. Health insurers, governments, and providers can all benefit greatly from the time and resources saved by accurately recognizing, assessing, and rectifying coding errors and inaccurate claims. Data matching and claims audits present a substantial opportunity to recover lost funds from incorrect claims [19, 20].

5. Employment Implications for the Healthcare Industry

The worry that AI would cause the automation of occupations and the major displacement of the labor has received a lot of attention. In a joint study by Deloitte and the Oxford Martin Institute, they found that 35 percent of UK occupations could be eliminated within the next 10 to 20 years due to AI. Other research has shown that while it is possible to automate some jobs, the rate at which this happens may be constrained by factors other than technology [21]. The advantages of automation go well beyond only replacing human labour, and its regulatory and social approval are also important factors. Due to these variables, the number of lost jobs may be kept to 5% or fewer. So yet, no human healthcare workers have been replaced by AI, as far as we know. To some extent, this is because AI has had a very little footprint in the business thus far, and because Integrating AI into healthcare workflows and electronic health record systems is difficult. There appears to be a greater risk of automation for healthcare jobs which deal handle digital information (such as those in radiology and pathology) than for jobs that involve direct patient interaction. However, even in jobs like radiology and pathology, the spread of AI is expected to remain gradual [22]. Despite our argument that deep learning and other technologies are improving their capacity to diagnose and categorize images, we still think jobs in fields like radiology are safe for the foreseeable future. To begin, the role of a radiologist goes beyond simply analyzing medical scans. Radiology AI systems are similar to other AI in that they specialize in a certain task. Machine learning models are trained to recognise certain categories of pictures (such as nodule diagnosis in chest CT scans or haemorrhage in brain MRIs) in academic and startup research laboratories and tech enterprises. Only a small fraction of these activities are now possible for AI [23]. Nevertheless, to fully identify all potential findings in medical images, hundreds of these small-scale detection activities are required. In addition to performing diagnostic imaging procedures, radiologists also consult with other medical professionals regarding patient care, specify the technical requirements of imaging tests to be carried out (tailored to the patient's circumstance), link information from images to other test and medical record findings, communicate with patients about procedures and outcomes, and more. The second problem is that clinical practises for utilising AI-based picture work are still in need of improvement [24]. Vendors of imaging methods and deep machine learning algorithms may give different parameters, such the possibility of a lesion or cancer, the characteristics of a nodule, or its location, a higher priority. It would be difficult to include deep learning algorithms into conventional therapy processes due to these distinct issues. Thirdly, in order for deep learning algorithms to recognise images, they require numerous photos from patients who have received a conclusive diagnosis of cancer, a broken bone, or another pathology. However, there isn't a single repository of radiological pictures that can be label-searched [25]. For automated image analysis to truly take off, however, major shifts are needed in both medical regulation and health insurance. The same considerations apply to digital pathology and other medical specialties. As a result of them, artificial intelligence is not expected to significantly impact the healthcare industry's labor market during the next two decades. Employment opportunities related to the use and advancement of AI technologies may potentially expand. However, with employment levels remaining steady or rising, it's safe to assume that advances in artificial intelligence won't significantly cut the cost of medical diagnosis and treatment anytime soon [26].

6. Implications for Ethics

Finally, there are a wide range of moral concerns related to the application of AI in healthcare. Concerns around accountability, transparency, permission, and privacy arise when intelligent robots are used to make or help in healthcare choices that have traditionally been made by humans. Given current technological capabilities, transparency may present the greatest challenge. Understanding or explaining the underlying workings of many AI algorithms, notably the deep learning technologies used for image analysis, is exceedingly difficult, if not impossible [27]. A patient who is told a photograph led to a cancer diagnosis will likely be curious about the process. In other cases, not even deep learning algorithms or doctors who are familiar with their use will be able to explain the cause. It can be challenging to establish liability when AI systems misdiagnose or mistreat patients. Additionally, there will unavoidably be instances where people receive medical advice through AI systems when a sympathetic clinician would have been a better choice [28]. Algorithmic bias can also affect healthcare machine learning algorithms, which may incorrectly attribute increased illness risk to a patient's gender or race when these are not contributing factors. There will likely be significant changes to healthcare ethics, medical practise, and the healthcare staff as a result of increased usage of artificial intelligence in healthcare. Healthcare providers, as well as governments and regulatory bodies, must set up systems to keep track of problems, respond responsibly when they arise, and implement governance measures to contain any fallout. This is among of the most potent and far-reaching technologies yet to have an effect on human society [29], therefore it needs years of regular monitoring and cautious policymaking.

7. Artificial Intelligence in Treatment of Diseases

In the business sector and in general society, AI and related technologies are proliferating, and they are now even entering the medical industry. Potentially altered by these developments include the regulatory processes of healthcare providers, payers, and pharmaceutical companies, as well as many other areas of the healthcare industry. Experiments have also shown that AI may be as good as, or perhaps better than, humans at diagnosing diseases, a critical first step in any medical treatment. Algorithms are already teaching scientists how to construct communities for expensive clinical research, surpassing radiologists in their ability to identify cancer cells. Nonetheless, we expect it to take quite some time before AI can totally replace human physicians. Despite AI's promising future in healthcare, there are some moral concerns to bear in mind as these systems are implemented and judgments are made. The potential of team injury owing to algorithmic discrimination and professional duties, as well as the integrity of therapists, are just a few examples of ethical concerns that have been raised about the use of such systems. Therefore, before implementing such programs, it is crucial to consider and analyze the potential benefits of high-quality healthcare systems featuring the most precise and cost-effective intelligence calculation at a very low cost [29-31].

7.1. Cancer

Artificial intelligence and machine learning have broad potential uses in biomedical research and healthcare, including oncology (the study of cancer). These include methods for detecting cancer at an early stage, determining its subtype, optimising treatment, and finding new therapeutic targets. To fully utilize technology in cancer research and therapy, several obstacles must be resolved, even if the vast amounts of data required to train machine learning models already exist. Both men and women rank colorectal cancer (CRC) as the third most frequent kind of cancer. It has contributed significantly to the estimated global increase in cancer-related mortality. Sixty percent to seventy percent of people with evident CRC are diagnosed at a late stage of the disease. However, early identification has the potential to enhance clinical outcomes for patients by reducing CRC morbidity and mortality due to treatment delays. Regular screening for CRC appears to be an effective strategy for reducing the prevalence of this cancer. It takes about 15 to 20 years for normal mucosa to undergo the changes that lead to a premalignant growth and eventually a malignant lesion. Due to the gradual nature of the polyp-cancer sequence, it may take 10 years or more for colorectal polyps to develop into cancerous tumours [32, 33].

7.2. Diabetes

The application of AI to diabetes treatment, particularly in the realm of medical technology, is next up for discussion. In 2012, the US Food and Drug Administration (FDA) approved Body Guardian, an electrocardiogram in the form of a patch that uses an AI-based arrhythmia detection algorithm. U.S., European, Chinese, and Japanese legislation on AI-enabled medical devices have progressed since then [34]. Because in large part to the tremendous growth of deep learning algorithms and advances in clinical applications today, the number of of AI-based medical devices having regulatory approval in the US and Europe has risen in recent years. The FDA has already authorised hundreds of healthcare products that employ AI and machine intelligence. Only three of these AI-based medical devices are concerned with diabetes control; the others are primarily devoted to radiology, cardiology, and cancer. As of the year 2020, Japan will have approved 12 distinct artificial intelligence (AI) medical devices. There are medical gadgets for analyzing images used in radiology and diagnostics, but none are currently on the market specifically for the treatment of diabetes. Clinical efforts to use AI to the diagnosis and management of diabetes can be broken down into four broad categories: (1) computerised retinal examinations, (2) guidance for doctors making diagnoses, (3) resources for patients managing their own care, and (4) risk categorization. The first type is artificial intelligence (AI) technology known as automatic retinal screening, which uses fundus images to detect the presence or absence of diabetic retinopathy. Digital Diagnostics Inc.'s IDx-DR gadget is one implementation of this technology; it was granted FDA clearance in 2018 due to its excellent diagnostic performance in clinical testing. This artificial intelligence device can determine whether or not a patient has diabetic retinopathy without the assistance of an ophthalmologist. After 12 months, primary care providers can either have their patients who have fundus images reexamine the IDx-DR device or refer them to an ophthalmologist. Patients in remote locations, where access to an ophthalmologist for diabetic retinopathy screening and diagnosis may be limited, can benefit greatly from this instrument [34, 35].

7.3. Obesity

There have been numerous IT-related (and AI-related, in particular) research projects produced over the past few years. This branch of Computer Science is both a scientific and engineering discipline, and it has produced useful reasoning tools for use in clinical decision-making. Philosophy, mathematics, economics, neurology, psychology, and computer engineering form the basis of artificial intelligence because they are applicable to any intellectual job. Generally speaking, artificial intelligence (AI) refers to the practice of programming a machine to mimic human intelligence and behavior in order to carry out tasks that humans have traditionally excelled in. Traditional machine learning approaches like the support vector machine, which divides data into two groups based on a decision boundary, and more recent deep learning approaches like neural networks are one of the most popular types of AI employed in health care today. They show how complex, nonlinear connections occur between input parameters and an outcome. When more people are overweight, society suffers. As a result, conditions are set that are conducive to the spread of several diseases as well as an increase in hospitalizations and expenditures on the part of the government. AI, in turn, exhibits exponential growth that can be put to work enhancing the quality of human life. The biggest problem in connecting the two is creating structures that are dedicated to the prevention and treatment of obesity. For obesity to be effectively managed, these technologies must be reliable and precise. There is a dearth of literature dealing with AI and obesity [35-37].

7.4. Respiratory disease

Symptoms, risk factors (such as smoking or indoor air pollution), and lung function tests are the usual basis for a diagnosis of COPD. Spirometry, which measures the ratio of the volume of forced expiration in 1 second to the forced vital capacity, can be used to demonstrate evidence of fixed airflow restriction in the correct clinical scenario, allowing for a determination of chronic obstructive pulmonary disease (COPD). By comparing the actual and projected FEV1, COPD is then categorized and graded according to the severity of symptoms, the frequency of exacerbations, and the degree to which lung function is impaired. Although under and over diagnosis and oversimplification of illness heterogeneity are observed [38], this disease definition and classification does influence prognosis and treatment stratification. Spirometry testing and interpretation calls for specialized, calibrated equipment and dedicated testing time. Normal ranges based on reference datasets include limitations, such as age and ethnicity biases, making accurate interpretation dependent on clinical competence. Artificial intelligence solutions may be able to remedy these shortcomings by improving the utility and precision of conventional lung function testing through optimized data interpretation for population-based characteristics. Artificial intelligence algorithms may also broaden the applicability of existing diagnostic methods by enabling them to be matched with clinical outcomes that should lead to a COPD diagnosis and subsequent therapy supply [39].

7.5. Brain disorder

Artificial intelligence (AI) is a prominent subject of computer science that has found numerous applications in clinical settings, including the analysis of complex medical data and the extraction of significant correlations within datasets. Several novel approaches have shown significant success in the field of brain care and provide novel avenues for future research and development in the areas of diagnosis, treatment planning, and outcome prediction. Herein, we cover key clinical applications of artificial intelligence in the field of brain care and provide an overview of the many AI techniques now in use in this area. Numerous real-world, clinic-based brain problems are slowly gaining efficient theoretical solutions thanks to the application of artificial intelligence methods. Recent years have seen a dramatic improvement in our understanding of the brain's complicated operations, thanks in large part to the collection of pertinent data and the creation of increasingly powerful algorithms. Researchers are developing algorithms that are both more complex and easier to understand, which bodes well for the widespread adoption of so-called "intelligent" technology in actual clinical settings [40]. In recent years, artificial neural networks have become increasingly popular as powerful analytical tools. Support vector machines and random forests, two of the original machine learning methods, are still frequently employed. Algorithms that are task-specific are tailored to a particular task. Data pertaining to the brain is frequently accessed. In the field of neurology, AI may help doctors make better choices. However, substantial challenges remain that must be overcome before AI can be put to practical use in the brain. To achieve this goal, it is necessary to construct AI algorithms that can be easily explained [41].

7.6. COVID -19

The early detection of COVID-19 can be aided by the application of AI and infrared thermography. A new meta-analysis indicates that about 83% patients report having fever as one of their first symptoms. As AI improves, thermal readers will become accessible as apps for smartphones. This will make it easier to screen a large number of people at once. In the COVID-19 age, this neuronal network-based contactless method is used not only for self-screening but additionally for screening large groups of people before large events, community activities, and even at the moment of entry into medical centres, restaurants, and health care facilities. Some facial-recognition companies, like Sense Time, have built in the ability to tell if a person has a fever based on thermal images. This makes it possible for automatic checking at public-access points. This helps move the social distance protocol forward and uses fewer people. Acoustic artificial intelligence technologies, in addition to thermal scanners, are utilised to distinguish between healthy patients and positive cases based on the sound of their cough; nevertheless, there is currently insufficient evidence to draw any firm conclusions [42, 43].

7.7. Spinal diseases

For a thorough study of the literature, the words "spine," "spinal," "lumbar," "thoracic," "cervical," "machinery learning," "deep learning," "supervised studying," "unsupervised learning," and artificial intelligence ("AI") were used. Since 1991, a total of 1500 publications were found. Of these, 420 were published in the year 2020 and 866 were published in the last decade. The following criteria were used to eliminate 420 potential publications: lack of peer review, lack of relevance to the spine, and the presence of meta-analyses, reviews, or case reports. As a result, 167 articles published in 2020 and 2021 dealt with the use of AI for spinal condition treatment. Radiological applications and imaging accounted for the bulk of the 102 articles in this area of artificial intelligence study. Artificial intelligence has taken root in radiology at an early stage because of the field's tight relationship to technology developments. This allows for automated parameter measuring when the spinal structures have been recognised. The detection of classical illnesses has already been realised, and better algorithms are being released all the time, making automated analyses of spine pictures possible. Recent years have seen increasing opportunities for achieving evaluations and classifications of picture data beyond the established benchmark. Further progress has been made on correlating picture data with underlying systemic disorders. Considering how important this imaging is for making treatment decisions, the accuracy and efficiency already achieved by using advanced algorithms to find and interpret spinal imaging data are revolutionary improvements that will have a lasting effect on the care of spinal illnesses [44, 45].

7.8. Kidney disease and acute kidney injury

Both CKD and AKI are linked to high rates of illness, use of health care services, and death, making them big public health concerns around the world. With the introduction of promising new treatments for CKD, pinpointing those patients most at risk for developing the disease is more crucial than ever. There are a lot of models that have been built with decent predicted accuracy, but they haven't been subjected to rigorous external validation or peer review. AKI forecast models made with machine learning have reached the same level of accuracy. Problems arise, however, with putting these models into practice, as there is no consensus on the link between AKI outcome prediction and reductions in the likelihood of other adverse events, and there may even be cases when this could cause harm [46].

7.9. Glaucoma

Glaucomatous optic neuropathy is the underlying cause of the great majority of cases of irreversible blindness around the world. It is vital for appropriate diagnosis and monitoring of disease to combine objective data from visual field tests with biometric data such as pachymetry, corneal hysteresis, and imaging of the optic nerve and retina. Due to the lack of exact definitions for the existence and progression of glaucomatous optic neuropathy, it is possible for a clinician to make an interpretation error during such a complicated procedure. This risk should not be taken lightly. People have thought that machine learning (AI) and the processes that AI makes possible could be the answer. The applications of this area of computer science have the potential to improve the dependability and accuracy of insights that are gathered from clinical data, hence boosting the clinician's approach to patient treatment [47].

7.10. Dentistry

The past decade has been heralded as the watershed moment in the development of technology, marking the beginning of the creation of artificial intelligence, a topic that is swiftly garnering the interest of researchers all around the world. Every industry has jumped on the artificial intelligence bandwagon with great zeal, and the dental science industry is no exception to this trend. The employment of intelligent software to compile and retain patient data has become an urgent necessity in light of the significant growth in the amount of patient-documented information and data. The usage of artificial intelligence in dentistry and medicine spans from the rudimentary step of taking history from a patient to the more complex steps of processing data and extracting relevant information for diagnosis. There will always be a need for human dentists, and AI will never be capable to replace them, it is essential that dental practitioners are familiar with the ways in which they can integrate advances in technology into their work in the near future to improve patient care. Kim et al., did a study in which they used an artificially intelligent neural network to build a model that predicted toothache based on the relationship between toothache and how often you brush your teeth every day, how long you brush, how often you use dental floss, how often you replace your toothbrush, how often you have scaling done, and other things like your diet and how much you exercise. The model can forecast tooth based on the relationship between toothache and how often, how long, and how often you brush your teeth every day. It can also predict tooth based on how often you use dental floss. This fruitful investigation contributed to the development of a toothache predicting model that has a high degree of precision. This model acknowledges that the most significant variables in preventing toothaches are maintaining good dietary habits, good oral cleanliness, and avoiding unnecessary stress [48, 49].

8. Artificial Intelligence's Potential Impact on the Future of Medical Care

We anticipate that AI will play a significant part in future medical services. Machine learning is the fundamental technology driving precision medicine, an area of healthcare where nearly everyone agrees that we desperately need to see progress [50]. Even though early efforts in this area have been hard, we think that AI will eventually be able to do a good job of giving diagnoses and treatment suggestions. Rapid advancements in AI for image analysis is a good sign that most radiology and cancer pictures will one day be looked at by a computer. Speech and text detection have been employed in medicine to do things like talk to patients and make notes. In some areas of healthcare, the biggest problem with artificial intelligence (AI) is not whether or not the technologies will work, but how to get them used in everyday professional practise. To be widely used, artificial intelligence (AI) systems need approval from regulatory bodies, integration using electronic health record (EHR) systems, enough standardisation so that similar products work similarly, education of clinicians, financing from either private or public payer organisations, and ongoing updates in the field. There are ways to solve these problems, but it will take a lot longer than the time it took to make the technology itself. So, we think that AI will be used in clinical practise in some way inside the next five years, and then more widely inside the next ten [51–53].

9. Conclusion

There is an increasing body of research indicating that artificial intelligence systems will not replace human therapists but rather will complement the work that they undertake. It's feasible that in the future, human doctors may place more of an emphasis on activities and Job designs that use human traits like understanding, persuasion, and integration of the whole person. This is something that's at least a possibility. There is a possibility that in the not-too-distant future, the only medical personnel, such as doctors and nurses, who refuse to collaborate with AI will be the ones who are fired from their positions.

Conflict of interest

None

Funding

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