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Research Article

Digital Physicians: Unleashing Artificial Intelligence in Transforming Healthcare and Exploring the Future of Modern Approaches

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ABSTRACT

Growing global awareness that attention to health care is the basis for maintaining citizens' quality of life. Health institutions seek to increase interest in electronic care services and enhance patient results by integrating artificial intelligence techniques. Artificial intelligence tools are indispensable to diagnosis, treatment, and patient care. Integrating artificial intelligence techniques into the development of the electronic healthcare environment works to enhance public health and disease prevention and provide free services to all citizens. Designing electronic platforms raises health awareness in society, provides health programs and initiatives, and reaches homes, gardens, schools, and universities through applications based on artificial intelligence. The primary purpose of this article is to challenge the extent to which artificial intelligence is related to medicine and its contribution to the positive and negative effects of revolutionizing healthcare services.

1. INTRODUCTION

Healthcare services are the primary step in physical existence [1][2]. It is an integrated service that can be diversified in social, cultural, and economic terms. In this sector, the quality, cost and accessibility of the service provided to the target patient population are among the most important evolving issues today. These services are an economic activity that aims to give people the resources they need for continued living. Health is one of the important services that countries must pay attention to by providing basic activities to preserve human life, create a quality of life, and protect it from epidemic diseases [3][4]. Modern artificial intelligence strategies aim to develop and encourage various sectors to pay attention and achieve progress in meeting the needs required by the environment and society. Many sectors suffer from neglect and problems that need solutions using devices and applications to meet the needs of citizens. One of these sectors is healthcare, which is considered one with the most incredible pressure to respond to diseases and treatments. Recent years have witnessed the application of artificial intelligence techniques in the development of medicine, as technological convergence has created a healthy environment for tracking the spread of diseases and monitoring patients [5-7]. This integration led to the development of health care by increasing the accuracy of diagnosis and predicting disease behaviours within patients. Artificial intelligence and medicine provide opportunities to eliminate traditional practices, enhance healthcare systems, and assist physicians and healthcare workers in providing services to all patients [8][9].

Comprehending the operation mechanism of artificial intelligence techniques is considered a basis in various sectors and verifying doubts about the work of these techniques and what purposes they will achieve [10][11]. In addition, developing digital media that plays an essential role in the communication process between people and healthcare workers and what needs patients have. The primary motivation for integrating artificial intelligence and recognising the capabilities it possesses in facing all challenges in the area of healthcare. These technologies contribute to eliminating traditional methods and incorrect diagnoses, increasing medical resources, and generating modern electronic services that help patients improve their health (see Figure 1). These techniques provide innovative solutions to alleviate the issues that hinder healthcare workers

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and patients, usher in a new era of accuracy and efficiency in business, develop many platforms, and reduce the financial burden on patients [12-14].

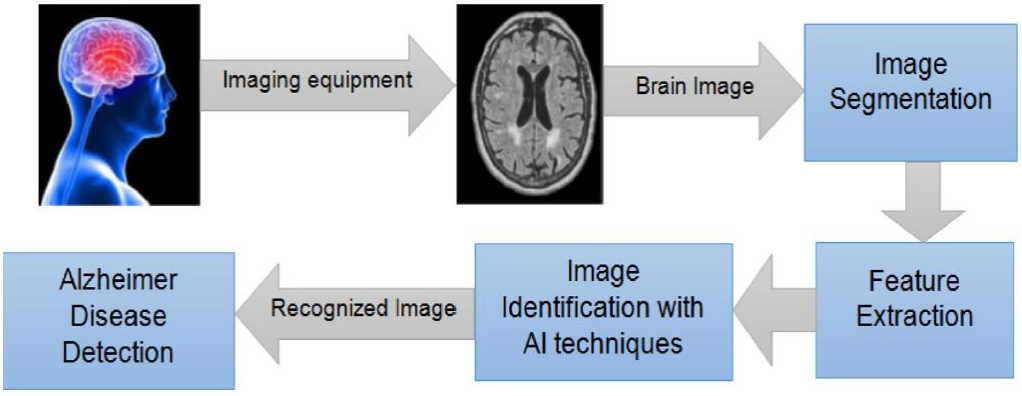

Fig. 1. Alzheimer's disease detection using AI methods [15].

Medical diagnosis is one of the most critical areas that should be paid attention to, as machine learning algorithms appear, which play an important role in diagnosing medical data, as they have the ability to study patterns and abnormalities found in x-ray images or computed tomography images [16][17]. These algorithms enhance the accuracy of diagnosis, early disease detection and prediction, and develop treatment and drug development plans. In addition, these algorithms perform accurate data diagnoses and help specialists and physicians make decisions and reduce diagnostic errors. These algorithms have the ability to constantly adapt to patient data, continually learning and making plans to improve treatments. They design treatment plans based on the data they learn from and are also trained to discover new patterns of drug discovery, which leads to accelerating medical discoveries. With the advancement in modern technology, especially after the COVID-19 pandemic, health services have improved and developed, and people's quality of life has improved. Advanced technologies in the field of healthcare are methods of diagnosis, treatment and monitoring of post-treatment processes, communication with patients and preventive health services and processes, health institution management processes, payment methods, patient appointment systems and much more [18]. In general, artificial intelligence (AI) and technologies and applications related to artificial intelligence and machine learning are becoming increasingly important to healthcare organisations and society. These technologies have the potential to develop many aspects of patient care in addition to creating electronic administrative processes within health institutions. Digital technologies can be found in different areas, such as portability, wearability, machine-to-machine connectivity (M2M), cloud computing, Internet of Things (IoT) and artificial intelligence. The benefit of these technologies in healthcare services is that they allow the digitalisation of processes [19][20].

This article reviews the advantages and disadvantages resulting from the application of artificial intelligence techniques in developing the medical field and healthcare services. Review the primary purposes of applying these technologies and their role in improving patients' health.

2. THE SIGNIFICANT

This section will discuss the effect of artificial intelligence (features and defects) in the healthcare field. There is no doubt that artificial intelligence techniques involved in healthcare have significant advantages that facilitate and accelerate the processes that have become a problem for humans. Many currently published studies agree that artificial intelligence, especially machine learning, is a tool that helps physicians in many tasks, including diagnosis and data analysis [21][22]. Artificial intelligence techniques are the backbone of growing healthcare services within the environment. The capabilities that result from these techniques are the ability to process the vast amount of medical and biological data that are produced daily. This procedure is complex and is continuously being improved. Companies that develop artificial intelligence seek to periodically analyse threats related to new diseases, as it is one of the advantages that help people predict the spread of epidemics and viruses through the application of strategies that support humans in preparing and responding to the threat of emerging diseases. Discovering diseases or their observers is a significant challenge for humans. Therefore, artificial intelligence is vital in producing practices relating to analysing data in actual time to detect diseases and abnormal behaviour. The development and improvements in AI as it relates to medicine tend are much more significant over time, and more doctors and healthcare workers are involved in improving and tracking patient data. The more these techniques

are used, the more accurate the prediction accuracy of the artificial intelligence methodology will be enhanced and thus will be of greater importance in future missions.

In general, artificial intelligence is still in its early stages with regard to large-scale applications in providing health care services, despite the emergence of many applications such as ChatGPT and others [24][25]. The COVID-19 pandemic has presented us with many challenges in confronting and tracking epidemic diseases [26][27]. Rapid processing and analysis of relevant data is essential to limit the negative impact of any disease outbreak. This data can be broken down into molecular, patient, population, and community levels, contributing to successful treatment and prevention. However, this was challenging about COVID-19 in the initial deployment period due to the task's enormity and sophistication. One of the drawbacks of applying artificial intelligence in healthcare is in the field of kidney disease, where many nephrologists and specialists in this field still need to become more familiar with the basic principles of medical artificial intelligence. Also, for fully developed countries, the costs are very high, which creates a huge barrier between patients and health institutions. Figure 2 shows the importance of healthcare and technology in serving humanity. The Third Industrial Revolution is considered the basis because it implemented the digital revolution when electronics and information technology allowed production automation. The current Fourth Industrial Revolution depends on the Third Industrial Revolution. The main goal is to transform any sector into a digital environment. Industry 4.0 affects not only the healthcare sector but all sectors. With Industry 4.0, medical devices have become more efficient, innovative, and valuable, diagnosis of diseases has been accelerated, accuracy rates in their treatments have increased, and hospital and medical clinic data system security has been increased. Preparing for Industry 5.0, as the smart digital society characterises it, the integration of virtual and physical spaces, the Internet of Things, robotics, augmented reality, the innovation ecosystem, the brain-machine interface, and the centrality of human technology. This industry, the concept of which was launched in 2016, is still under development as it focuses on combining the creativity and craftsmanship of humans with the speed and productivity of robots. Therefore, the transition from Industry 4.0 to Industry 5.0 will take place by generating a set of interactions between humans and machines, human creativity and the power of their minds, and enhancing automation through robots and automating all tasks [28-30].

Fig. 2. The importance of healthcare and technology in serving humanity [23].

Managing datasets from the cloud is one of the desirable tasks implemented in healthcare institutions. It is essential and necessary for artificial intelligence, data processing, and information analysis. Unfortunately, healthcare organisations have limited datasets and need to be equipped to share them quickly because they use older-generation IT infrastructure rather than newer cloud-based systems. Even when they can combine data sets, because each person classifies their data in different ways, an AI system will only be as valuable as the data it relies on to learn from. Providing diagnosis and managing

the patient's condition is one of the objectives of artificial intelligence and medicine. Thus, it is preferable to employ artificial intelligence techniques because they are able to give personalised diagnoses for diseases such as multiple sclerosis, and its goal is to accurately predict these procedures by providing physicians with a prediction of clinical disability for two years in patients with multiple sclerosis with an average error (see Figure 3) [31][32]. Not only that, predicting patients infected with COVID-19, that is, accurately predicting the occurrence of future coronavirus cases in all settings and countries [33][34]. Another goal that confirms the excellent use of artificial intelligence practices in the field of healthcare is that combining human and artificial intelligence indicates superiority over a single approach. Table 1 illustrates the difference between artificial intelligence and human doctors in providing healthcare services. Diagnosis is one of the most critical procedures required to be implemented in health institutions, as each diagnosis must be necessary in the shortest possible time "retrospective interpretation, that is, providing diagnostic judgments. In analysing x-ray images, artificial intelligence has a major and vital role in analysing a large group of x-ray images and studying the patterns found in them. It has become possible to analyse these images with the help of artificial intelligence, as doctors and specialists can analyse them based on visual aids and pattern recognition.

Table 1. The key differnce between AI and human doctors.

Points	Key differences	
	AI	Human Doctors
Data Processing and Pattern Recognition	Data-driven	Experience
Experience and Intuition	Algorithmic	Intuition
Adaptability and Learning	Adaptive	Lifelong-learning
Emotional Intelligence	Emotionless	Empathetic
Ethical and Moral Decision-making	Amoral	Ethical
Communication	Non-communicative	Communicative

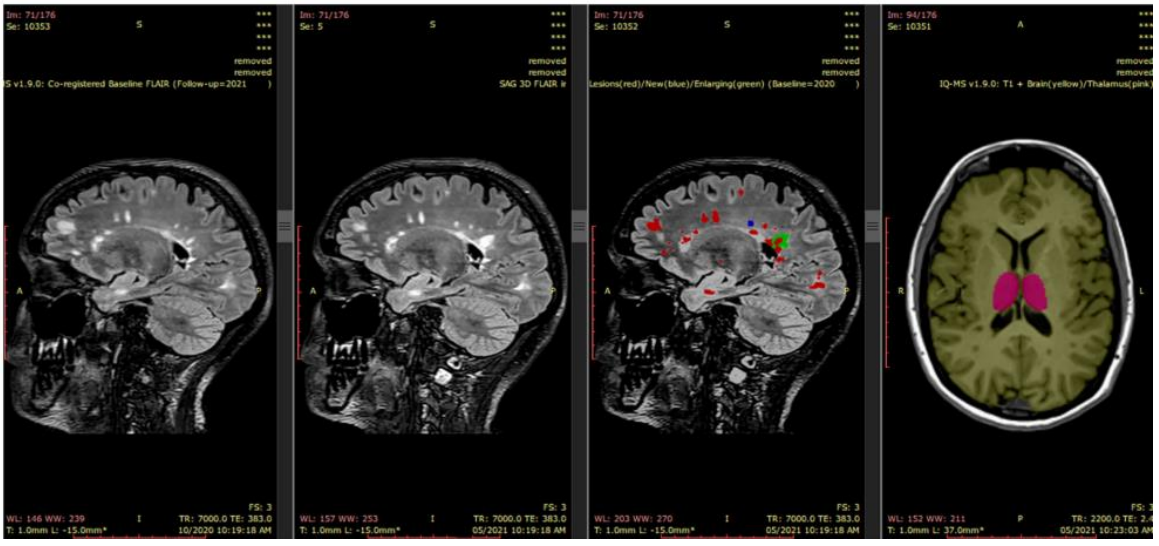

Fig. 3. AI in radiological images [35].

Changing the perspective of healthcare in the face of many barriers that can be terminated through artificial intelligence techniques. The world is expected to witness a significant change in artificial intelligence scenarios in the medical field in the coming years. Therefore, it has become necessary to study the research conducted on this technology and learn about its various applications in the medical field. Moreover, medical ethics has an essential role as an intermediary between the physician and the patient. The application of artificial intelligence techniques in health care has a promising role, and there are technical and ethical challenges. [36-40] Finally, AI-based systems are machine-based, controlled, and implemented by computer programmers without medical training. This has led to a problem-oriented approach involving AI in developing healthcare and transitioning to electronic environments.

3. CONCLUSIONS

Healthcare is considered one of the most important sectors contributing to developing the nations' economies. In recent times, this sector has witnessed its reliance on artificial intelligence technology to perform many tasks within health institutions. Increased knowledge and ease of access to information have led to developments in information technology as well as changes in the healthcare sector, which has led to the creation of electronic tasks that assist patients in improving their medical condition. Digital transformation contributes to creating an electronic environment in a short time that includes many tasks, as access to these tasks has become effortless thanks to various artificial intelligence technologies. Therefore, these practices resulting from digital transformation are being integrated very quickly with the healthcare sector in hospitals and medical clinics. Various AI strategies are being used by patients, healthcare professionals, hospital management, and healthcare delivery processes. These strategies will significantly impact many sectors in the future, especially the healthcare sector, as they are being integrated into diagnosis, treatment processes, planning, patient tracking, hospital information management, and much more. AI techniques utilised in healthcare must be integrated with other healthcare systems and standardised so similar AI products can work together in coordination. In addition, these techniques should be taught to patients who use electronic healthcare services and healthcare professionals who use applications in healthcare delivery. Thus, the public and private sectors must work together, and the necessary improvements in this area must be updated over time.

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Conflicts Of Interest

The author's disclosure statement confirms the absence of any conflicts of interest.

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