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ROLE OF ARTIFICIAL INTELLIGENCE IN BUSINESSTRANSFORMATION OF HEALTH CARE INDUSTRY

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Abstract

Artificial Intelligence (AI) is of great interest to researchers and practitioners as a means of achieving the necessary progress in the field of pharmaceutical industry, Business Process, Human resources (HR), Marketing and Health care. However, the role of AI and ways of transforming companies are not well studied. The purpose of the paper is to identify exactly how AI affects the key and support business processes of pharmaceutical companies along with Human resources (HR), Marketing and Health care. As a result of social trends and information technology, businesses are being forced to upgrade and recreate themselves. Artificial intelligence is becoming increasingly popular in this context. The impact of artificial intelligence (AI) on HR, marketing, and healthcare will be investigated in this study.

Keywords: Artificial intelligence, Pharma industry, Business processes, Industry transformation, Health Care.

Introduction

Artificial intelligence (AI) generally applies to computational technologies that emulate mechanisms assisted by human intelligence, such as thought, deep learning, adaptation, engagement, and sensory understanding [1, 2]. Some devices can execute a role that typically involves human interpretation and decision-making [3, 4]. These techniques have an interdisciplinary approach and can be applied to different fields, such as medicine and health. AI has been involved in medicine since as early as the 1950s, when physicians made the first attempts to improve their diagnoses using computer-aided programs [5, 6]. Interest and advances in medical AI applications have surged in recent years due to the substantially enhanced computing power of modern computers and the vast amount of digital data available for collection and utilization [7]. AI is gradually changing medical practice. There are several AI applications in medicine that can be used in a variety of medical fields, such as clinical, diagnostic, rehabilitative, surgical, and predictive practices. Another critical area of medicine where AI is making an impact is clinical decision-making and disease diagnosis. AI technologiescan ingest, analyze, and report large volumes of data across different modalities to detect disease and guide clinical decisions [3, 8]. AI applications can deal with the vast amount of dataproduced in medicine and find new information that would otherwise remain hidden in the mass of medical big data [9–11]. These technologies can also identify new drugs for health services management and patient care treatments [5, 6].

Figure 1: Role of Artificial Intelligence in Healthcare

Human Resource Management (HRM)

It began as a corporate business strategy focused at retaining people and developing staff who could produce outcomes and whose capabilities could be efficiently utilized. Hospital nursing organizations have stressed human

resource approaches in people management in recent years. Human Resource Management has regained prominence in the healthcare industry in recent years. It is critical to focus on legal and ethical concerns, employee safety and welfare, and incentive and support activities in order to improve collaboration and enrich company culture. A competent Human Resource department is required to pay closer attention to issues such as recruitment, payroll, and compliance, all of which have a significant impact on the healthcare industry's day-to-day operations. Figure 2 depicts the area of impact for AI in healthcare.

Figure 2: Global AI in HM Ecosystem

Employees are the most valuable assets in any industry, and to maximize their potential, a highly effective Human Resource Management department is required. Job analysis and recruitment, advancement in the healthcare business, distribution of employee benefits, motivation and support, as well as compliance and payment, are all areas where the Human Resource department must constantly improve. The HR department's collaboration with the healthcare industry's management is unique. The majority of healthcare businesses use a dual management structure. Human resource and clinical managers are in charge of two sets of personnel with different tasks and training requirements. It is critical that staff follow the ethical and legal guidelines set forth by the healthcare business. In this regard, the human resource department's function becomes even more crucial in enforcing ethical and professional standards, which allows the organization to improve its proper working culture. Of course, job analysis and design is another key role that HR managers should take on from time to time to improve efficiency, and this is a significant activity for any company.

Path-Accurate AI's Cancer Diagnosis

Path-Accurate AI's Cancer Diagnosis is one of the top Machine Learning and Artificial Intelligence tools in healthcare, allowing Pathologists to make precise diagnoses. With increasing precision in cancer diagnosis, the majority of cancer patients can be treated or cured before it becomes fatal, sparing many lives. Chatbots can also converse with patients about their illnesses and symptoms, which relieves the burden on medical practitioners. Furthermore, chatbots assist in providing essential solutions to patients, allowing healthcare professionals to focus on other critical activities. Automation of Redundant Healthcare Tasks Another important role of AI and its tools in healthcare is the automation of redundant, time-consuming procedures. As a result, administrators have more free time to work on other critical and necessary responsibilities. Image Diagnosis by Machine AI apps makes it simple to interpret photographs for analysis. These AI systems use Deep Learning technologies and programme to create algorithms that allow them to read complicated images more quickly, such as CT scans and

MRIs. The automated picture diagnosis system improves clinicians' performance by offering more accurate disease diagnoses. Furthermore, it is an important tool for hospitals to battle the scarcity of radiologists and other medical personnel. In recent years, AI has achieved significant advances inmedical imaging.

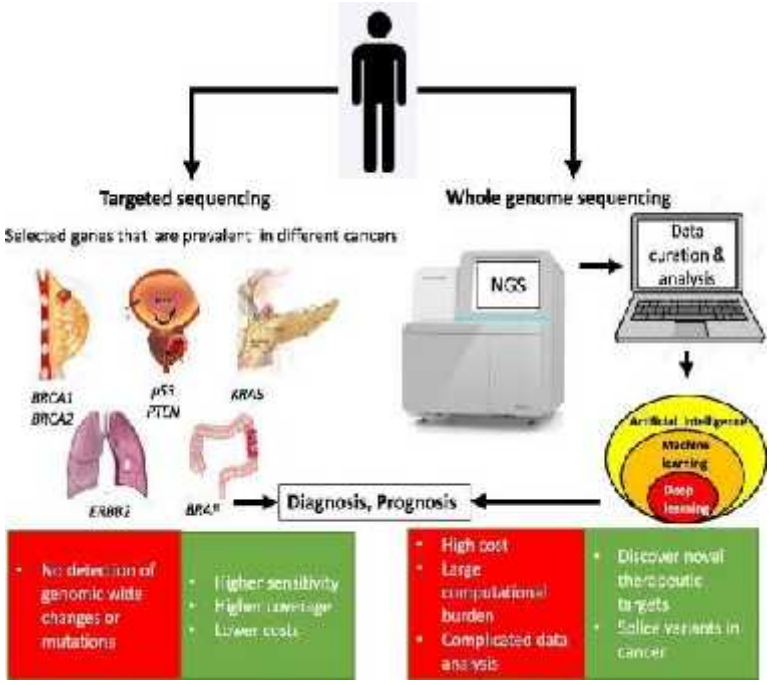

Figure 3: Data in Cancer and Precision Oncology

The Modern Pharmaceutical Industry

It is characterized by costly and lengthy development cycles of new drugs, as well as price pressures from patients, insurance companies, and states [12, 13]. The typical cost of developinga new medicine is estimated at USD 2.5 billion, and this process takes an average of 10–15 years[12]; Chan et al., 2019). These costs start with scanning millions of components in the early stages of research and development (R&D) and finish with the most expensive clinical trials with poorly predictable results. Despite careful preparation, only 12% of clinical trials end in success [13]. All pharmaceutical companies are looking for opportunities to increase efficiency in their business processes for the discovery and development of new products, compliance with thestrict rules inherent in the industry, and achieving the necessary financial parameters, among other things [14]. The more pharmaceutical companies know about the patient, the more likely they are to choose an individual drug and treatment plan that will have the best result. At the same time, the rapid growth of computing capabilities allows companies to form and providedata for processing based on advanced machine and deep learning algorithms, which are the foundation of artificial intelligence (AI) [15,16]. These algorithms include the recognition of existing text and audio materials, the generation of new materials, and subsequent analyses of received data. The increase in IT productivity also launched the formation of numerous AI companies and influenced transformations in the business processes of medium and large pharmaceutical companies that are forced to adapt to new realities [17]. The pharmaceutical industry is the beneficiary due to the lack of bias, reduction of the human factor, and the time to bring new products to the market [18]. The digitization of medical data collected from the pharmaceutical industry over decades and subsequent human analysis do not provide a significant increase in industrial efficiency [19]. AI allows real-time processing of patient data, selecting the best candidates for clinical trials, exchanging information with the patient, doctor, provider, and insurance company [20].

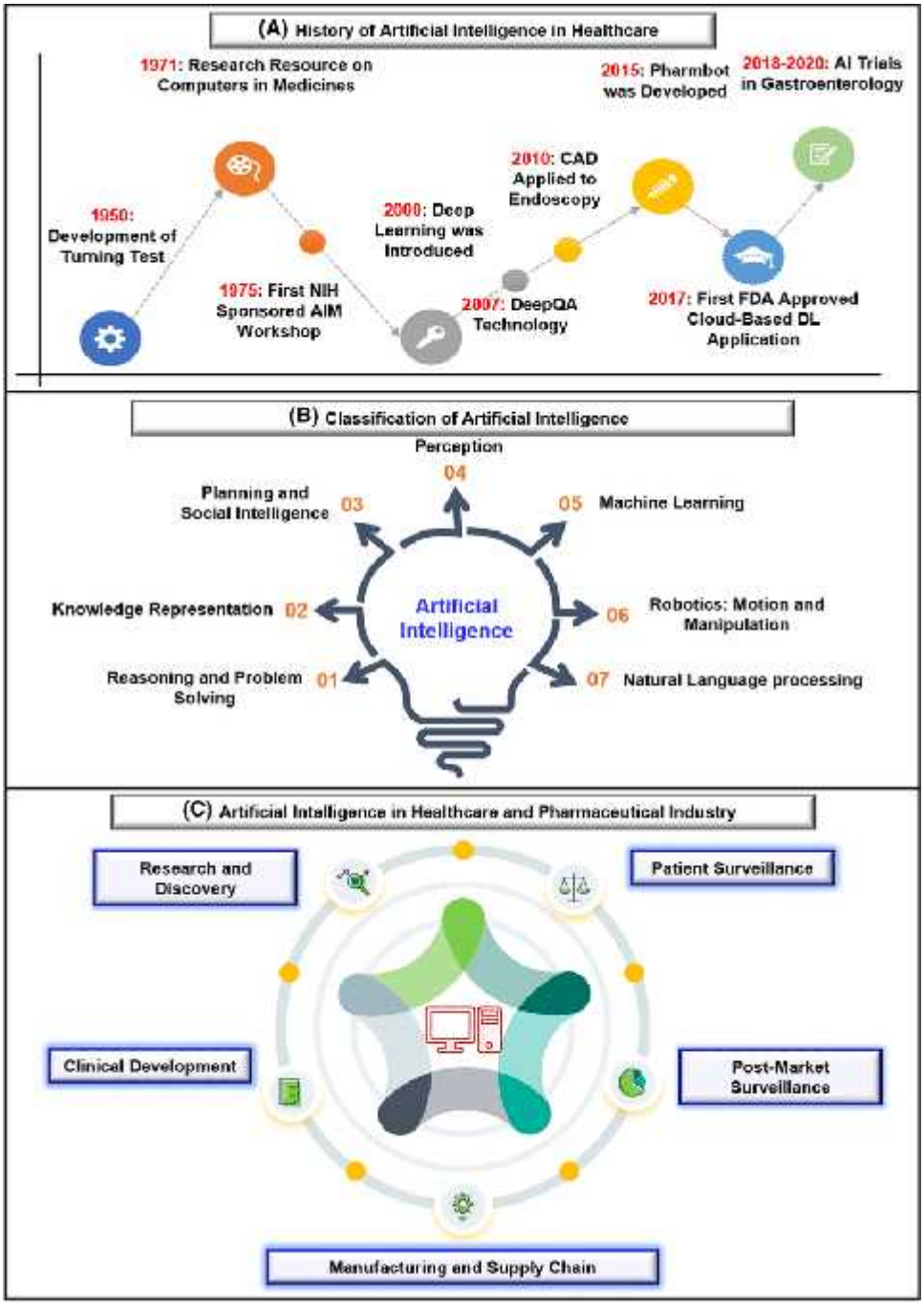

Figure 4: History of AI in Health and Pharmaceutical Industry

Detection of Fraud

While many patients are looking for cost-effective medical services, the number of fraud instances is increasing at an exponential rate. Most medical organizations and patients have suffered significant losses as a result of this. These fraud efforts have decreased dramatically thanks to AI-based solutions, which enable detailed navigation through processes and detect fraud.

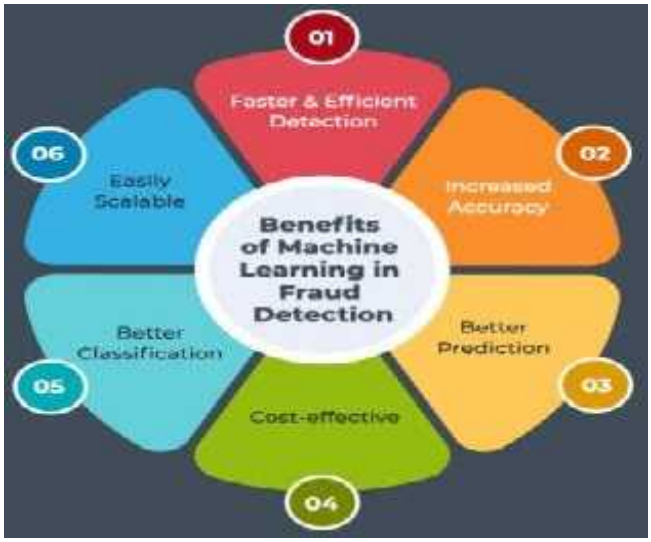

Figure 5: AI in Detection of Fraud

Modern marketing relies on a thorough understanding of customer desires and preferences, as well as the ability to act quickly and effectively on that knowledge. Because of its ability to make real-time, data-driven decisions, AI has surged to the forefront for marketing stakeholders. However, marketing firms must take caution when contemplating how to best integrate AI into their campaigns and operations. The research and implementation of AI tools is still in its infancy. As a result, while employing AI in marketing, there are a few challenges to consider. The bulk of businesses that incorporate societal standards into their operations have gained notoriety. As a result, businesses have always needed to enhance their reliance on sustainable concerns, which is a critical component of their future worth. The goal of this study is to look into the role of financial management in supporting sustainable business practices and growth, with a focus on Artificial Intelligence (AI) and its connection to finance.

1. How Artificial Intelligence Will Transform Businesses

Business process management, or business process reengineering, studies associations among the management of business processes to improve the performance of business indicators. Internal and external factors, such as the demand for qualified personnel, innovations, and demandchanges, form the need for organizational changes in companies [21, 22]. In his classic work, Hammer [23] identified the reengineering of business processes using IT solutions as a way to achieve improvements in business performance. Subsequent studies supplemented this definition. For example, Hashem [24] declares that changes in business processes are related to changes in performance indicators, while Baiyere et al. [25] claim a radical change to achieve meaningful results such as price, service, and quality. The majority of authors agree that IT solutions play a key role in increasing productivity and quality, thereby transforming business processes and making companies more successful in the healthcare industry (for example, [26,27].

According to Guha et al. [28], the following steps should be distinguished in changing business processes: project planning, identifying and modeling existing business processes, developing alternatives, changing the current practices to the desired processes, and monitoring and evaluating updated processes for possible further transformations. Subsequently, Radosevic et al. [29] suggested that available resources be considered when transforming business processes; Rao et al. [30] added reasons for project failures in relation to business process changes in the companies; Bertolini et al. (2015) paid attention to the training of managers responsible for changing business processes. Business process modeling has always been one of the key activities associated with improving the performance of business processes [31,32]. For example, Mendling et al. [33] proposed a study of errors in modeling business processes, the relationship between the complexity of the

simulated processes, and the likelihood of success. However, there is some uncertainty regarding the theoretical foundations of business process modeling. As an exception, it is worth noting the work of Mendling et al. [34]; who proposed a sequence of steps for putting business process modeling into practice. These guidelines bring theoretical research into practice and provide strong guidance to practicing managers for implementing business process transformation projects.

Business process reengineering is largely associated with IT capabilities and their impact on society. New technologies based on powerful computing capabilities give a new impetus to the development and adaptation of business. There is a gap in the literature about how specific technologies affect business processes in a particular industry. AI's capabilities are often associated with the pharmaceutical industry; however, researchers pay little attention to this area. Our research closes this gap and demonstrates what kinds of business processes are changing under the influence of AI in the pharmaceutical industry and how they are doing so.

Figure 6: Business Process Automation

2. How AI and Data is Transforming Pharma Marketing

Drug development is a long-term process that can be roughly divided into the following main groups: target selection and validation, screening of compounds and optimization of leads, preclinical stages, and clinical trials [35]. AI is a combination of mathematical algorithms and systems that can perform tasks previously available only to humans [36]. The key difference between AI and other automated systems is AI's ability to independently learn and make or recommend decisions for humans [37]. The pharmaceutical industry generates demand for two groups of solutions based on AI. The first group is based on analytical solution systems [38] and includes various types of analysis and predictions of the probability of event occurrence. Such systems are able to offer scenarios with the required resources and can recommend the best for a particular company. AI algorithms allow users to deeply analyze and find the connections between objects and processes that were not previously available for analysis. The second group includes recognition technologies such for speech, snapshots, video, and other unstructured data [39]. The software allows users to find existing similar patterns, adapt them for mathematical calculations, and offer recommendations for users. AI is involved in increasing the efficiency of the pharmaceutical industry. Image processes are used to optimize the search when creating a new drug or other application of already known drugs. Such methods are used to analyze biological, chemical, and medical databases. AI algorithms are used for deep semantic analysisof specialized or open information, for example, scientific articles, conference reports, newspaper articles, genetic databases, and more that could be a source of background information. Any unstructured data on a specific topic could become the basis for training and finding relationships without human intervention. In turn, the processed information serves as the basis for assessing the obtained molecule's potential and effectiveness. Researchers often highlight the search for drugs for rare diseases as one of the most promising applications of AI in the pharmaceutical industry [40]. On the one hand, pharmaceutical companies are less likely to devote resources to drug development if there is insufficient market demand for it. On the other hand, AI is able to select the best candidates for clinical trials. Forming a profile of

optimal candidates could significantly reduce the likelihood of failure at the clinical trials stage, the most expensive in the pharmaceutical industry. Researchers also pay great attention to the role of replacing humans with AI algorithms [41–43]. Social researchers study various prospects for AI development. On the one hand, there is an opinion that many employees, regardless of industry, could be replaced by algorithms [44]. According to some researchers, the number of new jobs created in the pharmaceutical industry will be significantly less than the number of jobs lost to AI. This approach requires policy makers to work toward maintaining social stability when introducing new technologies. On the other hand, researchers during the last decade suggest that AI-based applications are more likely to complement humans, providing more data for decision- making [45]. Current legislation in most countries does not allow for decision-making without a human presence, especially in relation to human life and health as in the pharmaceutical industry. Moreover, most medical studies suggest that AI can cope with the detection of topologies better than humans, but collaboration between a human and AI is still more productive [46].

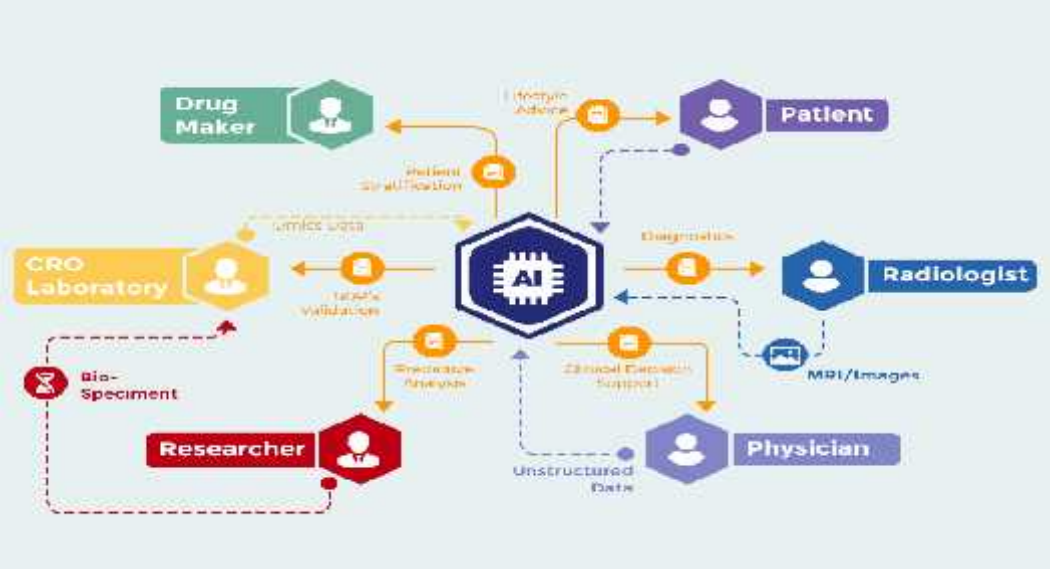

Figure 7 : AI in Pharmaceutical Industry

3. Transforming healthcare with AI

Artificial intelligence applications and usage in healthcare have impacted a wide range of industries, including healthcare. This cutting-edge technology, which was once simply a pipe dream, is now a reality. Rather, this rapidly expanding technology has integrated itself into our daily lives in ways we never envisaged. The application of artificial intelligence in healthcare is transforming the IT sector.

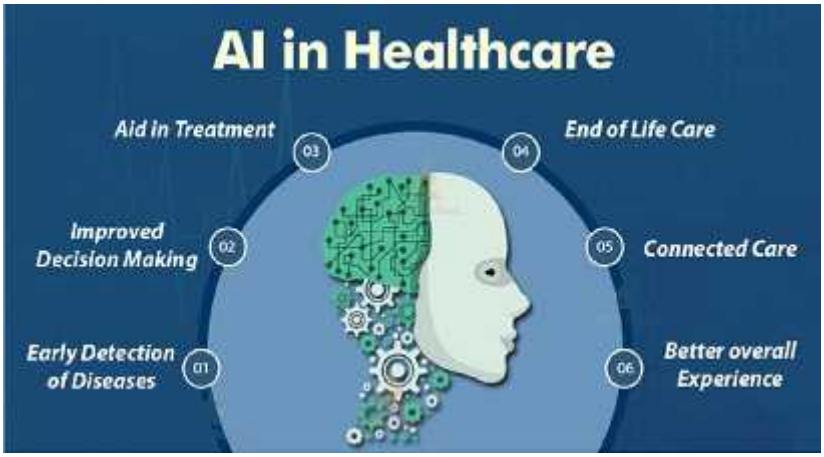

Figure 8: AI in Healthcare

AI's Impact on Healthcare From chronic diseases like cancer to radiology, AI is being used to develop efficient and precise technologies that will aid in the treatment of people with these conditions and, ideally, lead to a cure. AI has significant advantages over traditional analytics and clinical decision-making tools. AI algorithms improve system precision by allowing them to analyze training data, allowing people to gain unprecedented insights into treatment variability, care processes, diagnostics, and patient outcomes. One of the notable aspects of AI techniques is potential support for comprehensive health services management. These applications can support doctors, nurses and administrators in their work. For instance, an AI system can provide health professionals with constant, possibly real- time medical information updates from various sources, including journals, textbooks, and clinical practices. These applications' strength is becoming even more critical in the COVID-19 period, during which information exchange is continually needed to properly manage the pandemic worldwide. Other applications involve coordinating information tools for patients and enabling appropriate inferences for health risk alerts and health outcome prediction. AI applications allow, for example, hospitals and all health services to work more efficiently for the following reasons:

- Clinicians can access data immediately when they need it.
- Nurses can ensure better patient safety while administering medication.
- Patients can stay informed and engaged in their care by communicating with their medical teams during hospital stays.

Additionally, AI can contribute to optimizing logistics processes, for instance, realizing drugsand equipment in a just-in-time supply system based totally on predictive algorithms. Interesting applications can also support the training of personnel working in health services. This evidence could be helpful in bridging the gap between urban and rural health services. Finally, health services management could benefit from AI to leverage the multiplicity of data in electronic health records by predicting data heterogeneity across hospitals and outpatient clinics, checking for outliers, performing clinical tests on the data, unifying patient representation, improving future models that can predict diagnostic tests and analyses, and creating transparency with benchmark data for analyzing services delivered.

Conclusion

In recent decades, new technologies have contributed to progress in various areas of life. AI has attracted increased attention from business and society. Changes in pharmaceutical business processes, healthcare, marketing and HR under the influence of AI play an important role, but it has not been sufficiently studied before.AI in healthcare is an umbrella term to describe the application of machine learning (ML) algorithms and other cognitive technologies in medical settings.

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