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AI-Powered Healthcare: Exploring Innovations and Applications

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ABSTRACT

Artificial Intelligence and Machine Learning are somewhat more sophisticated technology. A subfield of computer science called artificial intelligence aims to develop and enhance machine intelligence and combine it with other fields to create a brand-new age of problem-solving with nearly minimal deformities and zero human mistakes. John McCarthy coined the term "artificial intelligence" in 1955. With the emergence of artificial intelligence (AI), a new era of Groundbreaking medical diagnosis and treatment advancements has begun. This Review offers a comprehensive analysis of AI's use in the medical field, highlighting its potential to enhance clinical judgment, enhance patient care, and expedite administrative processes. Because of the development of AI-driven technologies healthcare practitioners now have access to large volumes of data and can derive meaningful insights that were previously impossible. AI could be useful in the healthcare sector in several ways, such as mining information from medical files, creating treatment strategies, forecasting health events, helping with repetitive duties, conducting online consultations, supporting medical decision-making, controlling medications, developing new drugs, assisting with consumer decision-making, and resolving other public health issues. AI could be highly helpful in areas with a dearth of personnel, such as remote and rural regions. The administration of COVID-19 has enhanced in India because of AI technology. It has helped with early COVID-19 case screening, containing the coronavirus, identifying contacts, imposing isolation, monitoring participants, monitoring the pandemic, closely observing COVID-19 patients, finding vaccines and medications, and other related duties. India's implementation of AI-driven healthcare faces many challenges. Unstructured information sets, compatibility issues, a shortage of open sets of clinical information, insufficient analytical techniques that could work with massive amounts of data, financial constraints, and insufficient facilities. The approach outlined in this review to explore the dynamic landscape of AI-driven solutions. Artificial intelligence (AI) finds multiple applications in medical management, encompassing image analysis in fields like radiology and pathology, predictive analytics for disease diagnosis, drug discovery and research, personalized therapy recommendations, and the enhancement of administrative processes. This chapter delves into the realm of healthcare innovation and its potential ramifications for the field of medicine in the years to come.

Keywords: *Artificial intelligence, Machine Learning, Medical Field, Radiology, COVID-19.*

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INTRODUCTION

Artificial intelligence (AI) and associated technologies are being embraced by the healthcare industry more and more, broadening their use across a range of fields and specializations. Many contexts, including clinical labs, hospitals, and research processes, are seeing the potential of artificial intelligence. Artificial intelligence (AI) is critical to electronic health records (EHRs) and improves the sciences of neuroscience and biology in addition to being frequently employed in machinery and consumer electronics. AI is mostly used in the healthcare industry for the detection and treatment of medical conditions [1]. The broad field of artificial intelligence (AI) science and engineering aims to understand and mimic intelligent behavior. Making systems act in this manner is required [1-3]. By deploying specialized software designed to do tasks more quickly and affordably, artificial intelligence (AI) enables computers to simulate intelligent human behavior. Creating machines that can mimic human cognitive processes, such as thinking and behavior, is the ultimate aim of artificial intelligence. These artificial intelligence systems are often referred to as intelligent agents. Officially, artificial intelligence (AI) is a field of study that focuses on creating entities capable of intelligent behavior and on understanding intelligent behavior analytically. These devices can do tasks that would typically require the cooperation of humans and computers. Building AI theory from the concept of intelligent agents makes sense because it provides AI with the essential qualities required to pass the Turing test [1], created by British mathematician Alan Turing, who made significant contributions to computer science and artificial intelligence (AI). The Turing test is used to determine whether a machine can simulate human performance [2]. To pass this test, an intelligent agent must be able to sense, reason practically, and complete tasks. The multidisciplinary field of artificial intelligence (AI) combines ideas and techniques from several disciplines, such as computer science, mathematics, logic, biology, and logic. It is essential for addressing the issues of emulating intelligence and performing cognitive tasks with the least amount of human intervention [3]. AI technologies help address challenges at a speed and scale that is not achievable for humans by using cutting-edge algorithms to mine massive volumes of healthcare data for a range of insights. These algorithms have the potential to grow more accurate and efficient through machine learning and self-improvement. By giving medical practitioners access to clinical papers, journals, and cutting-edge medical knowledge, healthcare AI systems are essential. This abundance of data advances both the field of medical literature generally and patient care specifically. AI may lead to fewer therapeutic and diagnostic errors. Medical data can be used for learning, especially when it comes to patient populations [4]. An infobot is an intelligent agent that consists solely of a computational environment, whereas robots are computational cores with physical actuators and sensors. Combining an advisory program with human specialists is called a decision support system [1]. Artificial intelligence (AI) has numerous applications in medicine, along with the ability to diagnose illness, perform surgeries, predict disease risks, assess treatment effectiveness, manage treatment difficulty, support patient care, clinical examination, drug advancement, and more. You may evaluate where and how artificial intelligence (AI) could provide opportunities for development by having a thorough understanding of the environment and forces that are causing change in the healthcare sector. Through the use of a range of tools and settings, AI will likely promote automation and provide patients, "families," and healthcare professionals with recommendations that are pertinent to their context. Data visualization should be made possible by AI, and ethical collection and utilization of data should be a primary goal for AI creators and stakeholders [7]. Business factors like revenue productivity and return on investment provide financial support for technology improvements. It is critical to look into how these factors may impact the development, evaluation, and application of AI in the healthcare Industry. This fact is made more problematic by the fact that the American government and the public alternately view health and healthcare as an economic good and a social good. The subsequent use cases in healthcare company operations will likely be motivated by these variables. AI tools may be employed to find workflow optimization techniques, lessen medical waste, cut costs, and increase productivity. Using regularly collected and organized data can also be utilized to automate extremely frequent business and workflow operations [9]. When using these technologies, it is crucial to be wise, equitable, and inclusive to avoid unintended consequences and unfavorable effects. By failing to consider user preferences and the intended applications of this technology, AI technologies run the risk of escalating previous access and outcome disparities [11]. Advancements in AI technologies are poised to revolutionize healthcare delivery by extending beyond the traditional brick-and-mortar, encounter-based model. This evolution is expected to result in improved patient outcomes, driven by shifts in compensation structures and incentives that promote community-based health management over fee-for-service models. However, the accuracy of data and privacy security will remain challenges, contingent on whether AI technologies are regulated as medical devices or classified as entertainment applications. These consumer-facing AI solutions are anticipated to fundamentally transform the dynamics of interactions among patients, caregivers, and healthcare professionals. Tools such as continuous blood glucose monitoring and single-lead electrocardiogram (ECG) surveillance are poised to reshape how health data is collected and utilized. They also enable the consideration of social determinants of health (SDoH) in identifying patient populations that could benefit from specialized therapies, leading to improved outcomes and reduced healthcare utilization [12]. The resource-intensive nature of SDoH therapies limits their potential for widespread adoption. AI, however, can provide practical solutions for allocating scarce healthcare resources to SDoH-related problems and lower the cost of using SDoH data [13].

IMPACTFUL APPLICATIONS OF AI IN HEALTHCARE

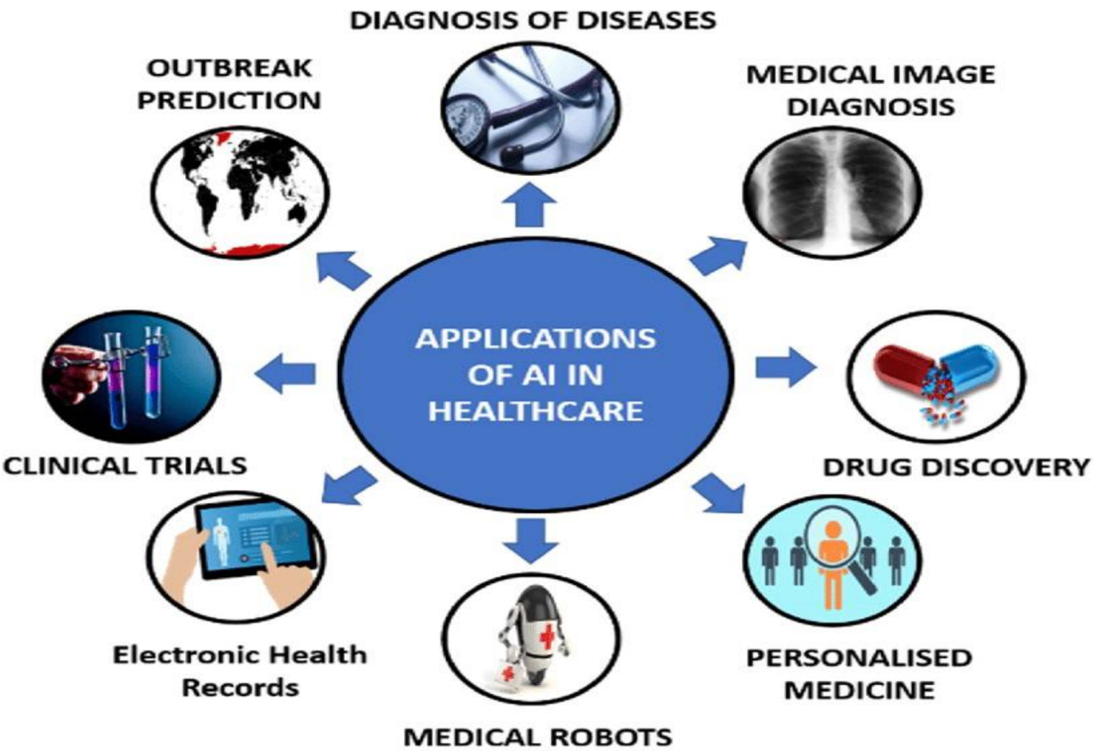

Fig 1: Application of AI in Healthcare

Radiology: AI can assist radiologists in quantifying medical images; this is one medical area where the technology has made great strides in recent years. For instance, deep network models have been used to perform segmentation with minimal human oversight, allowing for autonomous localization and separation of the borders of cellular structures or lesions [14]. Additionally, by prioritizing and monitoring results that need quick attention using AI approaches, radiologists can focus on the photographs that are probably going to be unique [14]. Radiomics is an area of image processing in healthcare that makes good use of artificial intelligence. While the term "radiomics" may not have a strict definition, its primary objective is to extract quantitative data from diagnostic and treatment planning images [15]. This data extraction process encompasses the identification of tissue and lesion characteristics, including factors like heterogeneity and shape. Radiomic features, derived from these images, hold great potential in addressing clinical questions, whether they are employed independently or in conjunction with other data sources such as demographic, histologic, genomic, or proteomic information. The impact of radiomics is particularly pronounced when it is coupled with AI algorithms to manage and analyze the vast volumes of data it generates [16]. In essence, radiomics powered by AI enhances the capabilities of healthcare professionals by providing them with quantitative insights and information-rich data, ultimately contributing to more informed clinical decision-making and improved patient care.

Digital Pathology: Digital pathology encompasses the cutting-edge process of digitizing entire slide images using advanced slide-scanning techniques. Additionally, it refers to AI-based methods employed for recognizing and analyzing digitized images [17]. While standardized criteria can facilitate the harmonization of diagnostic processes, histopathological examination faces inherent challenges due to its subjective nature and variations in expert opinions. Two major obstacles that oncologists and pathologists face are inter-subject variation and inter-operator inconsistency. AI can be of considerable assistance in resolving these issues. According to multiple studies, AI can reach precision levels comparable to those of pathologists [18]. Most importantly, AI can increase diagnosis precision when paired with pathologists' diagnostic knowledge [17]. Digital pathology has allowed AI to be integrated into several aspects of picture analysis and categorization. In addition to higher-level activities like detecting and prognosticating diseases, assessing the severity and course of diseases, and applying tests for predicting treatment responses, these applications also encompass lower-level tasks like object detection [17]. In the end, improved patient care should result from AI and digital pathology working together to improve the accuracy and speed of diagnostic processes.

Drug Discovery: AI technology has significantly improved healthcare, particularly in the areas of medication discovery and pharmaceuticals. By detecting targets more quickly and helping with the study of off-target chemicals, it has accelerated the process of discovering novel medications and made it simpler to repurpose those that already exist [19]. Artificial Intelligence is being utilized in medication development to speed up and remove repetitive operations. Leading biopharmaceutical companies are using AI proactively to support their drug discovery efforts. Pfizer, for example, uses IBM Watson, a machine learning system, to find possible immuno-oncology drugs [20]. Similarly, Roche subsidiary Genentech has adopted an AI system from GNS Healthcare in Cambridge, Massachusetts, to advance cancer drug development, while Sanofi collaborates with Exscientia's AI platform to discover drugs for metabolic diseases. Virtually every major biopharmaceutical company either engages in such collaborations or has internal programs dedicated to AI-driven drug discovery. The proponents of these strategies argue that AI and machine learning have the potential to usher in a new era of drug discovery that is faster, more cost-effective, and more successful. While skepticism exists among some experts, the prevailing belief is that these technologies will continue to gain significance in the future. The integration of AI and automation not only presents opportunities but also challenges for scientists. As AI-driven techniques become more prominent, they have the potential to reshape traditional drug discovery processes, offering both promise and complexity to the field of pharmaceutical research [21].

AI-Based Stethoscope: The introduction of digital stethoscopes has brought about several notable advantages in the field of healthcare. These modern devices can take measurements even in situations of noise, which traditional stethoscopes do not have. Because healthcare professionals can rely on clearer and more reliable data, this improved functionality contributes to more accurate diagnoses [22]. The ease of use of digital stethoscopes is another important advantage. Digital stethoscopes don't require a lot of training to use, unlike their analog counterparts. This accessibility effectively closes geographic discrepancies in healthcare access by enabling anyone to compile patient records and send them to medical professionals. Additionally, in light of the COVID-19 pandemic, using digital stethoscopes reduces the possibility that medical personnel will become infected with the virus because they allow them to remotely evaluate and monitor patients who are chronically ill in remote locations, enhancing overall patient care [22]. Furthermore, computers are now capable of analyzing enormous amounts of clinical data to find patterns and abnormalities linked to various diseases. This ability also includes evaluating blood flow in the human body. Circulating blood around blood clots in blood vessels has different characteristics from normal arterial blood flow. By utilizing this analytical capability, medical practitioners can identify and treat illnesses more accurately and quickly [23]. With better diagnosis accuracy, easier access to medical knowledge, and more effective disease detection and management, digital stethoscopes and sophisticated computer evaluation of clinical data are revolutionizing the healthcare industry.

Healthcare Robotics: Some medical robots have vital roles not only in supporting medical professionals but also in providing direct patient assistance. These technological developments are causing amazing improvements in the lives of people with medical disorders. One noteworthy development is the application of robotic exoskeletons, which restore mobility and freedom to people who were previously crippled [24]. These exoskeletons are designed to improve and support the user's motions, allowing them to walk and perform other activities for which they were not before capable. One noteworthy example of a technology application is smart prosthetics. These artificial limbs with sensors have significantly greater sensitivity and precision than natural human components [24]. By affixing these prostheses to their muscles, people can enhance their functioning and quality of life by recovering fine motor control over their movements. Robots are making significant contributions to the fields of surgery and rehabilitation as well. The Hybrid Assistive Limb (HAL) exoskeleton from Cyberdyne, for instance, is used in the rehabilitation of individuals recuperating from ailments such as spinal cord injuries and strokes that cause anomalies of the lower limbs [25]. HAL works by attaching sensors to the patient's skin that recognize and respond to electrical signals generated by the body, improving mobility and healing. These developments in medical robotics not only improve the quality of life for people with medical conditions, but also show how technology can revolutionize mobility and rehabilitation solutions, improve patient independence, and improve healthcare outcomes.

Virtual Patient Care: There has been a lot of investigation and study into wearable technology development as well as the possible uses of artificial intelligence (AI) and machine learning (ML) in the healthcare industry. Because of this, wearable technology solutions for virtual care administration and patient tracking have evolved from a concept to a reality and are currently accepted as standard practices in the healthcare industry [27]. AI, in particular, plays a vital role in managing chronic health conditions, including diabetes, hypertension, respiratory issues, and chronic bronchial asthma, utilizing wearable and non-invasive sensors [27]. These sensors are part of a sophisticated system linked to a network of devices designed to monitor an individual's environment and home while simultaneously collecting data on their health and behavior. These biomedical and wearable sensors continuously monitor physiological parameters such as blood pressure, electrocardiogram (ECG) signals, breathing waveforms, pulse rate, and respiratory rate. To bridge the gap between users and sensors, smart devices are employed, serving as intermediaries. The data collected from these sensors are transmitted to the cloud for analysis and storage, facilitating remote healthcare and elderly care [28]. The advantages of wearable electronic devices in healthcare were demonstrated in a noteworthy case report by Patel and Taraji. After a thorough study, it was concluded in this report that atrial fibrillation was the primary and most probable cause of the stroke the patient experienced. Afterward, an electrophysiologist verified the ECG data that the patient had taken with a wearable electronic gadget. This example demonstrates how wearable consumer technologies might support precise medical diagnosis [29]. In the arena of mental health, wearable sensors, and mobile data have also shown to be invaluable. Using mobile sensor data, machine-learning algorithms have been created to identify emotions even in scenarios with a wide range of data types and a significant quantity of missing information [30]. Medical personnel can effectively analyze their patients' mental health with the help of these models. By providing accurate diagnosis, remote monitoring, and enhanced insights into medical disorders, including mental health and chronic diseases, the use of wearables, machine learning, and artificial intelligence (AI) in healthcare is revolutionizing patient care. These innovations are changing healthcare norms and improving patient care generally.

Maternal Health: Maternal mortality can be decreased with prompt treatment of a variety of maternal health conditions, such as gestational diabetes, heart disease, postpartum depression, premature births, and miscarriages. For the fetus to grow and develop normally, the mother's health must be maintained at its best. Even though the mother experiences many changes throughout the pregnancy, it's crucial to keep an eye on her health in case there are any symptoms or indicators that point to a problem with the mother's or the fetus's normal ability to survive and operate. Pregnancy often causes constriction of the blood supply to all body parts because of enlarged nerves or too narrow arteries, which puts a great deal of strain on the arteries. This state, sometimes referred to as hypertension (HTN), makes it challenging for blood to pass through the placenta and nourish the developing fetus. This may result in the fetus growing more slowly and increase the mother's risk of premature labor and pre-eclampsia. Pregnancy lowers a woman's immune system and exposes her to many diseases and disorders, which may even harm the fetus if appropriate care is not given. With the right prenatal, perinatal, and postpartum care, many of these disorders can be avoided or managed.

Surgery: Artificial Intelligence (AI) has assumed a pivotal role in surgical decision-making, offering numerous advantages to both healthcare professionals and patients. AI harnesses a wide array of data sources, encompassing patient risk factors, anatomical intricacies, disease progression, patient preferences, and cost considerations, to empower surgeons and patients with more informed insights into surgical outcomes. One notable application of AI, especially deep learning models, is in the identification of patients with mesial temporal lobe epilepsy, particularly those resistant to conventional treatments, who are likely to benefit from surgery [31]. The accuracy of patient selection and treatment planning is greatly increased by the use of AI. Furthermore, by offering insightful direction to surgical teams in the operating room, AI platforms enhance surgical procedure safety. These platforms provide surgical safety roadmaps that lower risks and improve overall [32]. AI can actively participate in surgical procedures, so its role goes beyond pre-operative planning and decision-making. For example, safety has been improved by remote-controlled robotic surgery, especially when medical staff is exposed to high levels of ionizing radiation during the procedure. Additionally, it makes surgery possible in anatomical places that would otherwise be difficult or impossible for human hands to reach [33]. Surgeons may eventually oversee and direct autonomous robotic surgical systems in addition to performing direct surgical procedures as AI-driven robotic surgery develops [34]. Improving patient outcomes and the general safety of surgical procedures are two major benefits of integrating AI into surgical practices.

Cardiology: The automated analysis of cardiovascular imaging data is one of the most promising uses of artificial intelligence (AI) and is a crucial component in the assessment of heart function and structure in the field of cardiology [40]. Cardiologists must invest a great deal of time and energy in the interpretation and diagnosis of cardiac imaging data, which is obtained from modalities like cardiovascular magnetic resonance imaging, cardiac ultrasound, and cardiovascular computer tomography. This is because cardiac imaging data frequently contains complex spatiotemporal information. The field of cardiology is changing due to AI-driven cardiac image processing technologies. These tools can greatly speed up the patient assessment procedure, enabling cardiologists to evaluate patients more quickly in their day-to-day work [41]. AI speeds up diagnosis while simultaneously improving the accuracy and consistency of results by automating the analysis of cardiovascular imaging data. By simplifying the examination of complex cardiac imaging data, artificial intelligence (AI) is essentially revolutionizing cardiac clinical practice, which will ultimately benefit patients as well as medical professionals. Cardiology stands to benefit greatly from this use of AI, which could lead to more effective and efficient patient care.

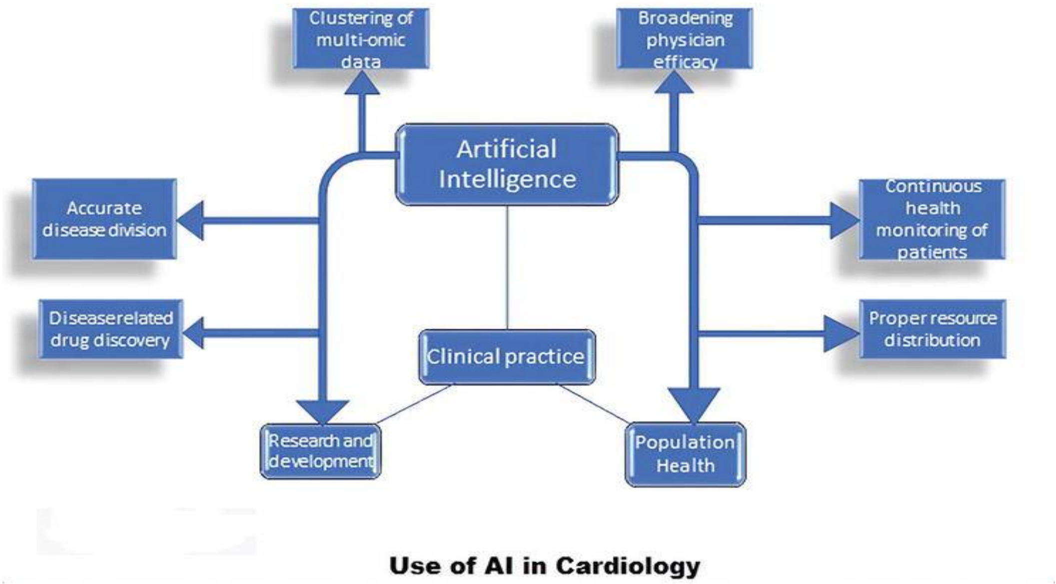

Fig 1: Application of AI in Cardiology

Nephrology: In the past, nephrology has played a smaller role in AI research than other medical specialties [42]. However, over the last ten years, developments have increased medical professionals' awareness of its potential. For example, a newly developed deep-learning model designed for ultrasound kidney imaging exhibits non-invasive classification capabilities to identify chronic kidney disease (CKD) [43]. Additionally, the emergence of a deep neural network capable of annotating and categorizing human kidney samples has streamlined the digital analysis of histological images [44]. As AI algorithms continue to evolve, becoming more reliable and generalizable, they excel in tasks such as identifying kidney masses and distinguishing between benign and malignant cases. Overall, the adoption of AI models in the realm of renal disease is anticipated to improve prognosis, facilitate individualized patient management, and contribute to reducing the global economic burden associated with kidney disease [46]. These developments hold promise for enhancing the diagnosis and treatment of kidney-related conditions.

Diabetic retinopathy: By Analyzing retinal images taken by a specialized camera, available machine learning (ML) technologies can identify symptoms of diabetic retinopathy. The technologies can also suggest a diagnosis to doctors. As mentioned above, these technologies enable medical personnel to efficiently and consistently screen patients to identify diseases earlier than with traditional approaches, which may improve patient outcomes and treatment. According to the website of one company, the technology may produce a result in under a minute.

Additionally, the method can be scaled up more successfully than manual screening to assist in meeting the needs of a growing diabetic population [47].

Cancer: With the aid of MRI, CT, pathology slide microscopy, and X-ray pictures, doctors may now utilize machine learning (ML) to detect, measure, and analyze Tumors. The ML technology of one company analyses breast MRI data and provides radiologists with details about the sizes and densities of lesions. According to a corporate spokesman, radiologists can use this information to analyze concerning details or determine whether the tumor is cancerous. Participants in the interview and participants at expert meetings claim that ML technology can also be used to track the growth of particular cancers over time, which can help doctors better assess treatments. The capacity to verify ML technologies for cancer diagnosis differs, nevertheless, depending on the type of disease. For instance, a representative from a VA medical facility informed us that because lung and breast tumors are more clearly defined than prostate cancer, it is simpler to verify image-based ML algorithms for identifying such conditions [47].

Personalized Management and Treatment: Precision medicine, driven by AI, has opened new avenues for personalized healthcare. Clinicians are exploring AI's potential to tailor medical treatments to individual patients, with notable examples including the customization of chemotherapy doses and the mapping of patient responses to treatment for future dosing planning [35]. In gastroenterology, AI-driven natural language processing (NLP) has been employed to identify polyp descriptions in pathology reports, enabling physicians to determine the ideal monitoring intervals for colonoscopy exams using guideline-based clinical decision support [36]. AI technologies have also proven valuable in assisting doctors facing complex diseases like cancer. In situations of clinical equipoise, where treatment guidelines do not favor one therapeutic option over another, AI methods can predict patient responses to different treatment combinations using retrospective data from diverse patient cases [37][38]. These technologies not only offer immediate treatment selection support but also generate valuable insights for future practice recommendations. Dashboards that display expected outcomes, treatment costs, and anticipated improvements based on patient behavior, such as increased physical activity, can facilitate collaborative decision-making among the clinical team, patients, and their families. AI has the potential to support the patient-centered medical home paradigm [39]. As genome-phenome integration becomes a reality, genetic data is likely to play an increasingly prominent role in AI systems for assessment, healthcare delivery, and treatment planning. However, to have a significant impact on routine care, genetic datasets must accurately represent a diverse range of patient populations. AI can also assist in identifying comparable cases from electronic health records (EHRs) to inform treatment decisions based on past outcomes [40]. These advancements hold promise for delivering more personalized and effective healthcare while involving patients in their care decisions.

CHALLENGE OF AI IN HEALTHCARE:

The potential of artificial intelligence (AI) in healthcare is undeniably significant, but its successful integration into the healthcare ecosystem is accompanied by several noteworthy challenges. These key challenges include:

Data privacy and cyber security: Privacy problems may arise when personal patient statistics are gathered and disseminated by artificial intelligence (AI) systems on massive datasets. Therefore, AI technology must adhere to statutory mandates, medical standards, and regulations [49]. Criminals with access to patients' highly sensitive confidential information run the risk of endangering the patient's social life. Additionally, due to the inaccurately faked data used by AI systems, there may be an elevated risk of misdiagnosis. One study found that benign moles could be misdiagnosed as cancer by just rotating them or making hostile noises [49].

Safety and dependability: Any error made by an AI system, if not immediately remedied, could lead to incorrect outcomes of the assigned work, which could have disastrous effects. For instance, a doctor was advised incorrectly to send asthmatic patients home by an AI program that estimated the likelihood that pneumonia patients would encounter issues [50].

Responsibility for technology use: Utilizing AI-based technology in medical practice, if it results in a patient's death, raises numerous ethical challenges and questions regarding responsibility [48].

A possible reduction in support networks and autonomy: The advent of AI-powered health applications holds the potential to empower users to manage their health symptoms and address their needs in real-time. This technical development could have a big impact on the need for healthcare professionals, among other things. Reliance Industries on family members for support may decrease as users take greater charge of their health care. However, a more independent lifestyle may also come with social isolation issues and potential behavioral issues, which emphasizes the necessity for an all-encompassing approach to healthcare. However, concerns about personal autonomy can arise with AI agents' rising influence over healthcare decisions. Although AI systems can offer insightful analysis and practical recommendations, there is a chance that they will restrict patients' access to therapies and even their ability to give informed consent for medical operations. It is imperative to strike the correct balance in the rapidly changing field of healthcare technology between preserving patient autonomy and choice and AI-driven healthcare support [49–51]. These developments emphasize how important it is to build AI-powered healthcare solutions using patient-centered design and implementation methodologies that are morally sound. Ensuring that AI improves human care and maintains patient autonomy and choices is necessary for fully exploiting the potential of AI while maintaining people's well-being.

Difficulties extrapolating for fresh populations: Artificial intelligence systems are now unable to efficiently extrapolate or use most medical data for therapeutic purposes [49].

Technological challenges: The application of AI technology in healthcare has raised several important issues that require serious thought and attention. The fact that AI models frequently generate results and treatments over which patients and healthcare practitioners have little control is one of the main problems. The decision-making process in healthcare is opaque and uncontrolled since these models are frequently created and used by experts outside of medicine. This is a crucial issue for public officials who want to guarantee the ethical and responsible use of AI. There are also justifiable concerns regarding the inherent limitations of AI technology. Since AI systems are human inventions, mistakes and defects in functionality and design are likely.

Organizational and managerial challenges: Among the difficulties facing AI development are data ownership and transfer, the possible displacement of trained healthcare workers and entry-level labor, and other obstacles [53].

Malicious use: AI has the potential to benefit humans, yet it can potentially be misused. Robots can covertly monitor and examine motor behaviors that reveal a person's identity and personal information [54].

Governance Challenges: The growing use of artificial intelligence (AI) in the healthcare industry has highlighted how urgently robust governance frameworks are needed to effectively manage trust, ethics, and regulatory challenges [55]. Particularly at the hospital level, good governance offers an opportunity to proactively address the difficulties associated with the use and integration of AI in healthcare. According to recent research, this strategy is crucial for ensuring patient safety as well as fostering accountability within the healthcare system. Furthermore, there are significant implications for the healthcare sector as a whole from this kind of governance, which is gaining acceptance. A comprehensive governance framework is necessary when implementing AI-powered apps to handle a variety of concerns that fall within the clinical, operational, and leadership domains.To ensure the moral, responsible, and effective use of AI technology in the healthcare sector, this framework should consider a wide range of criteria.

FUTURE OF AI IN HEALTHCARE

The most promising applications of AI in healthcare in the next few years will come from hybrid models, in which doctors retain ultimate authority over patient care while receiving support for diagnosis, risk factor detection, and treatment planning. Evaluating the risk involved would make it easier for doctors and patients to use these tools, and healthcare professionals would find it easier to provide operational efficiency and quantifiable improvements in patient outcomes. Aside from the aforementioned difficulties, artificial intelligence (AI) is taking over this sector and will soon serve as a support system for healthcare professionals, lessening their workload in the process. AI is also getting better at diagnosing patients remotely who are too poor to visit large institutions. It would get easier to provide effective medical care to underdeveloped communities. Much work needs to be done in AI because the field's future is bright, attainable, and exciting. The cost of AI treatment is higher, but it will provide complex, rapid, and effective diagnosis once it is developed. Additionally, by using realistic simulations that simulate real-time conditions—something that computer-driven algorithms are unable to do—training medical students would become simpler and more engaging.

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