AI Automation in Healthcare

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Abstract
As the demand for healthcare services surges, the industry is becoming increasingly vulnerable to issues such as patient engagement challenges, data overload, and diagnosis and prescription hurdles. AI automation is a novel technology that promises to address these challenges. This document discusses some of the challenges in healthcare and how AI automation mitigates these issues.

Index Terms: healthcare, AI automation, technology.

Introduction

Artificial intelligence is increasingly proliferating in the healthcare industry. According to industry insights, 86 percent of healthcare companies use some form of AI in their day-to-day operations [1]. It is estimated that 25 percent of US hospitals already use AI-driven predictive analysis, and 53 percent of EU health organizations plan to use medical robotics by the end of 2024. The recent AI burst in healthcare is denoted by the blistering growth of the technology in the industry. According to AIPRM, the market size for AI in healthcare has grown from $6.7 billion to $22.4 billion between 2020 and 2023, representing a growth of 233 percent [2].

From these insights, it is evident artificial intelligence is taking root in the healthcare sector. But does everyone know the potential applications of AI in healthcare and the issues that surround the use of the technology? This document explores healthcare challenges that can be mitigated by AI automation. It further explores the impact of AI on healthcare facilities.

Key Insights	
86 percent	Healthcare companies using AI.
25 percent	US hospitals already using AI-driven predictive analysis.
53 percent	EU health organizations planning to use medical robotics by the end of 2024
$22.4	Healthcare AI market size
233 percent	Medical AI market growth between 2020 and 2023

Problem definition

The modern healthcare environment is quickly changing. Patient expectations are continuously evolving, the mode of day-to-day operations is shifting, and even morbidity is changing. While some of these changes are progressive and desirable, they introduce challenges that must be addressed to attain seamless operations and positive patient outcomes. Some of the challenges in the modern healthcare landscape include;

Data overload

Healthcare providers collect patient data to provide personalized services and enhance overall service delivery. Although data can help providers improve their service delivery, it must first be processed and

converted into usable insights. Processing data manually is an uphill task – it is an exhilarating exercise that is time-consuming. Besides, manual data processing does not reveal all patterns in data and denies providers the ability to retrieve insights from data timely. Due to manual data processing, many providers have valuable data that they cannot leverage to the fullest.

Patient engagement bottlenecks

Patient engagement is an emerging challenge in the healthcare sector. With a growing population and need for personalized care, the number of people contacting healthcare facilities for inquiries and advice has tremendously increased. Besides, for programs such as telemedicine and mobile clinics to work, healthcare providers must have robust customer support agents. As the number of patients contacting increases, providers are finding themselves unable to respond to inquiries timely and make necessary follow-ups. Also, the workload for customer support teams is gradually worsening. Some facilities are attempting to address the challenge by increasing headcount. Although this lessens the challenge, it's not a practical solution, and it's expensive.

Diagnosis and prescription challenges

Medical images play a significant role in the diagnosis of illnesses. Typically, care providers analyze medical images manually. Recent studies show that human experts are not quite efficient in interpreting medical images [3]. They are slow, and their accuracy level is relatively low. With the growing epidemiology and emerging interventions, it is difficult for human care providers to memorize all suitable therapies for different conditions. Healthcare facilities attempt to address this deficiency by providing legacy prescription support systems. These systems are not designed to provide prescription advice; instead, they only hold information about diseases and their interventions.

Although the challenges above are proving problematic for healthcare facilities to address, they can be mitigated by emerging technologies. For instance, all the issues mentioned above can be resolved by implementing artificial intelligence-powered systems. Artificial intelligence systems can automate processes such as data analysis and patient engagement, and can support physicians in the diagnosis and prescription of therapies.

Healthcare AI

AI systems are programs that leverage algorithms or a set of rules to mimic human cognitive functions. Healthcare AI systems are artificial intelligence programs specifically designed to automate healthcare processes by performing or supporting the execution of functions traditionally reserved for human workers. These systems are trained using relevant data and fine-tuned with additional data as they work in a real environment. Some of the applications of AI in healthcare include;

Data analysis

One of the primary functions of AI in the healthcare industry is analysis of data. The technology can be employed in the analysis of patient data, improving patient flow and scheduling, and facilitating the provision of personalized care. In hospital management, AI can be used to analyze market data, allowing management to optimize their facilities' offerings to reflect patients' needs [4]. For example, AI can sift through EHRs to provide healthcare providers with insights into patient populations, such as trends in symptoms or risk factors. The technology's ability to process data fast and in real time renders every nugget of data into useful information.

Chatbots and virtual assistants

AI algorithms such as Natural Language Processing (NLP) are designed to understand human language and generate responses. These algorithms are ideal for contact centers where they can support human agents to respond to patient queries. These tools can also be deployed alongside telehealth and mobile clinic programs to autonomously provide medical advice and help manage chronic conditions by sending reminders for

medications, appointments, and lifestyle tips. AI automation in contact centers not only reduces response wait times but also helps reduce the workload of the department.

Algorithms for diagnosis and prescription

AI algorithms are becoming integral in diagnosing and predicting diseases. These algorithms are capable of processing patient data and making accurate diagnoses similar to or even better than human experts. For example, AI algorithms meet or exceed the performance of human experts in image-based diagnoses for several medical specialties, such as pneumonia, dermatology, pathology, and cardiology. AI algorithms can also process patient records, such as genetic information and patient histories, to predict health risks. AI algorithms can also help care providers plan treatments. These algorithms can suggest alternative treatment plans. For example, if a patient with hypertension does not respond well to a specific drug, AI can recommend another one based on real-world evidence and guidelines. AI can also recommend proper medical dosages and warn care providers about allergy risks. This is especially useful for patients on multiple medical plans.

Impact of AI in healthcare

Deployment of artificial intelligence tools in healthcare environments can impact healthcare delivery and overall patient experience in various ways. Some of the positive impacts of the technology in healthcare include;

Enhanced productivity

Deploying AI to assist with administrative tasks, diagnosis, designing treatment plans, and mining health records reduces time wastage on repetitive tasks. This allows healthcare providers to spend their time on more productive clinical tasks. Besides, this enables them to serve more patients. According to Indrajit Hazarika policy advisor for WHO on health systems, in nursing, AI increases productivity between 30 and 50 percent [5].

Reduced workload

By automating tasks such as responding to patient inquiries, data entry, and data analysis, the workload for healthcare providers is significantly reduced. For instance, a simple voice-to-text transcription tool can reduce workload for doctors by 17 percent and for registered nurses by 50 percent. Reduced workload translates to higher workplace engagement and improved workforce well-being.

Better performance

AI tools improve diagnostic decisions and treatment outcomes and reduce medical errors. These tools also extract information for quality reporting. The use of tools such as Google's DeepMind and IBM's Watson in surgical operations increases precision, reducing tissue damage and recovery pace. Reduction of errors in diagnosis and precision in surgical operations minimizes patient risks.

Enhanced patient experience

AI automation in contact centers ensures instant response to patient inquiries 24/7. Patients do not have to wait for hours to get responses or for their appointments to be scheduled. The technology also allows patients to independently manage their chronic conditions with minimal human expert support.

Conclusion

Although the healthcare sector is one of the most essential industries globally, it is vulnerable to challenges that impact the quality of healthcare delivery. For instance, limited data processing capabilities prevent healthcare providers from fully leveraging the benefits of big data. Patient engagement issues and, diagnosis and prescription hurdles are other challenges synonymous within the sector. All these issues can be mitigated using relevant AI tools. AI systems can automate data management and analysis, automate patient engagement, and improve the accuracy of diagnosis and treatment plans. Although AI automation is not a

replacement for human healthcare experts, healthcare institutions should consider assimilating AI tools in their operations to enhance patient outcomes and the well-being of their staff.

Summary		
Issues	**AI applications**	**Impact**
• Data overload • Patient engagement challenges • Diagnosis and prescription challenges	• Data analysis • Patient engagement • Diagnosis and prescription support.	• Enhanced productivity • Reduced workload • Better performance • Better patient experience

Sources

1. Healthcare IT News (2017), 86% of healthcare companies use some form of AI. Retrieved From: https://www.healthcareitnews.com/news/86-healthcare-companies-use-some-form-ai
2. AIPRM (2024), 50+ AI in Healthcare Statistics 2024. Retrieved From: https://www.aiprm.com/ai-in-healthcare-statistics/
3. Bajwa, J., Munir, U., Nori, A., & Williams, B. (2021). Artificial intelligence in healthcare: transforming the practice of medicine. *Future healthcare journal*, *8*(2), e188-e194.
4. Maleki Varnosfaderani, S., & Forouzanfar, M. (2024). The role of AI in hospitals and clinics: transforming healthcare in the 21st century. *Bioengineering*, *11*(4), 337.
5. Hazarika, I. (2020). Artificial intelligence: opportunities and implications for the health workforce. *International health*, *12*(4), 241-245.