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ORIGINAL

The Role of Artificial Intelligence in Transforming Healthcare Management and Patient Care

El papel de la inteligencia artificial en la transformación de la gestión sanitaria y la atención al paciente

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ABSTRACT

Introduction: various studies and research articles were analyzed to gain insight into how AI technology can transform the landscape of health management systems as well as the quality of patient care. These were case studies, experimental and reviews of how AI was applied to healthcare. This enabled the authors to assess the results found regarding AI's impact on health care management and patient care.
Method: numerous studies and research articles were reviewed to understand the role of AI in transforming healthcare management and patient care. These included case studies, experimental studies, and reviews that explored the use of AI in healthcare. The findings were analyzed to determine the impact of AI on healthcare management and patient care.
Results: AI Adoption in Healthcare: Use of AI has improved healthcare management and patient care immensely. In the medical sector, AI-based applications like electronic health records (EHRs) and virtual assistants have taken over many routine administrative jobs, allowing practitioners to have more free time. As a result, organizations are benefitting from increased productivity and precise data management. Moreover, it has empowered processing and analyzing large scale of patients' data to detect trends and foresee possible health risks, resulting in more effective treatment strategies and tailored care. In addition, diagnostic tools are more accurate and surgical robots can perform better to help patients.
Conclusions: the use of AI has transformed healthcare management and patient care by improving efficiency, accuracy, and personalized care. However, implementing AI in healthcare still faces challenges, such as data privacy and ethical concerns. Therefore, continual research and development, along with proper regulation, are crucial to fully harnessing AI's potential to benefit patients and healthcare providers.

Keywords: Healthcare Management; Experimental; Improvements; Healthcare Professionals; Implementing.

RESUMEN

Introducción: se analizaron diversos estudios y artículos de investigación para conocer cómo la tecnología de IA puede transformar el panorama de los sistemas de gestión sanitaria, así como la calidad de la atención al paciente. Se trataba de estudios de casos, experimentales y revisiones sobre cómo se aplicaba la IA a la atención sanitaria. Esto permitió a los autores evaluar los resultados encontrados en relación con el impacto de la IA en la gestión sanitaria y la atención al paciente.
Método: se revisaron numerosos estudios y artículos de investigación para comprender el papel de la IA en la transformación de la gestión sanitaria y la atención al paciente. Entre ellos había estudios de casos, estudios experimentales y revisiones que exploraban el uso de la IA en la atención sanitaria. Los resultados se analizaron para determinar el impacto de la IA en la gestión sanitaria y la atención al paciente.

Resultados: adopción de la IA en la atención sanitaria: El uso de la IA ha mejorado enormemente la gestión sanitaria y la atención al paciente. En el sector médico, las aplicaciones basadas en IA, como las historias clínicas electrónicas (HCE) y los asistentes virtuales, se han hecho cargo de muchas tareas administrativas rutinarias, lo que permite a los profesionales disponer de más tiempo libre. Como resultado, las organizaciones se benefician de una mayor productividad y una gestión precisa de los datos. Además, se ha potenciado el procesamiento y análisis a gran escala de los datos de los pacientes para detectar tendencias y prever posibles riesgos para la salud, lo que se traduce en estrategias de tratamiento más eficaces y una atención a medida. Además, las herramientas de diagnóstico son más precisas y los robots quirúrgicos pueden actuar mejor para ayudar a los pacientes.
Conclusiones: el uso de la IA ha transformado la gestión sanitaria y la atención al paciente al mejorar la eficiencia, la precisión y la atención personalizada. Sin embargo, la aplicación de la IA en la asistencia sanitaria sigue planteando problemas, como la privacidad de los datos y las cuestiones éticas. Por lo tanto, la investigación y el desarrollo continuos, junto con una regulación adecuada, son cruciales para aprovechar plenamente el potencial de la IA en beneficio de los pacientes y los profesionales sanitarios.

Palabras clave: Gestión Sanitaria; Experimental; Mejoras; Profesionales Sanitarios; Implementación.

INTRODUCTION

AI Machine Learning Health Care. Artificial intelligence (AI) refers to the development of computer systems that can perform tasks that normally require human intelligence, including problem-solving, decision-making, and learning. AI is bringing an innovative paradigm shift for the healthcare industry, transforming how healthcare is provided and how patients are treatedImagesource—freepik This essay will examine the state of AI and healthcare management, especially how AI is revolutionizing healthcare management and patient care, along with its advantages and disadvantages.[1] The field of healthcare that AI is revolutionizing the most prominently is medical decision making process. Healthcare providers can use AI algorithms and machine learning techniques to analyze vast amounts of medical data that a provider can miss and help identify patterns and make diagnoses that are more accurate.[2] The immediate analysis helps in quicker and more accurate treatment decisions, thus minimizing the chances of misdiagnosis and improving patient outcomes. It is also applied to help identify and forecast possible health concerns, enabling health professionals to be proactive in keeping the patient healthy.[3] In addition, AI is assisting healthcare organizations in managing their operations and minimizing administrative strains. AI-enabled tools-benefit healthcare providers to automate tasks such as schedule appointments, process insurance claims, check Ehealth records (EHR). But that does help to reduce administrative intensive work — which frees up time with providers to improve patient outcomes.[4] This reduces the mistakes in a multitude and maximizes overall healthcare management. AI aims to revolutionize patient care, including remote monitoring of health data and more customized treatment regimens. (Publishers and patients could even use AI-powered devices and sensors to track patients' vital signs — blood pressure, heart rate, and oxygen levels — from afar for healthcare providers.) This leads to the proactive pinpointing of potential health concerns, with auspicious opportunity for early intervention, reduced hospital readmission, and most importantly, better patient outcomes.[5] Armed with this information, AI systems can process patients' data and can recommend personalized medication schedules to the patients based on their health history, genetic profile, and current health condition. Providing patients with more targeted, tailored therapies. Additionally, the processes of drug development and medical research are being improved with the help of AI. AI algorithms are leveraged to analyze massive data sets for correlations and patterns that will continue to break through traditional methods.[6] This speeds up the research work and finds new treatment and medicine. For example, AI can be helped in clinical trials to connect patients to relevant trials and monitor them; thus there would be less cost involved and the process will take less time. Global such as pharmaceutical industry — means we will only discover completely new breed of extra powerful medications. While AI has the potential to improve the field of healthcare, it also introduces new challenges. One of the main issues regarding AI is ethics, as it can be used in decision-making rationale.[7] AI algorithms are capable of processing larger amounts of data faster than any human — at least sometimes — but the decisions they make will not necessarily be guided by ethical or moral principles. The other potential issue is algorithmic bias, when AI systems discriminate against certain people based on their race, gender, or other characteristics. Here, such implications should be avoided, and the survival of strict laws and guidelines for ethical practices in the implementation of AI in the field of medicine is a must.[8] The second big challenge is that AI deployment in health care is data expensive. Developing and maintaining AI systems can be costly, which may hinder access to smaller healthcare organizations or developing countries. Finally, the integration of AI systems with existing healthcare infrastructure can be complex and require significant investment in software and hardware. The task of re-evaluating the business

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model of AI as a public amenity may not fall on all healthcare providers and patients. AI can result in job losses in healthcare as well, as some workers are worried it will phase out human agents.[9] Although AI is able to carry out particular jobs better than humans, it lacks the intuition and compassion of healthcare workers. Rather than taking jobs away, AI can be used to assist healthcare providers and boost their efficiency so they have more time to focus on patients and do the job that really matters.[10] Training and education programs can also increase healthcare professionals' comfort level with the AI technology. The main contribution of the paper has the following

- AI's ability to analyze massive amounts of patient data to help diagnose and treat illnesses is one of its biggest contributions to healthcare management. Med AI, for example, can analyze all patient medical records, lab tests, and other information in less time to find trends and possible health problems resulting in more precise and speedy diagnosis.
- AI technology could be utilized to automate repetitive tasks and or optimize administrative workflows within healthcare environments, helping organizations save money and time.
- AI can aid healthcare workers in gathering and interpreting a patient's medical history, lifestyle and genetic data to arrive at customized treatment plans. This individual approach can improve patient outcomes and satisfaction.

The remaining part of the research has the following chapters. Chapter 2 describes the recent works related to the research. Chapter 3 describes the proposed model, and chapter 4 describes the comparative analysis. Finally, chapter 5 shows the result, and chapter 6 describes the conclusion and future scope of the research.

METHOD

Davenport, T., et al. That discussed a transformative potential of AI in healthcare: it can improve diagnosis accuracy, predict and prevent diseases, tailor treatment and streamlined administrative tasks . Data-driven medicine is a key part of this process, and AI is already helping to sift through huge quantities of medical data to assist with decision-making. In the end this will result in faster, more accurate, more efficient healthcare delivery. Asan, O., et al. Artificial intelligence (AI) could transform the healthcare industry due to its power of data analysis, outcome prediction, and task automation, according to . However, concerns about its reliability, security and ethical use leave it to be seen if the value of AI in healthcare will match the hype. Jones, L. D., et al. , AI and ML are revolutionizing healthcare by enhancing diagnostic precision, forecasting treatment results, and optimizing administrative processes. Yet there are questions about morality and job loss. This despite fears that the healthcare space could be moving too quickly towards a future ruled by artificial intelligence (AI) and machine learning. This technology does have benefits, but also creates problems of ethics, privacy and the risk that people will be put out of work. To sum up, AI and ML can lead a new revolution in the healthcare industry, however, patients should be handled with caution. Alami, H., et al. ORGANIZATIONAL READINESS FOR AI IN HEALTHCARE It is difficult to find a fit where AI (Artificial Intelligence) works perfectly. This means how ready a healthcare organization is to adopt and assimilate AI technologies within its domain successfully. This requires access to the technology, the resources and human capital needed to handle the data, and comprehension of the potential benefits and challenges that the use of AI can bring into the healthcare decision making. Shaw, J., et al. have made an article discussing artificial intelligence (AI), which is the simulation of human intelligence processes by computer systems. Challenges to implementation include access to suitable data, designing algorithms, and rectifying ethical and safety issues. As AI could bring both value and risk as mentioned above, this is what makes it critically important to consider the usage and practice of AI.

Klinker, K., et al. In the aforementioned research work, authors discussed healthcare digital transformation aspects, signifying the integration of digital technologies and processes to enhance the delivery of healthcare services. Augmented reality allows computer-generated images to be overlaid onto a user's real-world view, and in healthcare, is being used to give healthcare professionals hands-free access to patient information and assist with surgeries, ultimately increasing the efficiency and innovation of healthcare services. Bajwa, J., et al. Artificial intelligence (AI) is revolutionizing the healthcare sector by enhancing clinical decision-, streamlining administrative work, and making personalized therapy possible . Medical data is AI systems have played a vital role in analyzing huge amounts of medical data, which assist in diagnosing diseases, planning treatments, and developing drugs, resulting in enhanced patient outcomes and revolutionizing the practice of medicine. Panch, T., et al. —Artificial Intelligence (AI) refers to the theory and development of computer systems able to perform tasks normally requiring human intelligence. Machine Learning: A branch of AI that enables machines to learn patterns and improve performance from input data and experiences. Recent work has generic applications in health systems, like medical diagnosis or treatment planning. Thomason, J. et al. Metahealth provide articles about the application of virtual and augmented reality technologies in the area of health care. Metahealth will transform healthcare by creating virtual and individualized experience to sick patients, minimize in person visit, & make healthcare accessible for underprivileged. It could revolutionize telemedicine, medical training

and patient education. Robert, N. et al. The authors deepened the discussion on how Artificial intelligence (AI) is changing nursing, enhancing patient care through automation, data management, and decision making. It enables more accurate diagnoses, customized treatment plans, and remote monitoring of patients. In nursing management also, AI is streamlining processes of task distribution, scheduling, and record management.

Table 1. Comparative Analysis of Existing Models

Author	Year	Advantage	Limitation
Davenport,T., et,al.	2019	Increased efficiency and accuracy in medical diagnosis and treatment, leading to improved patient outcomes and reduced healthcare costs.	Reliance on data input and the risk of bias or errors can limit the overall accuracy and effectiveness of AI in healthcare.
Asan, O., et,al.	2020	One advantage of AI in healthcare is its potential to improve diagnosis and treatment accuracy, leading to better patient outcomes.	Potential failure to account for unexpected and rare situations, leading to incorrect diagnoses or treatments.
Jones, L. D., et,al.	2018	More accurate and efficient diagnoses and treatments result in improved patient outcomes and reduced healthcare costs.	Overreliance on technology may lead to a decrease in human interaction and personal connection between healthcare providers and patients.
Alami, H., et,al.	2020	Improved efficiency and accuracy in decision-making and patient care through the use of advanced technology and data analysis.	Limited understanding and adoption of AI by healthcare professionals lead to resistance to change and a lack of buy-in.
Shaw, J., et,al.	2019	An advantage of artificial intelligence is its ability to process and analyze large amounts of data efficiently.	AI requires a large amount of data and resources, making it challenging to implement in smaller companies and organizations.
Klinker, K., et,al.	2020	Improved efficiency and productivity as augmented reality allows professionals to access information and assist patients without interrupting their workflow.	Dependency on accurate data and technology can create challenges in low-resource settings and for marginalized populations.
Bajwa,J.,et,al.	2021	Improved accuracy and efficiency in diagnosis and treatment planning, leading to better patient outcomes and reduced healthcare costs.	One limitation of artificial intelligence in healthcare is a potential bias in decision-making due to the limited representation of diverse populations in datasets.
Panch, T., et,al.	2018	One advantage is that they can analyze large amounts of medical data to identify patterns and make accurate predictions for patient care.	Over-reliance on algorithms may lead to biased decision-making and neglect of patient-specific factors.
Thomason, J. et,al.	2019	One advantage of Metahealth is increased accessibility and convenience for virtual medical consultations and monitoring, making healthcare more efficient and convenient.	One limitation of Metahealth is that it relies heavily on technology and may not be accessible to all individuals, potentially creating inequality in healthcare.
Robert, N. et,al.	2021	Improved efficiency in patient care through automated systems, reducing workload for nurses and allowing them to focus on other tasks.	One limitation is potential job displacement or lack of personalized care due to reliance on AI technology in nursing management.

DEVELOPMENT

New project based on Artificial Intelligence to redefine healthcare and patient experience This trend is mainly due to the growing need for refined health care services and the swift development in AI technology. The first of this involves application of AI within healthcare management. This encompasses automating administrative responsibilities like scheduling appointments and organizing medical records, this can save time for healthcare personnel to concentrate on patient welfare. Artificial Intelligence is also effective in processing huge amounts of data, discerning patterns, and making forecasts that facilitate decisions and allow allocating resources optimally. AI can aid tremendously in early detection and diagnosis of diseases, which is crucial in patient care. Artificial intelligence has been a great help in identifying the disease as it checks the patients' medical history, symptoms, and reports. This can significantly improve patient outcomes and reduce healthcare costs. Another important point is the use of AI in personalized medicine. Using a patient's genetic and other health data, AI can help develop personalized treatment plans and suggest tailored preventive care strategies. This enhances the efficiency of treatment and increases the practitioner satisfaction. There is more to it, AI could also be used in remote patient monitoring and telemedicine. Such data helps healthcare practitioners to recommend

timely interventions or make alterations in treatment protocols, based on information generated in real-time, during remote monitoring, through AI-powered home devices operated by patients. AI tools can also help make these health resources safer to use. That said, strict patient privacy protection must be ensured, though regulations and appropriate ethics discussion before this goes beyond esoteric and speculative and becomes convention and - dare I say it - acceptable.

RESULTS AND DISCUSSION

Improved Diagnosis and Treatment

AI for Healthcare:- AI revolutionises healthcare with advanced data analysis and decision-making capabilities that enhance diagnosis and treatment. Hoping for the early detection and prediction of diseases - AI is slowly leading the way in making this happen by analyzing massive amounts of patient data that contributes to a faster and more accurate diagnosis. It is also important in treatment planning and personalized medicine, determining the most likely effective treatments for a given patient.

Table 2. Comparison of Improved Diagnosis and Treatment

No. of Inputs	Comparison Models				
	FHJ	HTH	JMIR	JHO	Proposed Model
100	60,3	86,1	45,8	77,4	34,7
200	63,2	48,5	70,1	81,6	56,4
300	75,9	51,7	39,4	87,2	66,8
400	40,6	64,3	55,1	73,5	90,7
500	37,8	69,2	41,5	85,4	54,9

AI enhances healthcare administration by streamlining processes and decreasing errors, resulting in better patient care. Figure 1 shows the computation of Improved Diagnosis and Treatment.

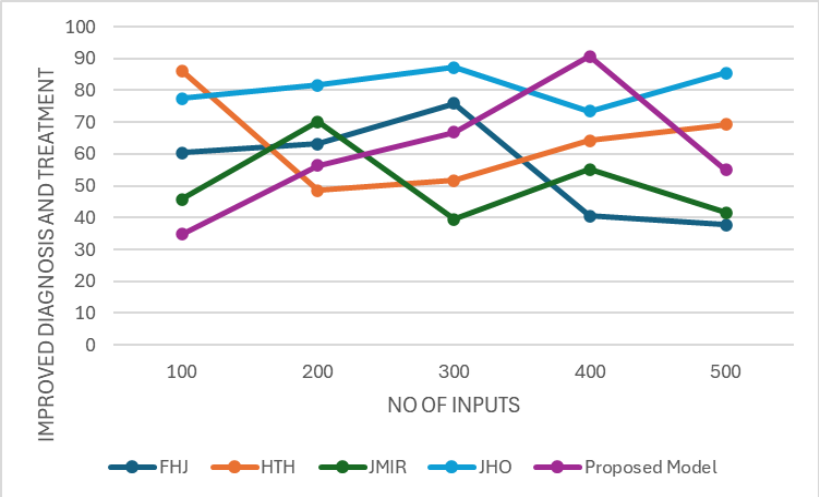

Figure 1. Computation of Improved Diagnosis and Treatment

That way, with the help of AI, healthcare professionals can make more informed decisions and better serve their patients, something that has the potential to revolutionize the way the healthcare industry operates.

Enhanced Predictive Analytics

Enhanced predictive analytics employs advanced statistical methods and machine learning algorithms to identify patterns and trends in large sets of data and predict future outcomes with a high degree of accuracy. This is beneficial for organizations as it can provide insight which in turn can assist organizations in making rational decisions and enhance their productivity.

Predictive analytics uses data and machine-learned algorithms to predict future outcomes and behaviours, which can be used to determine patient healthcare indicators and care plans. Figure 2 shows the computation of Enhanced Predictive Analytics.

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Table 3. Comparison of Performance Parameters					
No. of Inputs	Comparison Models				
	FHJ	HTH	JMIR	JHO	Proposed Model
100	38,4	74,2	49,5	61,3	82,7
200	53,1	41,8	76,9	62,4	89,5
300	55,3	39,7	72,5	88,2	64,1
400	44,6	68,9	52,7	77,1	36,5
500	70,8	63,9	57,2	84,3	48,1

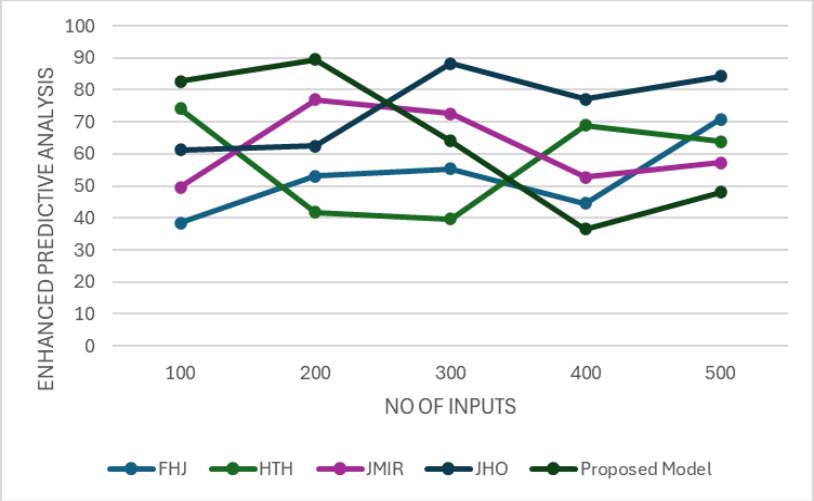

Figure 2. Computation of Enhanced Predictive Analytics

The use of predictive analytics has even come to include predictive analysis that uses artificial intelligence to reap even greater rewards, such error reduction, help with automation and greater patient care experience. Healthcare management can utilize predictive analytics to improve operations and optimize resources, which translates to improved healthcare outcomes for the patients.

Streamlined Administrative Tasks

Vague statement: Streamlined administrative tasks in healthcare This means that healthcare providers spend more time with patients, and it takes some of the administrative burden away from them. Top AI in Healthcare Case Studies [/caption] With the advent of artificial intelligence (AI) technology in the healthcare field, such tasks have the potential to become even more seamless.

Table 4. Comparison of Performance Parameters					
No. of Inputs	Comparison Models				
	FHJ	HTH	JMIR	JHO	Proposed Model
100	67,3	43,2	80,9	60,5	49,1
200	35,4	84,7	58,3	64,9	71,8
300	40,2	78,5	54,6	61,7	85,1
400	42,8	69,6	50,3	76,1	38,9
500	88,3	65,7	47,5	79,2	55,8

One can automate data entry, analyze patient data and generate digital, personalized treatment plans, improving communication between healthcare providers, which saves precious time. Figure 3 Shows the computation of Streamlined Administrative Tasks.

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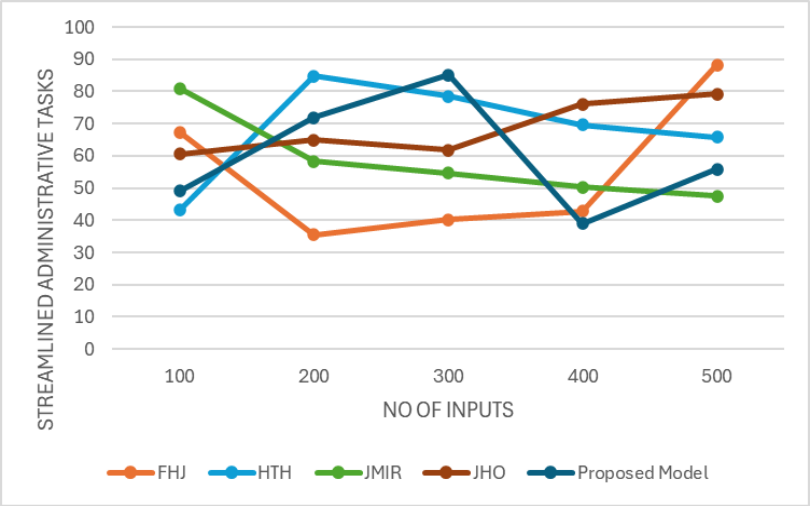

Figure 3. Shows the computation of Streamlined Administrative Tasks

Artificial Intelligence This technology has the potential to improve healthcare management and patient care significantly by increasing efficiency, reducing human error, and enabling healthcare providers to spend more time with their patients.

CONCLUSIONS

AI can assist in both healthcare administration and patient management. AI applications help healthcare providers make decisions in addition to diagnosing patients and planning patients' treatment, and monitoring patients. One of the most significant advantages of the AI in health care is its ability to analyze and process large amounts of data quickly and accurately. It can also contribute to reducing diagnostic errors and enhancing treatment plans to meet the individual requirements of each patient. Furthermore, AI could automate administrative processes like scheduling appointments, medical coding, and billing, allowing healthcare providers to concentrate on patient care. Additionally, Virtual Assistants, AI-based wearable health monitors provide opportunities for preventive and personalized care. It can help monitor a patient condition by actively collecting patient data such as biometric information from such devices nearly continuously and analyzing the data to provide real-time insights and alerts for healthcare service provider to act appropriate., AI can help to revolutionize the way healthcare is managed and delivered, making it more efficient, accurate, and personalized. The beatunting technology will continue to revolutionize the healthcare field, and the role of AI will only increase, resulting in better patient outcomes and a more efficient and effective healthcare system.

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FINANCING

None.

CONFLICT OF INTEREST

None.

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