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Emerging Trends in AI-Driven Health Tech: A Comprehensive Review and Future Prospects

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Emerging Trends in AI-Driven Health Tech: A Comprehensive Review and Future Prospects

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Abstract

Purpose: The purpose of this research is to explore the integration of artificial intelligence (AI) in healthcare, specifically within the realm of health informatics (HI). The study aims to understand the impact of AI on patient treatment, research, and operational processes within healthcare systems. Additionally, it seeks to address the challenges posed by the increasing volume of unorganized and unstructured data generated by AI technologies in healthcare.

Materials and Methods: This research employs a comprehensive analysis approach, utilizing complex health information systems, clinical images, and intricate language. It examines the current utilization of AI in healthcare, focusing on its effects on patient and clinician involvement in healthcare decision-making. The assessment emphasizes key skill areas of Health Informatics, including IT, health information systems, security and privacy, telemedicine, m-Health, consumer health informatics, and clinical informatics.

Findings: The study identifies several significant findings regarding the role of AI in healthcare. It highlights how AI technologies contribute to the generation of unstructured data, posing challenges for research and analysis. Additionally, the research underscores AI's

ability to enhance personalized medical guidance, identify complex illnesses, forecast negative health occurrences, and improve patient outcomes. Moreover, it discusses AI's impact on social media and mobile apps, emphasizing its potential to gather valuable insights from online sources for a deeper understanding of patient needs and behaviors.

Implications to Theory, Practice and Policy: Based on the findings, the research suggests several recommendations for future research and progress in the field of AI usage in healthcare. These recommendations may include further exploration of AI applications in healthcare decision-making, addressing challenges related to unstructured data, enhancing security and privacy measures, and leveraging AI for improving patient outcomes and clinician engagement. Additionally, the study emphasizes the importance of ongoing research and development to maximize the potential benefits of AI in healthcare.

Keywords: *Health Informatics (HI) [I10, O33], Healthcare [I10, I11], Artificial Intelligence (AI) [C88, O32], Data Analytics [C55, O32], Challenges [O31, O38], Healthcare Decision-making [I11, I12], Patient Involvement [I12, I19], Future Research [O32, O33]*

1.0 INTRODUCTION

Health informatics (HI) can be described as the intersection of healthcare and information technology. Utilizing technology to effectively handle and study healthcare information to improve patient care, research, and administrative functions. This may consist of electronic health records (EHR), telemedicine, and communication technology platforms (Gibson, Dixon, and Abrams, 2015; Suganya and Rajaram, 2019). The HI sector encompasses various areas of expertise including IT, consumer HI, m-Health, telemedicine, health information security, health information systems, and clinical informatics, as depicted in Figure 1.

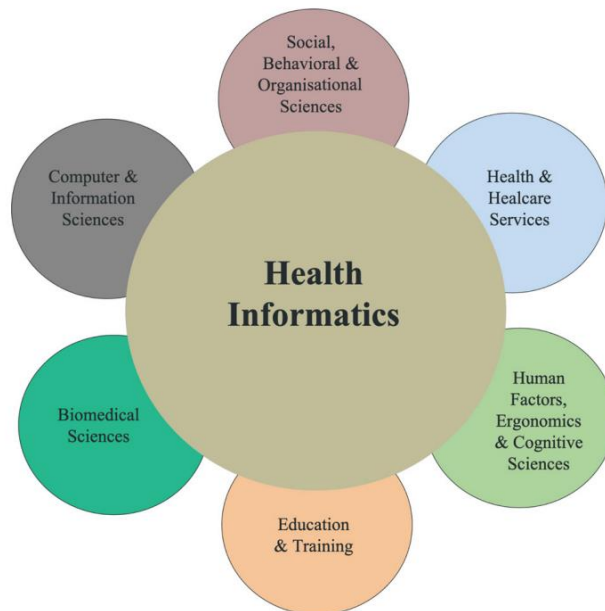


Figure 1: Key Domains of Knowledge in Health Informatics

Health informatics (HI) represents the convergence of healthcare and information technology, aiming to utilize technology effectively for handling and analyzing healthcare information to enhance patient care, research, and administrative functions. This encompasses electronic health records (EHR), telemedicine, and communication technology platforms (Gibson, Dixon, and Abrams, 2015; Suganya and Rajaram, 2019). The HI sector comprises various areas of expertise, including IT, consumer HI, m-Health, telemedicine, health information security, health information systems, and clinical informatics, as depicted in Figure 1.

Healthcare IT professionals have diverse responsibilities, encompassing data analysis, system administration, and clinical informatics, to ensure the efficient and secure use of technology in the healthcare industry (Chan et al., 2018). Within the realm of HI, a patient's medical information can be accessed through personal digital assistants (PDAs), mobile phones, patient monitoring devices, or other wireless devices, utilizing artificial intelligence (AI) to advance medicine and public health. The implementation of AI technology has led to the development of various healthcare-focused applications providing extensive information on health aspects.

Currently, numerous projects in healthcare informatics are underway, with approximately 40,000 medically related apps available worldwide (Khan and Alotaibi, 2020). There has been a recent surge in proposals and evaluations for integrating artificial intelligence into HI. AI has proven effective in supporting maintenance efforts and improving the analysis of medical records in healthcare. According to Khan and Alotaibi (2020), the quantified self-movement illustrates the participatory health model, where individuals collect, track, and analyze their health data to gain insights into their overall well-being.

The remarkable progress in intelligent computing and analytics, such as AI, now enables a deeper understanding of individual health, marking a significant revolution in the field. This relates to specific database searches and criteria for including or excluding literature. The present study summarizes empirical research and contributes to theoretical discourse in analytics literature. Current theoretical assessments face methodological obstacles, as noted by Cartiolovni et al. (2022) and Cheerkoot-Jalim and Khedo (2021), and their implications for the use of big data analytics in healthcare (Gu et al., 2017) were examined.

Thanks to AI methods and techniques, individuals and experts in collaborative medical informatics can now derive valuable insights from online sources (Ma et al., 2018). Artificial intelligence transforms participatory health by enhancing technologies such as mobile applications and social media platforms. For example, AI computational modeling can accomplish various tasks, including replicating or enhancing personalized medical guidance from healthcare professionals, identifying rare and complex diseases, understanding the spread of epidemics or illnesses, predicting negative health outcomes, and analyzing healthcare utilization patterns by individuals. Comparing treatment outcomes based on personal experiences (Jiang and Yang, 2017; Yang, 2022; Wimmer, Yoon, Sugumaran, 2016).

While AI offers a promising and innovative approach to improving collaborative health efforts, the field is still evolving and lacks substantial empirical evidence. This research explores how the use of artificial intelligence impacts the hospitality industry. Participatory health has various implications for both patients and practitioners.

Objectives

This area of research presents several challenges, such as the use of training data from non-standard sources. This article aims to give an overview of the current advancements and possible uses of artificial intelligence in the HI field. The objectives of HI are as follows:

- i. To use technology to improve the efficiency of healthcare services and enhance the quality of patient care through the timely and precise delivery of information to healthcare professionals.
- ii. To improve the management of population health by utilizing electronic medical records and encouraging patient participation and self-care using mobile health and telemedicine.

Statement of the Problem

The field of Health Informatics (HI) faces several challenges, including the utilization of training data from non-standard sources and the need for advancements in artificial intelligence (AI) applications. This study aims to address these challenges and gaps in the current understanding of AI in HI by examining the following aspects:

Who: Healthcare professionals, researchers, and policymakers involved in the implementation and utilization of AI in healthcare settings.

What: The study focuses on the current advancements and potential uses of artificial intelligence in the HI field, particularly in improving healthcare efficiency, enhancing patient care, and managing population health.

How the Problem has been Addressed: The study provides an overview of the current state of AI applications in HI, including the challenges faced in using training data from non-standard sources. It explores how technology can be leveraged to improve healthcare services and patient outcomes. Additionally, the study examines the role of electronic medical records, mobile health, and telemedicine in managing population health.

Gaps the Study Intends to Fill

Lack of Comprehensive Understanding: The study aims to fill the gap in understanding the full scope of AI applications in HI, providing insights into how AI can be effectively utilized to address healthcare challenges.

Challenges in Training Data Utilization: By addressing the challenges associated with using training data from non-standard sources, the study intends to provide guidance on overcoming obstacles in AI implementation in healthcare.

Need for Advancements in AI Applications: The study seeks to identify areas where advancements in AI applications can lead to improvements in healthcare efficiency, patient care, and population health management.

Overall, by addressing these gaps, the study aims to contribute to the advancement of AI in HI and provide valuable insights for healthcare professionals and policymakers.

2.0 LITERATURE REVIEW

This article first explains health informatics (HI) as the area of study focused on utilizing IT to enhance healthcare delivery, results, and patient satisfaction. Next, we explore how artificial intelligence (AI) and machine learning (ML) can be used in health informatics (HI) to support activities like identifying diseases, predicting outcomes, and creating treatment strategies. The article also explores the rise of deep learning (DL) methods, which have demonstrated promise in improving the accuracy and efficiency of analyzing medical images, processing natural language, and performing other healthcare-related duties. Lastly, it will examine the possible effects of integrating AI into healthcare, considering both the advantages and challenges of incorporating these advancements into medical care. The study and application of technology and data in healthcare are essential in the field of HI.

Health Informatics is a diverse area that focuses on integrating technology advancements in communication and information, information science, computer science, and health sciences to improve the effectiveness of healthcare. It has a crucial function in handling and analyzing large volumes of health data, such as electronic health records (EHRs), clinical information, telemedicine, health information exchange, mobile health apps, medical imaging, and genomic data (Mascia et al., 2018; Gu et al., 2019).

HI enables healthcare institutions to utilize health data for patient care, population health management, and decision-making by providing access, storage, and analysis capabilities (Patel et al., 2022) HI assists medical professionals in enhancing the precision, effectiveness, and security of patient treatment through the utilization of cutting-edge technologies such as AI, ML, and natural language processing (NLP). AI technology in healthcare can be used for predictive analysis, personalized medical treatment, patient categorization, and clinical decision support systems. At present, the widespread use of AI in healthcare has been rapidly increasing, resulting in significant progress in fields like diagnosis, treatment planning, and pharmaceutical research. Nevertheless, obstacles such as data privacy, security concerns, ethical considerations, and regulatory hurdles continue to impede the widespread adoption of AI in healthcare.

Despite these challenges, the future of healthcare informatics is set to be influenced by artificial intelligence and other cutting-edge technologies that will further transform the healthcare sector (Jiang et al., 2017). AI technologies like Machine Learning (ML) and Deep Learning (DL) have shown great promise in healthcare by proving effective in medical image analysis, drug discovery, and disease diagnosis, among other applications (Shen, Wu, and Suk, 2017).

Artificial Intelligence Technologies

While Artificial Intelligence (AI) for Health Informatics (HI) has made significant advancements, continuous progress is essential in this area. AI technologies refer to computer systems designed to perform tasks typically carried out by humans, such as recognizing speech, making decisions, or identifying patterns in data. These advancements enable machines to gather and interpret data, then make predictions using algorithms and mathematical models (Lau, Staccini, 2019; Paranjape, Schinkel, and Nanayakkara, 2020).

In recent times, there have been notable advancements in AI technologies, leading to their widespread adoption across various industries, including healthcare. Figure 2 visually illustrates the interconnectedness and hierarchical structure of AI, Machine Learning (ML), and Deep Learning (DL), showcasing their relationship to each other. In HI, artificial intelligence is being leveraged to enhance patient care and streamline clinical decision-making, ultimately resulting in improved patient outcomes. AI applications in healthcare informatics encompass predictive analysis, personalized medicine, patient categorization, and clinical decision support systems (Jiang et al., 2017; Amann, 2020). Machine Learning (ML) is the process of creating algorithms that enable machines to improve their performance at a specific task over time through practice. It plays a crucial role in healthcare informatics, allowing health systems to analyze large quantities of clinical data, electronic health records, imaging data, and other information to identify patterns and predict outcomes.

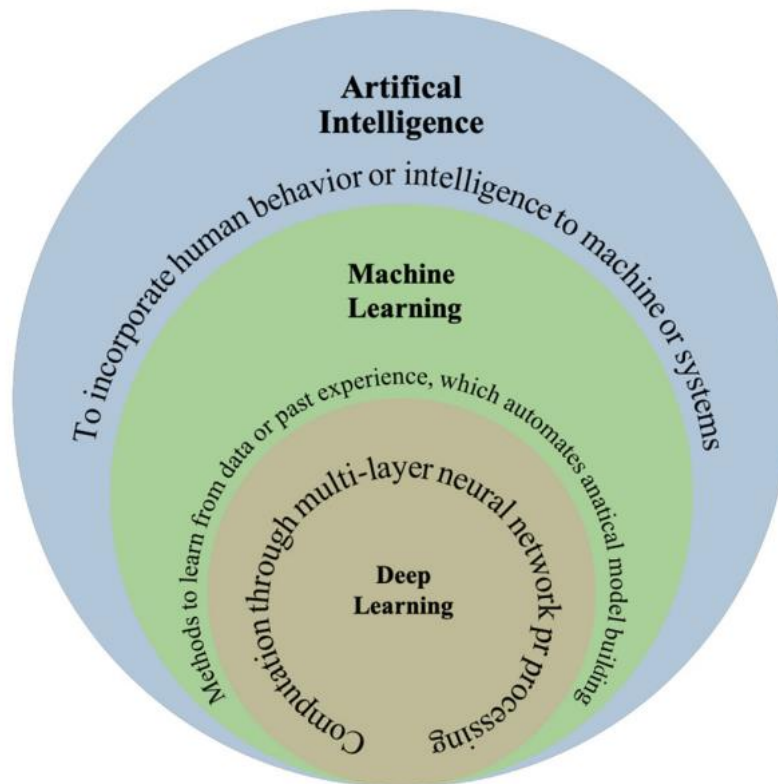


Figure 2: AI Field Illustrations

ML algorithms have been applied in various healthcare applications, including diagnosing and recommending treatment, managing population health, and predicting disease risk (Miranda and Felip, 2015; Ahmad et al., 2021). Similarly, Deep Learning (DL) is a subset of machine learning that utilizes multi-layer artificial neural networks to perform complex calculations. DL algorithms have been applied to tasks such as image analysis, speech recognition, and natural language processing. In healthcare informatics, DL algorithms are used for tasks like identifying irregularities in medical images and studying genomics.

The significance of AI in healthcare lies in its ability to analyze large amounts of data and assist in making informed decisions in the medical field. As HI increasingly relies on data, AI technologies become critical tools for healthcare organizations and researchers. By utilizing AI technology, HI can contribute to enhanced patient outcomes, optimal resource allocation, and increased efficiency in delivering healthcare services. However, despite the numerous advantages of using AI in healthcare, there are obstacles hindering its widespread implementation. Factors such as data privacy and security, ethical concerns, and regulatory obstacles need to be addressed. Additionally, it is crucial to thoroughly validate and test AI systems to ensure their safety, efficiency, and accuracy (Jiang et al., 2017).

Machine Learning Techniques

Machine learning is an advanced technology that employs algorithms to analyze data and forecast outcomes. For many years, it has been utilized in biomedical research to unveil data patterns and

enhance the process of decision-making. Smaller research labs frequently fail to fully utilize these strategies. Health informatics is the use of uncertain information to guide decision-making in the field of healthcare.

The combination of machine learning and human intelligence has the potential to enhance the overall quality, effectiveness, and efficiency of treatment and care. A variety of ML techniques have been used in different areas of patient care, including diagnosis, treatment planning, and disease prediction. ML is employed for real-time patient monitoring through the analysis of data from various sensors or devices. This is especially valuable in ICU settings (Mao et al., 2012). Researchers have been closely studying physical activity patterns using data from body-worn sensors for the last twenty years (Calhoun et al., 2012). Understanding the connection between physical activity and health issues such as diabetes, cardiovascular diseases, and osteoporosis is crucial, particularly as sedentary lifestyles become more common.

Impact of Artificial Intelligence on Health Informatics

The field of health informatics has embraced artificial intelligence more and more, leading to notable changes in healthcare such as improved diagnosis, treatment, and patient management. The implementation of AI in healthcare has resulted in improved precision, effectiveness, and promptness of decision-making, ultimately leading to improved patient results. The following provides a summary of the influence of artificial intelligence on human intelligence and explores some of its possible advantages.

Improved Diagnosis and Disease Prediction

The use of AI technologies like ML and DL can enhance healthcare by analyzing large amounts of data and identifying trends that may not be immediately apparent to healthcare professionals, ultimately leading to better disease diagnosis and prediction (Rama et al., 2021). This can lead to better patient results by allowing for earlier and more precise diagnoses.

Better Treatment Planning

AI can also be utilized to develop personalized treatment plans for every patient. For instance, artificial intelligence algorithms can examine a patient's data, including genetic information and medical records, to identify the most suitable treatment options for an individual patient. Medical professionals can make improved decisions and provide more effective treatment to their patients by following this approach (Paranjape, Schinkel, and Nanayakkara, 2020).

Personalized Medicine

AI technology can be utilized to analyze patient information and develop personalized treatment plans, ensuring that patients are given the most suitable and effective treatments for their specific requirements (Dey et al., 2019).

Improved Clinical Decision-Making

AI technologies can aid healthcare providers in making clinical decisions by granting them immediate access to patient data. This allows them to swiftly recognize and address potential health concerns (Wimmer, Yoon, Sugumaran, 2016).

Increased Efficiency and Cost Savings

AI technologies can improve productivity and lower expenses by automating everyday tasks, allowing healthcare professionals to concentrate on more challenging and crucial matters (Jiang et al., 2017).

Predictive Analytics

AI can be utilized for predictive analysis in the healthcare field, enabling healthcare professionals to predict and preemptively address potential health issues. One way AI algorithms can be used is to analyze patient information and forecast the probability of a particular illness, allowing doctors to intervene sooner and stop the advancement of the illness (Hasan and Bao, 2021).

Machine Learning for Health Informatics

Machine learning can effectively analyze vast datasets in the field of healthcare informatics. ML algorithms can recognize and analyze patterns and connections within data, allowing for the development of predictive models and systems to support clinical decision-making. One of the main advantages of machine learning in the healthcare field is its capacity to create customized treatment strategies for each patient. ML algorithms can analyze patient data and create predictive models that consider the individual patient's specific traits and medical background (Ma et al., 2018; Baig et al., 2017).

One of the obstacles to implementing machine learning in the HI is the requirement for data that is high in quality, diverse, and representative of the population. Having reliable data management and governance procedures is crucial to ensure that data is gathered and stored ethically, securely, and following applicable regulations. Machine learning has the potential to greatly impact healthcare by allowing for customized treatment plans and enhancing clinical decision-making (Yoon, Davtyan, van der Schaar, 2017).

Linear Regression (LR)

LR is a commonly employed statistical method with various uses in the field of health informatics. Linear regression has a significant role in healthcare, particularly in predictive modeling. It can be utilized to create models that predict patient outcomes using clinical and demographic factors. Linear regression can be utilized to examine the correlation between various variables, such as the connection between a patient's age and their probability of developing a specific condition. Additionally, Combi et al., (2018) utilized LR to pinpoint the factors linked to a higher likelihood of being readmitted to the hospital. They discovered that variables such as age, gender, and existing medical conditions were important indicators. Despite the limitations of linear regression, such as the requirement for variables to have a linear relationship and the need for a large sample size, it continues to be a useful tool for predictive modeling and examining the relationship between HI variables.

Random Forest (RF)

RF is a machine learning technique commonly utilized in healthcare informatics because of its capability to manage intricate and high-dimensional datasets. Due to the necessity of analyzing vast quantities of data, identifying key elements, and making precise predictions, this is especially beneficial in the field of HI (Sun et al., 2020). This process involves the generation of several decision trees, and then combining their predictions to produce a final result. It has been utilized in a range of healthcare settings, including to diagnose, forecasting, and anticipate diseases. One

research conducted by Butt et al., (2021) uses the RF algorithm to predict the severity of COVID-19 by analyzing clinical and demographic information from patients. The research demonstrated that RF performed better than LR and SVM in predicting the severity of COVID-19, and it also pinpointed crucial features for this prediction.

This algorithm is constrained by issues such as the risk of overfitting, challenges in interpreting the outcomes, and the complexity of its calculations. In general, the RF algorithm has demonstrated its significance in the field of healthcare informatics by effectively managing intricate and multidimensional data sets, and showing promise for precise predictions in a range of healthcare scenarios. Additional investigation is necessary to overcome the constraints and fully uncover the potential of this technology in the healthcare field.

Naive-Bayes (NB)

NB is a machine learning algorithm that uses probabilities and has demonstrated potential in a wide range of applications in the field of human interaction. NB is widely used in medical diagnosis and prediction of diseases because it can effectively manage large datasets with high complexity, particularly when dealing with sparse data. It can also be utilized to pinpoint potential causes for specific illnesses and categorize patients according to their health backgrounds. For example, Hasan and Bao (2021) utilized Naive Bayes for categorizing heart disease, and they obtained an 88.46% accuracy rate.

Moreover, Rama et al., (2021) employed NB to categorize thyroid disease, achieving a precision of 95.13%. Its effectiveness comes from its capability to process noisy and incomplete data. This makes it especially valuable for analyzing medical data. The assumption of independence among variables may not always be valid in real-world applications, highlighting a limiting factor. NB continues to be a valuable asset in the field of healthcare informatics, as it is easily implemented and provides reliable accuracy in a wide range of medical uses.

Decision Tree (DT)

Decision Tree (DT) stands out as a significant machine learning algorithm in the field of healthcare informatics because of its capacity to create straightforward decision rules from intricate medical data. This method has been extensively utilized in a range of healthcare settings, such as making clinical decisions, diagnosing diseases, and monitoring patients. Research conducted by Rama et al., (2021) was used to create a predictive model for postoperative complications in colorectal surgery patients.

The DT model was found to have a 75.3% accuracy rate, making it more successful than other ML algorithms like LR and RF, as stated by the authors. Although it has many benefits, such as being easy to understand and use, it also has drawbacks, including a tendency to overfit the training data and an inability to deal with continuous variables. DT has made important contributions to healthcare research, particularly through its advancements in model optimization and pruning, which have enhanced its ability to address practical healthcare challenges.

Support Vector Machine (SVM)

Support Vector Machine (SVM) is a crucial machine learning method for health informatics due to its capability to manage big datasets with high dimensional features. This method has been used for various purposes in the field of artificial intelligence, such as medical diagnosis, image sorting, and gene expression examination. For example, Hasan and Bao (2021) utilized chest X-ray images

to forecast the severity of COVID-19, while Rama et al., (2021) employed predictions to assess the likelihood of developing type 2 diabetes. The ability of SVM to effectively handle non-linear data has proven to be advantageous in these studies, enabling precise classification and forecasting.

Applications

AI has a wide range of opportunities within this field with the potential to improve patient results, reduce healthcare expenses, and increase the efficiency of healthcare provision. Various aspects within the HI have recognized the potential of artificial intelligence, such as:

Medical Diagnosis and Decision-Making

This field shows great potential for AI in HI, as it can support medical professionals in accurately diagnosing and treating patients. ML algorithms like deep learning, such as RNNs and CNNs, can analyze patient data to identify trends and predict the probability of specific health conditions. These techniques can be developed using large sets of medical images such as X-rays and magnetic resonance imaging (MRI) (Esteva et al., 2017). The potential of AI in medical diagnosis and decision-making could lead to enhanced patient outcomes by offering earlier, more accurate, and personalized diagnoses and treatment plans. However, it is important to address potential ethical and regulatory issues, including the need to ensure AI algorithms are transparent and fair, as well as protect patient privacy (Obermeyer et al., 2019).

Drug Development and Personalized Medicine

Artificial intelligence (AI) is being applied to streamline the drug development process and tailor medicine to individual patients by forecasting the effectiveness and safety of potential drugs and adjusting treatment plans to match each patient's distinct genetic makeup and medical history. Advanced AI methods such as machine learning are used to analyze large amounts of data from various sources including clinical trials, electronic health records, and genetic data to identify potential drug candidates and predict their safety and effectiveness. Furthermore, artificial intelligence can be utilized to identify specific patient groups with distinct traits that could react differently to a certain treatment, allowing healthcare providers to tailor treatment plans. This could lead to improved patient results and a streamlined medication development process (Schork 2019; Chopra et al., 2022).

Patient Monitoring and Management

AI-driven monitoring systems are now being recognized as a promising technology for monitoring and managing patients. These systems use advanced algorithms to analyze patient information, detect patterns and trends, and produce real-time alerts for healthcare providers. AI systems equipped with continuous monitoring can identify possible health issues in patients before they escalate, enabling early intervention and better patient results. This can result in lower healthcare expenses by avoiding hospital readmissions and other issues. A research investigation carried out by Pekmezaris et al., (2018) showed that an AI-driven remote monitoring system for heart failure patients was successful in decreasing hospitalizations by 70%.

Healthcare System Optimization

AI can greatly improve healthcare systems and make them more efficient. AI can be used in healthcare to predict patient needs and effectively distribute resources. For example, research conducted by Raita et al. (2019) showed that machine-learning models were able to predict emergency room visits with great precision, enabling hospitals to efficiently distribute their

resources. Furthermore, Natural language processing (NLP) has the potential to automate administrative duties and enhance communication among healthcare professionals. One instance of this can be found in the research conducted by Cai et al., (2016) involved the use of NLP to streamline clinical documentation processes in radiology departments, leading to a noteworthy decrease in the time needed for documentation.

Personalized Medicine

AI can revolutionize the healthcare industry by making personalized treatments possible. One method to accomplish this goal is by examining patient records, including genetics and electronic health records, to develop customized treatment plans specific to each patient. Carruth et al., (2019) conducted a research study that displayed the application of ML algorithms in examining genomic and EHR information to customize the treatment of patients with inflammatory bowel disease.

AI for Drug Discovery

The process of developing and finding new drugs is both rigorous and expensive, as it requires the identification of chemicals that have the potential to treat specific conditions. Artificial intelligence can be a key player in this process by examining extensive sets of data to discover potential drug options and forecast their effectiveness. Moreover, artificial intelligence can predict the harmfulness and adverse reactions of medications, as well as enhance the effectiveness of dosages. AI has been effectively used in drug discovery, such as in the case of using deep learning algorithms to analyze extensive genomic data to identify new treatments for Alzheimer's disease (Li et al., 2017).

Image Analysis

Artificial intelligence has become increasingly important in healthcare, particularly in the area of analyzing medical images. AI can significantly improve the accuracy of medical diagnoses by enabling healthcare professionals to identify slight variations in medical images, such as detecting tumors in X-rays or abnormalities in MRI scans, that may not be readily discernible to the naked eye. Recent research has looked into the possibilities of using AI in these fields, showing that DL algorithms are both accurate and efficient in analyzing medical images (Esteva et al., 2017; Golan, Jacob, and Denzinger, 2016; Kavitha et al., 2022).

3.0 CONCLUSION AND RECOMMENDATIONS

Conclusion

Recent research has seen a major advancement in the form of health informatics (HI), a method that uses a variety of applications and technologies to improve health care. Similarly, the integration of artificial intelligence (AI) in healthcare information (HI) is seen as a major advancement in contemporary healthcare infrastructure. This research article, explored the current status of AI use in healthcare informatics, focusing on how AI impacts patient and clinician engagement in healthcare. Several additional benefits of this mix for health informatics are emphasized.

The fields of expertise within health informatics encompass a range of areas including information technology, health information systems, telemedicine and m-Health, health information security and privacy, consumer health informatics, and clinical informatics. These domains are thoroughly described. In future research, a comprehensive evaluation of prior AI applications could be

conducted, integrating them with other digital health software or data to determine their effectiveness on these systems. By harnessing the power of AI responsibly and ethically, we can develop a healthcare system that is more productive and beneficial for both patients and healthcare professionals.

Implications of the Study

The study sheds light on the significant advancements in health informatics (HI), highlighting the use of various applications and technologies to enhance healthcare. Additionally, it emphasizes the integration of artificial intelligence (AI) into healthcare information systems as a major advancement in contemporary healthcare infrastructure. By exploring the current status of AI use in healthcare informatics, the study provides valuable insights into how AI impacts patient and clinician engagement in healthcare.

Recommendations

Comprehensive Evaluation of AI Applications: The study recommends conducting a comprehensive evaluation of prior AI applications, integrating them with other digital health software or data to determine their effectiveness. This approach can help identify synergies between different technologies and optimize their impact on healthcare systems.

Responsible and Ethical Use of AI: It is recommended to harness the power of AI responsibly and ethically. This involves ensuring data privacy and security, as well as addressing ethical concerns related to AI algorithms and decision-making processes. By doing so, a healthcare system can be developed that is not only more productive but also more beneficial for both patients and healthcare professionals.

Contributions to Theory, Practice, and Policy

Theory: The study contributes to the theoretical understanding of AI applications in healthcare informatics by providing insights into the current state of AI use and its implications for patient and clinician engagement.

Practice: The study offers practical recommendations for healthcare organizations and professionals on how to effectively integrate AI into healthcare systems. This includes conducting comprehensive evaluations of AI applications and ensuring responsible and ethical use of AI technologies.

Policy: The study provides policymakers with insights into the potential benefits and challenges of integrating AI into healthcare systems. It highlights the importance of developing policies that promote responsible AI use while also addressing concerns related to data privacy, security, and ethics. Additionally, the study underscores the need for policies that support the effective integration of AI technologies into existing healthcare infrastructure.

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