

The Role of Artificial Intelligence in Healthcare

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Research Methodology in Computer Science

AI800

01 Mar 2024

Secinaro, S., Calandra, D., Secinaro, A. et al. The role of artificial intelligence in healthcare: a structured literature review. BMC Med Inform Decis Mak 21, 125 (2021).

Artificial intelligence (AI) within the healthcare zone is receiving interest from researchers and fitness experts. The based literature overview with its dependable and replicable studies protocol allowed the researchers to extract 288 peer-reviewed papers from Scopus. The authors used qualitative and quantitative variables to examine authors, journals, keywords, and collaboration networks amongst researchers. Additionally, the paper benefited from the Bibliometrix R software program package. The research confirmed that the literature on this area is emerging. It makes a speciality of fitness offerings management, predictive medicine, affected person facts and diagnostics, and medical decision-making. The United States, China, and the UK contributed the best wide variety of studies. Keyword evaluation discovered that AI can guide physicians in creating a diagnosis, predicting the unfold of illnesses and customising remedy paths. The literature exhibits numerous AI packages for fitness offerings and a circulate of studies that has now no longer absolutely been covered. For instance, AI initiatives require abilities and facts exceptional recognition for facts-extensive evaluation and knowledge-primarily based totally management. Insights can assist researchers and fitness experts recognize and deal with destiny studies on AI within the healthcare area.

Tagliaferri, S.D., Angelova, M., Zhao, X. et al. Artificial intelligence to improve back pain outcomes and lessons learnt from clinical classification approaches: three systematic reviews. npj Digit. Med. 3, 93 (2020).

Artificial Intelligence and Machine Learning (AI/ML) maintain promise for enhancing the detection of medical styles in low-again ache (LBP) and guiding remedy decisions. We carried out 3 systematic evaluations to gain primary objectives: firstly, to evaluate the contemporary panorama of AI/ML studies in LBP; and secondly, to examine this fame with mounted LBP type structures, specifically STarT Back and McKenzie techniques.

The evaluation discovered that AI/ML utility in LBP remains in its nascent stages. Among the forty eight research reviewed, maximum had surprisingly small pattern sizes, simplistic fashions with few parameters, and normally centered on binary type of LBP as opposed to no-LBP. Furthermore, past those research, there has been a fantastic absence of AI/ML exploration in predicting diagnosis for precise LBP sub-corporations or guiding remedy decisions.

In contrast, mounted type structures along with the STarT Back device and McKenzie technique have passed through rigorous assessment for reliability, validity, and prognostic capabilities, with documented influences on ache and incapacity results. These structures classify people primarily based totally on bodily and psychosocial factors, making an allowance for tailor-made remedy approaches.

For AI/ML techniques to noticeably make a contribution to LBP (sub-)type and remedy allocation, there may be a vital want for complete datasets encompassing numerous medical features. Additionally, setting up the reliability, validity, and prognostic ability of AI/ML

strategies in LBP, in conjunction with their capability to enhance affected person results and decrease healthcare costs, is imperative.

Despite extensive search phrases used in our systematic review, the wide variety of applicable articles became limited, emphasizing the surprisingly underexplored nature of AI/ML within the context of LBP. A general of forty-eight research have been protected in our evaluation after thorough assessment, dropping mild at the contemporary fame and destiny guidelines of AI/ML utility in LBP studies.

Amir Amini., Wei Chen., Giancarlo Fortino., Ye Li., Yi Pan., May Dongmei Wang., Editorial Special Issue on (AI-Driven Informatics, Sensing, Imaging and Big Data Analytics for Fighting the COVID-19 Pandemic) (2020).

On March 12th, 2020, the World Health Organization (WHO) declared the outbreak of COVID-19 (Coronavirus Disease 2019) a global pandemic. This marked a significant event in modern history, as COVID-19, caused by the novel coronavirus SARS-CoV-2, rapidly spread worldwide. In just nine months, the virus reached 213 countries and territories, infecting over 27.7 million individuals and claiming the lives of more than 900,000 people by September 9, 2020. The pandemic not only posed immense challenges to public health but also led to profound economic disruptions, with regional and national economies experiencing complete or partial shutdowns to combat the spread of the virus.

COVID-19's global impact stems from its novelty and high transmissibility. Approximately 80% of infected individuals exhibit either mild or no symptoms, unknowingly contributing to virus transmission, while 20% develop severe respiratory symptoms requiring hospitalization. The rapid surge in severe cases overwhelmed healthcare systems, underscoring the urgent need for effective containment measures. Until a safe and efficient vaccine becomes widely available, preventive measures such as social distancing and mask-wearing remain crucial in curbing transmission.

In response to the pandemic, the scientific and technological community mobilized to develop strategies for combating COVID-19. Biomedical big data, advanced informatics, and artificial intelligence (AI) have emerged as key tools in this effort. Translational bioinformatics is investigating the mechanisms of SARS-CoV-2 to develop targeted therapies and vaccines. Sensor informatics utilizes wearable sensors for real-time monitoring of COVID-19 patients, while imaging informatics employs imaging data for accurate diagnosis and disease monitoring. Clinical informatics integrates multimodal data to optimize patient care, while behavioral informatics analyzes human behavior to inform policy decisions. Mental health informatics addresses the psychological impact of the pandemic, and rehabilitation informatics assesses patients' recovery trajectories. Infectious disease modeling predicts virus spread, aiding policymakers in decision-making, while public health informatics manages population health and resource allocation.

To further accelerate COVID-19 research and informatics development, a Special Issue has been initiated. This Issue aims to facilitate data sharing, inspire new informatics methods, and present advanced AI solutions for COVID-19 diagnosis, treatment, and prognosis. It seeks to develop computational models for tracking virus propagation and guiding policy decisions. The Call-for-Papers encouraged researchers to submit high-quality, unpublished work, with a fast-track review process to ensure timely dissemination of findings. To date, the Special Issue has received 109 submissions, with papers covering a range of topics. While some manuscripts have been accepted, others are under review, with submissions continuing to be accepted until December 2020.

The Special Issue is spearheaded by a distinguished group of researchers from leading institutions worldwide, highlighting the collaborative effort to address the multifaceted challenges posed by the COVID-19 pandemic. Their expertise in bioimaging, electrical and computer engineering, informatics, and public health underscores the interdisciplinary nature of the response to this global crisis.

Srinivasa Rao Burri, Abhishek Kumar, Anupam Baliyan, T. Ananth Kumar

2023 2nd International Conference on Smart Technologies and Systems for Next Generation Computing (ICSTSN) (2023).

The integration of synthetic intelligence (AI) with scientific practices has proven big capability in remodeling healthcare delivery. This systematic evaluation pursuits to comprehensively examine and examine the collaborative technique of AI and remedy in improving healthcare effectiveness. Through a radical literature seek throughout diverse databases, this evaluation identifies and synthesizes applicable research that discover the usage of AI strategies which include system learning, herbal language processing, and laptop imaginative and prescient in special scientific domains. The evaluation additionally examines the effect of AI on medical decision-making, affected person outcomes, aid allocation, and healthcare efficiency. Furthermore, it discusses the demanding situations and moral issues related to the implementation of AI in healthcare settings. By presenting insights into the cutting-edge country of AI integration in remedy and figuring out regions for destiny studies and development, this systematic evaluation contributes to the development of evidence-primarily based totally healthcare practices.

Wang, L.; Zhang, T.; Li, S., International Journal of Medical Informatics (2019)

Machine learning (ML) strategies have emerged as pivotal gear in healthcare, imparting exceptional abilities in disorder final results prediction, diagnostic assist, and remedy selection facilitation. By harnessing substantial datasets, ML algorithms own the ability to unveil complex styles and correlations that traditional statistical techniques may overlook. This have a look at delves into the world of ML methodologies for predictive healthcare tasks, aiming to provide a complete draw close in their suitability and efficacy. Through a scientific assessment

and evaluation, the researchers examine a spectrum of ML strategies, spanning selection trees, neural networks, and assist vector machines, throughout numerous healthcare situations together with disorder analysis and prognosis. By scrutinizing the strengths and weaknesses inherent in every approach, the have a look at furnishes priceless insights into set of rules choice and pertinent concerns for real-international deployment. Nonetheless, it's miles important to renowned the hurdles related to information accessibility and interoperability inside healthcare settings, that can probably hinder the effectiveness and scalability of ML-pushed predictive analytics. Through this inquiry, our goal is to make a contribution to the continuing speak regarding the usage of ML for transformative improvements in healthcare prediction.

Machine learning (ML) has surged as a powerful device in predictive analytics inside the healthcare domain, promising upgrades in disorder analysis, prognosis, and remedy selection-making. This have a look at gives an exhaustive assessment and evaluation of ML methodologies hired in predictive healthcare tasks. By scrutinizing a gamut of ML algorithms, along with selection trees, neural networks, and assist vector machines, the authors verify their adaptability and overall performance throughout various healthcare contexts. Key insights shed mild at the deserves and demerits of every approach, underscoring the pivotal position of set of rules choice and information first-rate in attaining particular predictions. While imparting treasured insights into set of rules overall performance and concerns for realistic implementation, the have a look at underscores the vital of addressing demanding situations related to information availability and interoperability inside healthcare settings to completely harness the capability of ML for predictive healthcare analytics.

Zhang, H.; Xu, T.; Wang, H., IEEE Transactions on Medical Imaging (2018).

The creation of deep gaining knowledge of, in particular convolutional neural networks (CNNs), has marked a huge leap forward withinside the realm of scientific photo evaluation. This article explores the panorama of deep gaining knowledge of strategies for scientific photo evaluation, aiming to offer a complete knowledge in their packages and implications in healthcare. With the proliferation of digitized scientific imaging records, there was an growing call for for stylish algorithms able to extracting significant insights from those complicated datasets. Deep gaining knowledge of techniques, in particular CNNs, have emerged as effective gear on this regard, presenting unprecedented talents in responsibilities which include photo segmentation, classification, and ailment detection. By delving into present literature, this newsletter elucidates the blessings of CNNs over conventional processes and their ability to revolutionize scientific exercise. Moreover, it examines key findings and discusses implications for stepped forward analysis and remedy making plans, underscoring the transformative effect of deep gaining knowledge of on healthcare delivery.

Deep gaining knowledge of, in particular convolutional neural networks (CNNs), has verified notable achievement in scientific photo evaluation, presenting unparalleled talents for responsibilities which include segmentation, classification, and ailment detection. This article

offers a complete evaluation of deep gaining knowledge of strategies for scientific photo evaluation, that specialize in their software in diverse healthcare contexts. Through an exploration of CNNs, the authors take a look at the blessings of deep gaining knowledge of in dealing with complicated scientific records and attaining modern-day overall performance in photo evaluation responsibilities. Key findings underscore the ability of deep gaining knowledge of to enhance analysis and remedy making plans via way of means of facilitating greater correct and green evaluation of scientific images. While the object offers treasured insights into the transformative effect of deep gaining knowledge of in healthcare, it additionally highlights the want to deal with demanding situations associated with version interpretability and ability biases in schooling records to make certain the robustness and equity of deep gaining knowledge of-primarily based totally answers in scientific photo evaluation.

In conclusion, the mixing of deep gaining knowledge of techniques, in particular CNNs, holds mammoth promise for advancing scientific photo evaluation and in the end improving affected person care. However, it's far vital to deal with demanding situations which include version interpretability and records biases to make certain the reliability and equity of those answers in scientific exercise. By fostering a deeper knowledge of the possibilities and demanding situations offered via way of means of deep gaining knowledge of in scientific photo evaluation, this newsletter pursuits to manual destiny studies and exercise on this unexpectedly evolving field.

Reverences

Year	Authors	Methodology	Findings	Weaknesses
2021	Secinaro, S., Calandra, D., Secinaro, A. et al.	A structured literature review extracted 288 peer-reviewed papers from Scopus, analyzed using qualitative and quantitative variables, with assistance from Bibliometrix R software package.	The literature in AI healthcare is emerging, focusing on health services management, predictive medicine, patient data, and diagnostics. The US, China, and UK contribute most studies. AI supports diagnosis, disease spread prediction, and treatment customization. Some areas remain underexplored, needing skills and data quality awareness for AI projects.	Overreliance on keyword analysis may overlook nuanced trends.
2020	Tagliaferri, S.D., Angelova, M., Zhao, X. et al.	The study conducted three systematic reviews with two main objectives: firstly, to assess the current landscape of AI/ML research in low-back pain (LBP); and secondly, to compare this status with two established LBP classification systems, namely STarT Back and McKenzie methods. The reviews followed rigorous protocols to identify relevant studies and evaluate their methodologies and findings.	The analysis showed that AI/ML application in low back pain (LBP) is still in its early stages, with most studies focusing on binary classification of LBP versus no-LBP and lacking exploration in predicting prognosis or guiding treatment decisions. In contrast, established classification systems like STarT Back and McKenzie method have well-documented impacts on pain and disability outcomes, providing tailored treatment approaches based on physical and psychosocial factors.	Despite efforts to conduct comprehensive reviews, the study encountered limitations. The relatively small number of relevant articles highlighted the underexplored nature of AI/ML in the context of LBP. Additionally, the absence of AI/ML exploration in predicting prognosis for specific LBP sub-groups or guiding treatment decisions underscores gaps in the current research landscape. Furthermore, the reliance on small sample sizes and simplistic models in existing studies may limit the generalizability and applicability of findings in clinical practice.

2020	Amir Amini., Wei Chen., Giancarlo Fortino., Ye Li.,	The methodology involved a multidisciplinary approach utilizing biomedical big data, informatics, and AI.	The COVID-19 pandemic posed significant challenges, with rapid transmission overwhelming healthcare systems. Various informatics and AI tools were employed for diagnosis, monitoring, and policymaking.	need for faster dissemination of information, disparities in access to technology, and ongoing adaptation to evolving scientific knowledge.
2023	Srinivasa Rao Burri, Abhishek Kumar, Anupam Baliyan, T.Ananth Kumar	Thorough literature search across databases to identify studies on AI integration in medicine. Synthesizes findings for analysis.	AI impacts clinical decision-making, patient outcomes, resource allocation, and healthcare efficiency. Identifies areas for future research.	Possible limitations due to availability and quality of reviewed literature. Ethical challenges in AI implementation not fully addressed.
2019	Wang, L.; Zhang, T.; Li, S.,	a systematic review and analysis of machine learning (ML) methodologies employed in predictive healthcare tasks. Researchers evaluate a spectrum of ML techniques, including decision trees, neural networks, and support vector machines, across diverse healthcare scenarios such as disease diagnosis and prognosis.	the adaptability and performance of various ML algorithms in predictive healthcare tasks. and the importance of algorithm selection and data quality for achieving precise predictions.	the hurdles associated with data accessibility and interoperability within healthcare settings, which could impede the effectiveness and scalability of ML-driven predictive analytics.
2018	Zhang, H.; Xu, T.; Wang, H.,	The article explores the landscape of deep learning methods, particularly CNNs, for medical image analysis by reviewing existing literature and examining their applications and implications in healthcare.	Deep learning techniques, especially CNNs, have demonstrated remarkable success in medical image analysis, offering unparalleled capabilities for tasks such as segmentation, classification, and disease detection.	Challenges such as model interpretability and potential biases in training data need to be addressed to ensure the reliability and fairness of deep learning-based solutions in medical image analysis.