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Artificial Intelligence in Enhancing Physiotherapy Treatment: Brief Review

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ABSTRACT

The rapid advancement of artificial intelligence (AI) has revolutionized various aspects of society, mirroring the transformative impact of the steam engine on human socio-economic systems. AI technologies enable the recognition of intricate patterns within vast datasets, profoundly influencing fields such as social, economic, educational, medical, legal, and moral systems. This paradigm shift may arguably surpass the impact of the mechanical revolution brought about by the steam engine. Looking ahead, healthcare professionals, including physiotherapists are poised to leverage AI within expansive information networks to enhance patient care. This article explores the profound implications of AI on physiotherapy practice, highlighting the imperative for evolving Physiotherapy education to prepare professionals for the complexities of 21st-century healthcare.

Keyword: Artificial Intelligence, Patient Care, Physiotherapy

INTRODUCTION

For millennia, human progress has followed a steady, incremental path, with generations witnessing only modest changes in their daily lives.[1] However, approximately two centuries ago, the Industrial Revolution catalyzed a monumental shift in the socio-economic landscape, marked by exponential population growth and a dramatic spike in productivity. The Industrial Revolution ushered in a wave of technological innovations and manufacturing methods that harnessed significant energy sources, vastly expanding human and animal labor capacities. This era of mechanical power revolutionized how we shape our physical surroundings, enabling mass production of goods and significantly enhancing quality of life across all social strata. As we stand on the cusp of the 21st century, we face a pivotal moment where human knowledge is expanding rapidly, soon to be surpassed by artificial intelligence. This impending shift is poised to reshape our social and economic frameworks

Artificial intelligence (AI)

Artificial intelligence (AI) refers to the capacity of computers to perform tasks that typically require human intelligence, essentially enabling machines to "think." From a technical standpoint, AI involves developing technology capable of executing tasks that typically necessitate human intervention.[2] This interdisciplinary field seeks to comprehend, simulate, and replicate intellectual and cognitive processes using computational, mathematical, logical, mechanical, and biological principles. In recent times, AI has been instrumental in driving technological advancements. Machine learning, a pivotal

component of AI, enables the training of models in a supervised or unsupervised manner, enhancing their ability to learn and evolve. This technology has diverse applications, ranging from software to hardware interfaces, facilitating the development of systems capable of learning from their data collection processes.

The incorporation of artificial intelligence (AI) into Physiotherapy practice

The impact of AI-driven technology on clinical practice and how physical therapy training can transform the 21st century healthcare system into hands-on, professional graduates In supervised learning by machine learning, the computer has access to labelled examples. For example, a physiotherapist uses the patient's knowledge for differential diagnosis. Deep learning is a special type of supervised learning in which a layer of algorithms (neural networks) processes information similar to what the brain does.[3] The success of machine learning depends on the accuracy and amount of training data available in the system. Predictive modeling can be a useful tool for predicting events or outcomes based on available data and providing prompt and preventive treatment for patients with certain diseases.[4] Examples of predictive modeling include, but are not limited to, predicting the onset of diabetes, predicting asthma exacerbations based on telemedicine data, and predicting treatment outcomes for depression. The recovery rate of stroke patients is based on information such as length of hospital stay, duration of stroke, and Barthel index.[5,6] The use of such AI can help assess the recovery of patients with neurogenic stroke and guide the rehabilitation process. Adding chatbots to AI-based applications that guide patients through their recovery process can use cognitive therapy to understand a patient's psychology to help them recover faster and maintain regularity, thereby increasing treatment adherence.[7] They can also follow their routine and talk regularly to collect more data for psychological processing. So, in addition to helping physical therapists diagnose and adhere to treatment, these systems can also help maintain an individual's emotional stability for recovery. Physicians can be supported in clinical decision making by incorporating AI-assisted analytics into large patient datasets. In New Age healthcare teams, clinicians must learn to seamlessly delegate the management of patient care to themselves and other team members (including data scientists and software developers) and intelligent machines.[8] The success of medicine is increasingly dependent on the ability of the team to perceive the collective intelligence of the system or network, and not on the experience of a particular profession or individual. So in this context, doctors need to learn how to work with intelligent machines, because AI will not only improve our physical and cognitive abilities, but it will soon be difficult to do without it.

The Future of Physiotherapy: Integrating AI into Treatment Plans

Artificial intelligence is revolutionizing physiotherapy by enhancing treatment outcomes and improving patient experience with the advancements in technology, AI is being used in various aspects of physiotherapy, ranging from personalized treatment plans to remote monitoring and assessments.[10] AI applications in physiotherapy can assist in tasks such as movement evaluation, rehabilitation program design, and patient monitoring. Through machine learning and data analysis, AI systems can analyze various data inputs, such as patient history, biomechanical evaluation, and sensor data from wearable[11] devices, to provide personalized and optimized treatment plans for each individual. These AI-powered systems can also track and monitor patient progress, adjusting treatment plans in real-time based on the data collected. By incorporating AI into

physiotherapy practices, healthcare professionals can benefit from improved clinical decision-making and more accurate assessments.[10] Furthermore, AI can play a crucial role in decentralizing the rehabilitation model by utilizing intelligent connected tools for remote monitoring and assistance. By leveraging computer vision technologies, AI can be used in tele-physiotherapy to monitor and assess patient movements. This allows for real-time feedback and analysis, ensuring that patients are performing exercises correctly and safely.[9]

CONCLUSION

The integration of AI into physiotherapy not only enhances the accuracy and effectiveness of treatment plans but also improves patient experience and engagement. Additionally, AI-powered systems can facilitate remote monitoring and assessments, allowing for greater accessibility to physiotherapy services. As AI continues to advance, its potential to revolutionize physiotherapy and improve patient outcomes is undeniable. The future of physiotherapy lies in the seamless integration of AI into treatment plans, ultimately leading to enhanced patient care and improved rehabilitation outcomes. With the ongoing developments in AI technology, the possibilities for its application in physiotherapy are endless, promising a new frontier for the intersection of technology and rehabilitation. As we move towards this future, the impact of AI in physiotherapy is poised to transform the field and elevate the standard of care for patients undergoing physiotherapy.

Declaration by Authors

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