

## A LITERATURE REVIEW OF ARTIFICIAL INTELLIGENCE IN PHYSIOTHERAPY PRACTICE

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### Abstract

As Unprecedented development and growth of human socio-economic systems followed the invention of the steam engine, the recent emergence of machines with artificial intelligence has allowed human cognitive abilities to recognize previously hidden patterns in huge datasets. These changes affected every aspect of society, including but not limited to the social, economic, educational, medical, legal, and moral systems, and may have had a greater impact on human progress than the mechanical revolution brought about by the steam engine. In the near future, doctors will work with large information networks, which will lead to the need for the use of artificial intelligence (AI) for the health of patients. This article focuses on explaining the potential impact and scope of AI-based technologies on the practice of physical therapy, as well as the subsequent ways in which physical therapy education must transform into fit professionals in the 21<sup>st</sup> century healthcare system.

*Keyword: Artificial Intelligence, Patients, Physical Therapy*

### Introduction:

For thousands of years, human progress has shown trajectories showing only gradual improvement over time. Little has changed from generation to generation in the material aspects of ordinary people's lives.<sup>1</sup> About 200 years ago, the Industrial Revolution brought about a dramatic leap in the socio-economic development of humanity, with sharp deviations in population growth and a near-vertical productivity curve.

The Industrial Revolution brought many advances in technologies and methods that produce large amounts of energy and increase the number of work humans and animals can do. The introduction of this mechanical power has greatly improved our ability to shape our physical environment and created the conditions for the mass production of material goods, improving the quality of life in all aspects of human life and at all levels of society. At the beginning of the 21<sup>st</sup> century, we are at a turning point where human knowledge is expanding first and artificial intelligence is surpassing it. This will lead to changes in our social and economic relations, just as they were brought about by the industrial revolution with the steam engine.

### Artificial intelligence (AI)

Artificial intelligence (AI) describes the ability of a computer to perform tasks that would normally require human intelligence: machines that can "think". Technically, it is defined as the development of technology used to perform technical tasks that require the intervention of human intelligence. AI is an interdisciplinary field of study that attempts to understand, model, and replicate intellectual and cognitive processes using computational, mathematical, logical, mechanical, and biological principles and tools.<sup>2</sup> In recent years, artificial intelligence has played an important role in technological progress. Machine learning is a key component of artificial intelligence and provides the ability to train models in an unsupervised and controlled manner. They can be used to better train and evaluate our systems. Currently,

artificial intelligence technology can take many forms, including software and hardware interfaces to develop systems that can learn from their own data collection.

### **Artificial intelligence (AI) and physiotherapy clinical practice.**

The impact of AI-driven technology on clinical practice and how physical therapy training can transform the 21<sup>st</sup> 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.<sup>3</sup>

The success of machine learning depends on the accuracy and amount of training data available in the system. Predictive modelling 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.<sup>4</sup>

Examples of predictive modelling 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.<sup>5,6</sup> 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.<sup>7</sup> He 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.<sup>8</sup> 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.

### **Teaching Artificial Intelligence (AI) and Physical Therapy**

Given the role and importance of studying the impact of AI in clinical practice for physical therapy, we as physical therapy educators need to ask ourselves a few questions. "Should students know how to interpret algorithmic solutions and, more importantly, when to ignore them?" "Should we continue to teach students how to interpret x-ray images when the algorithms are better at recognizing them?" Or, "Do students need to learn research skills for search, filter, aggregation, and synthesis algorithms in order to better generalize all their work?" These are just a few examples of such questions.

The current education system is largely based on rote learning, and we need to move to a system that incorporates three basic literacy courses into the basic physical therapy curriculum. (a) Information literacy, (b) Technical competence, and (c) Human literacy.<sup>9</sup> As they work more closely with AI-based systems, the physical therapists of the future will need the technical expertise to understand computer science terminology and machine interaction technology.

As machines become smarter and the pace of change accelerates, the relative value of job qualifications is declining. As a result, the ability to continue to receive training throughout one's working life must become increasingly important. We need to stop thinking of physical therapy as a temporary, once-in-a-lifetime program. We need to rethink physical therapy education as a lifelong learning platform that

provides learners with adaptive modules that they can access when needed.<sup>10</sup> Due to the rapid adoption of AI in healthcare systems, it will soon surpass medical practitioners, so it is not enough to focus solely on educating the healthcare workers of the future. Neglecting professional development can be problematic in an era of significant change requiring the retraining of thousands of physicians. For this reason, it is important to develop an agile mindset to adapt to current practice and the rapidly changing workplace of physical therapy students.

As machines take over the computational tasks and inference previously performed by humans, doctors will need basic human skills that go beyond machine learning algorithms. This will help them develop empathy, teamwork, creativity, design, ethics, and entrepreneurial skills. Incorporating this knowledge into the core curriculum will help future therapists develop the creative thinking and mental flexibility to discover, discover, and generate the original ideas needed to complement the computational and thinking skills of artificial intelligence.<sup>11</sup> Thus, it can help future doctors learn how to use highly efficient algorithms by focusing on the unique strengths of the individual. Without this kind of integration, we may see that there is a generation of healthcare professionals and educators who cannot speak the language of 21<sup>st</sup> century healthcare.

### Conclusion

As an influential figure in the training of future physiotherapists, educators should strive to deliver what intelligent machines cannot. Deep academic experience and practical wisdom, personal learning paths, and emotional connections with students as part of a relational approach to teaching and learning. While AI-based systems can handle day-to-day learning management tasks, teachers can still develop stronger relationships with students that can help them set meaningful goals, address the emotional aspects of learning, and provide better support. Help you do it. Motivate.

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