Artificial Intelligence in Physiotherapy

Artificial Intelligence in Physiotherapy:

Revolutionising Rehab, Biomechanics and Clinical Decisions

By

Radhika Chintamani, G. Varadharajulu and Gidugu Himashree

Cambridge Scholars Publishing

Artificial Intelligence in Physiotherapy:
Revolutionising Rehab, Biomechanics and Clinical Decisions

By Radhika Chintamani, G. Varadharajulu and Gidugu Himashree

This book first published 2026

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-0364-6101-0
ISBN (Ebook): 978-1-0364-6102-7

TABLE OF CONTENTS

PREFACE

The integration of artificial intelligence (AI) into physiotherapy marks a transformative era in rehabilitation and movement science. As technology advances, the traditional boundaries of physiotherapeutic assessment, diagnosis, and intervention are expanding, paving the way for data-driven, personalized, and highly efficient rehabilitation strategies. This book explores the convergence of AI with physiotherapy, shedding light on its applications, challenges, and future potential.

From machine learning models predicting injury risks to neural networks assisting in treatment planning, AI is reshaping how physiotherapists approach clinical decision-making. The book delves into the fundamental principles of AI in physiotherapy, covering machine learning techniques, computer vision applications, wearable sensor integration, and predictive analytics. Special emphasis is placed on biomechanical modeling, kinematic analysis, musculoskeletal simulations, and AI-enhanced injury prevention, offering a comprehensive outlook on AI's role in movement science.

While AI presents unparalleled opportunities, it also brings ethical dilemmas, challenges in data privacy, concerns over clinical validation, and resistance from professionals wary of automation replacing human expertise. This book does not advocate for AI as a replacement for traditional physiotherapy; rather, it emphasizes the importance of a collaborative approach where AI serves as an augmentative tool, enhancing human judgment and manual expertise. By integrating AI insights with hands-on clinical practice, physiotherapists can develop more precise, patient-centered rehabilitation strategies.

The future of AI in physiotherapy is both promising and complex. The rapid evolution of deep learning, robotics, virtual reality, and IoT-based physiotherapy solutions offers an exciting glimpse into a future where rehabilitation is more accessible, efficient, and personalized. However, the road ahead requires thoughtful implementation, standardization, and ethical considerations to ensure AI remains a facilitator rather than a disruptor in physiotherapeutic care.

This book is written for physiotherapists, researchers, AI enthusiasts, and healthcare professionals seeking to understand and navigate the dynamic intersection of AI and physiotherapy. It aims to bridge the gap

between traditional rehabilitation methodologies and cutting-edge AI innovations, offering a balanced perspective on the opportunities and limitations of AI-driven physiotherapy. As we embark on this journey into the future of rehabilitation, may this book serve as both a guide and an inspiration for embracing AI's potential while preserving the core values of physiotherapeutic care—human touch, clinical expertise, and personalized treatment.

ADDITIONAL RESOURCES

Artificial Intelligence: A Modern Approach

- **Authors:** Stuart Russell, Peter Norvig
- **Edition:** 4th Edition (2020)
- **Publisher:** Pearson
- **Affiliation:** Stuart Russell (University of California, Berkeley), Peter Norvig (Google Research)
- **Description:** One of the most comprehensive books on AI, covering fundamental concepts, machine learning, robotics, and ethical considerations. It is widely used as a university textbook for AI courses.

Deep Learning

- **Authors:** Ian Goodfellow, Yoshua Bengio, Aaron Courville
- **Edition:** 1st Edition (2016)
- **Publisher:** MIT Press
- **Affiliation:** Ian Goodfellow (Apple), Yoshua Bengio (Université de Montréal), Aaron Courville (Université de Montréal)
- **Description:** A foundational book in deep learning, covering neural networks, optimization techniques, convolutional networks, recurrent networks, and unsupervised learning. Frequently used in AI and machine learning programs.

Pattern Recognition and Machine Learning

- **Author:** Christopher M. Bishop
- **Edition:** 1st Edition (2006)
- **Publisher:** Springer
- **Affiliation:** Christopher Bishop (Microsoft Research, University of Edinburgh)
- **Description:** A rigorous introduction to pattern recognition, statistical modeling, Bayesian methods, and graphical models. It is widely used in advanced AI and machine learning courses.

Machine Learning: A Probabilistic Perspective

- **Author:** Kevin P. Murphy
- **Edition:** 1st Edition (2012)
- **Publisher:** MIT Press
- **Affiliation:** Kevin P. Murphy (Google Research)
- **Description:** A detailed book on probabilistic approaches to machine learning, covering Bayesian networks, Gaussian processes, and deep learning. It is commonly referenced in graduate-level AI and data science courses.

FOREWORD

The advent of artificial intelligence (AI) in physiotherapy marks a pivotal shift in how rehabilitation, movement science, and patient care are approached. This book explores the profound impact of AI-driven innovations on traditional physiotherapy methodologies, bridging the gap between technology and human expertise. As AI continues to evolve, its ability to analyze vast datasets, predict patient outcomes, and personalize rehabilitation programs is revolutionizing clinical decision-making and therapeutic interventions.

Physiotherapy has long been grounded in evidence-based practice, manual therapy, and patient-centered approaches. The integration of AI does not replace these foundational principles but rather enhances them. By leveraging machine learning, computer vision, neural networks, and predictive analytics, AI introduces precision and efficiency that were previously unattainable. The ability to assess biomechanics through AI-powered motion capture, diagnose movement disorders with deep learning algorithms, and provide real-time feedback through wearable sensors signifies a new era in rehabilitation.

The exploration of AI's role in physiotherapy, as presented in this book, delves into key areas such as musculoskeletal modeling, injury prevention, quantitative assessment, and predictive analytics. The seamless collaboration between AI and physiotherapists holds immense potential for improving patient outcomes, optimizing recovery protocols, and ensuring personalized, data-driven rehabilitation strategies. However, as with any technological advancement, ethical considerations, data security, and the importance of human oversight remain critical. The discussion on AI aversions, clinician skepticism, and the need for hybrid AI-human intervention models reinforces that technology should serve as an augmentative tool rather than an autonomous replacement.

Looking ahead, the future of AI in physiotherapy is promising. The synergy between AI and traditional physiotherapy concepts is not just about innovation—it is about evolution. It is about equipping healthcare professionals with advanced tools while preserving the art of human touch, intuition, and experience that define physiotherapy. As AI continues to refine its applications, this book stands as a guiding resource for clinicians, researchers, and technologists who seek to harness its potential while upholding the core values of rehabilitation and patient care.

This book is not just an exploration of AI in physiotherapy; it is an invitation to envision a future where technology and human expertise converge for superior healthcare solutions. It is with great enthusiasm that I commend this work to all those who seek to understand, implement, and advance AI in the field of physiotherapy.

Dr. Suresh Bhosale
Chancellor
Krishna Vishwa Vidyapeeth, Karad, Maharashtra

ACKNOWLEGMENTS

First and foremost, I would like to thank the Almighty for all the things bestowed upon us and for the blessings on me for the completion of the book.

With due respect, I would like to extend my gratitude to the Honorable Appasaheb, Late Shri Jaywantrao-ji Bhosale, Founder of KVV; Honorable Dr. Suresh Bhosale, Chairman and Chancellor of Krishna Charitable Trust Krishna Vishwa Vidyapeeth; Dr. Pravin H. Shingare, Advisor to Academic and Accreditation of KVV; Dr. Vedaprakash Mishra, Chief Advisor to Chancellor & KVV, and Dr. Neelam Mishra, Honorable Vice Chancellor of KVV. I am genuinely thankful for the opportunity to complete my book in such an esteemed organization, along with the best amenities and facilities provided.

I would like to express my most humble and profound gratitude to my respected Dean, Dr. G. Varadharajulu, Dean of the Faculty of Physiotherapy, KVV, for his inspiration, motivation, valuable guidance, and suggestions throughout this project and also is a part of the book.

I would like to also express my most modest and sincere gratitude to respected Dr.(Brig) G. Himashree, MD, MBA, Director of Research, KVV, for her valuable feedback throughout the journey of the book and suggestions throughout and who is also esteemed part of the book.

Additionally, I want to thank my teachers, Dr. Sanjeev Kumar Dr. Santosh Metgud, and Dr. Anand Heggannavar, who have made me capable of writing this book, serving as guides, mentors, and friends.

I also express my gratitude to my colleagues in Krishna College of Physiotherapy and Researcher Department Krishan Vishwa Vidyapeeth; Dr. Aggarwal, Director of Innovation, Incubation and Entrepreneurship (IEE),Dr. Jayanth Pawar, Assistant Director Innovation, Incubation and Entrepreneurship (IEE), and Dr. Rohan Pathak, Assistant professor Pharmacognosy- Krishna Institute of Pharmacy as well as the IT Team: Mr. Ajinkya Bhosale, who made extensive contributions to the development of this book. Thank you all for your support and experience throughout the publication process, and a special thanks for the photography used throughout.

With profound gratitude, I extend my deepest appreciation to my mother, whose unwavering support and guidance have been the cornerstone of my journey. I also express heartfelt thanks to my sister and my husband, whose encouragement and belief in my aspirations have been instrumental in shaping my career and enabling me to reach new heights.

Warm regards,
Radhika Chintamani
Associate Professor
Krishna College of Physiotherapy
Krishna Vishwa Vidyapeeth

SECTION I

INTRODUCTION

CHAPTER 1

AI IN PHYSIOTHERAPY – TRANSFORMING REHABILITATION AND MOVEMENT SCIENCE

Introductory note: In today's time, artificial intelligence (AI) is slowly becoming a part of our daily lives—even in healthcare and physiotherapy. This chapter explores how AI is helping physiotherapists in understanding a person's movement, planning better treatment, and tracking recovery more accurately. Earlier, physios had to depend only on their observation and experience, but now smart tools, apps, and machines are there to support them. Whether it's recovering after an injury or managing long-term conditions, AI can suggest personalised exercises, analyse posture, or even warn about possible problems early. It doesn't replace the physio but makes their work faster, smarter, and more effective. So in simple terms, AI is becoming a helpful partner in modern rehabilitation and movement science.

1.1 Artificial Intelligence (AI) and Its Role in Physiotherapy

Artificial Intelligence (AI) is transforming healthcare, including the field of physiotherapy. This is done bystrengtheningdiagnosis, assessment, and plan of treatment. Itaims to create asystemwhich can execute tasks that requirehuman intelligence, such as learning from data, recognizing patterns, making decisions, and solving complex problems.

Physiotherapy traditionally focused on manual assessments and human-guided rehabilitation. Nowadays it, is integrating AI-powered technologies to improve precision, efficiency, and personalization in patient care. These advancements enable physiotherapists to provide data-driven insights, predictive modeling, and real-time feedback, leading to better patient outcomes and faster recovery times.

AI is altering physiotherapy by intensifying the precision and efficiency of patient assessments, diagnostics, and customization of treatment. Conventional physiotherapy relies heavily on manual approach to evaluate and diagnose a patient's physical capabilities. AI-based technologies mechanize these assessments, facilitating faster and more precise diagnoses

of musculoskeletal conditions. With various fields of AI like computer vision and machine learning algorithms; it can evaluate movement patterns, identifyanomaly, and advocatecustomized rehabilitation programs. This benefit of AI can significantly improve patient outcomes. AI integration into Physiotherapy clinics and medical Out Patient Department's is providing real-time patient monitoring, automated diagnostics, and enhanced patient engagement. AI-powered diagnostic tools, check the movement pattern compare it with normal movement pattern of the human. After which it labels the abnormal movement pattern and identifies early signs of joint or muscle deterioration from X-rays, MRI scans and motion analysis data, allowing for timely interventions.furthermore, AI-assisted imaging technologies advance the precision of medical scans, providing physiotherapists with detailed insights into conditions like arthritis, ligament injuries, and fractures. These advancements not only optimize treatment efficiency but also empower physiotherapists with data-driven decision-making, eventuallyuplifting the standard of care in the field[3].

1.2 Revolutionizing Patient Care

Artificial Intelligence is renovatingPhysiotherapy in several core fieldsas mentioned below:

1.2.1 AI in Patient Assessment and Diagnosis

1.2.1a Computer vision-based motion analysis:

AI-driven systems can investigatemovement patterns, posture, gait and several other biomechanical parts of Activities of Daily Living like sit-to-stand, running, (also used in sports like swimming evaluation, throwing evaluation) to detect abnormalities and assess biomechanical efficiency. Computer vision plays a fundamental role in markerless motion capture systems by enabling the precise tracking of human movement without the need for physical markers. Utilizing advanced algorithms and synchronized cameras, computer vision enhances the accuracy of motion analysis while allowing for unrestricted, natural movement. These systems adapt to various environments by strategically positioning cameras to achieve comprehensive coverage and minimize occlusions, ensuring accurate tracking of joint positions and motion patterns. The non-invasive nature of computer vision-driven markerless systems makes them highly valuable in sports science, clinical rehabilitation, and ergonomic

assessments, as they capture real-world movement dynamics with minimal interference, leading to more realistic and practical evaluations[4].

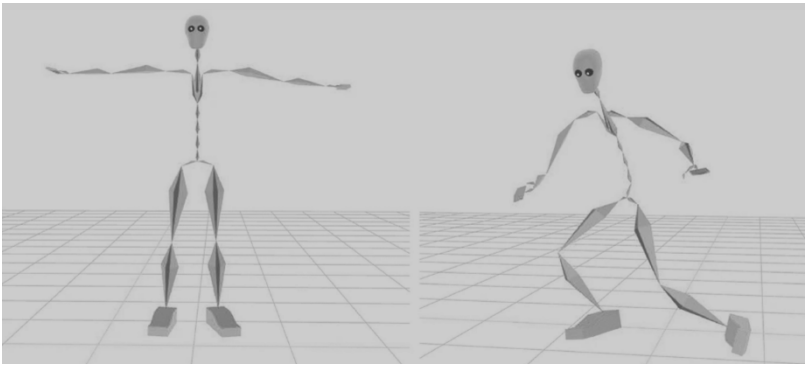

Fig. 1-1 Skeleton Model,
Source: https://sportsmedicine-open.springeropen.com/articles/10.1186/s40798-018-0139-y

The above image (**Fig. 1-1**) is an example of a skeleton model consisting of "bones" of predetermined lengths connected at joints, allowing movement through accessory glides at these joints. This model is frequently used to represent human motion and can be adapted to various data sources. The model can be used to examine joint motion during marker-based motion capture and markerless systems powered by computer vision. By utilizing the skeleton model with captured movement data, it enables accurate motion analysis and reconstruction[5].

1.2.1b AI in medical imaging:

Deep learning algorithms are used to analyze MRI, ultrasound, and X-rays**,** allowing early detection of musculoskeletal disorders and soft tissue injuries**.** The following image illustrates the use of AI in medical imaging. AI plays a very important role in medical imaging by enhancing the accuracy and efficiency of diagnosing a disease, classifying it, and its investigations. Deep learning models, predominantly convolutional neural networks (CNNs), easeup the identification of abnormalities in medical scans. This results in distinguishing between healthy and unhealthy patients. It is also known to categorize the condition based on chronicity. But, the image cannot be directly used for any purposes mentioned above. The images have to be mandatorily further refinied for the clarity purpose

by Image segmentation process again powered by Artificial Intelligence (as shown in **Fig. 1-2**). This process of image segmentation precisely identifies the affected regions. Given the complexity of medical imaging multiple AI models often work in collaboration within a structured pipeline to ensure comprehensive analysis. This type of collaborative work ultimately improves diagnostic precision and accelerates clinical decision-making[6].

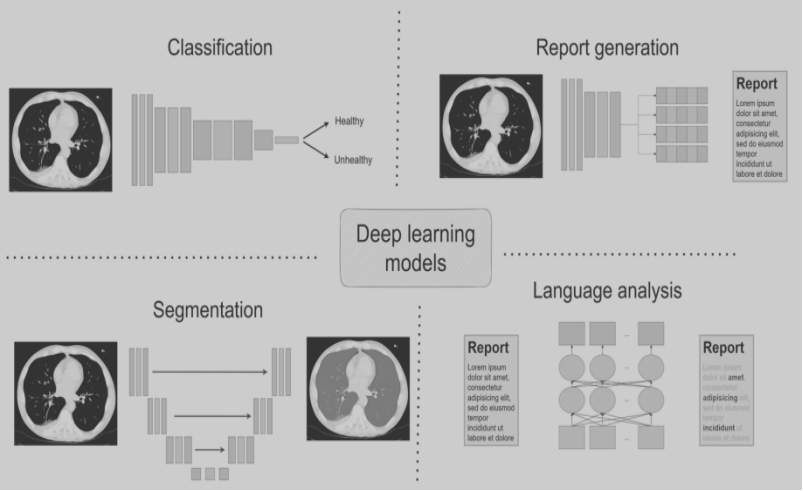

Fig. 1-2 The image illustrates the use of artificial intelligence in medical imaging. *Source: https://www.mdpi.com/2075-4418/15/3/282*

1.2.1c Wearable sensors with AI integration:

Devices such as inertial measurement units (IMUs), force sensors, and electromyography (EMG) sensors collect real-time movement data and help physiotherapists assess patient conditions accurately. The image below (**Fig. 1-3**) represents the employment of AI integrated wearable sensors to assess the movements performed by individuals. The KAM system mentioned-below has got in-built, light-weight, non-intrusive sensors and is designed to constantly monitor angles of knee joint over extended periods. To accomplish this function, the device is incorporated with two miniature IMUs one-above and one-below the knee for precise motion tracking. Additionally, an on-board EMG amplifier tracks muscle activity of ankle and knee joints. The hardware of the device is a modular PCB design, permitting it to be distinguished into distinct components: a

microcontroller with connectors, an EMG amplifier, and two IMU boards. This compartmentalization enables flexible integration into garments for optimal usability. The device also has unique feature of customization, such as omitting the EMG component when not required for a specific study or patient[7]. The below image (**Fig. 1-3**) illsutartes wearbale sensor integration with AI.

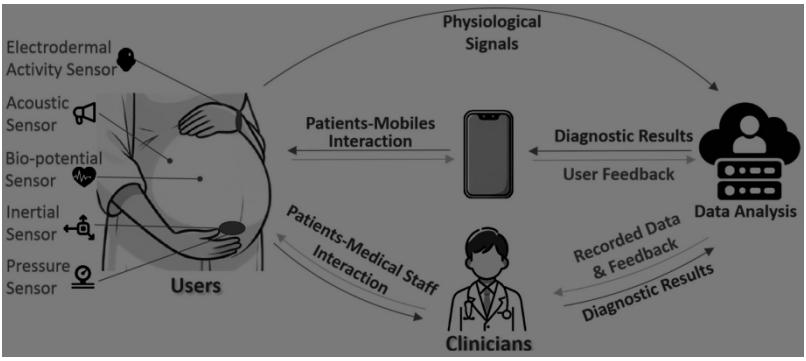

Fig. 1-3 The image illustrates Artificial Intelligence integrated wearbale sensors. *Soucre: https://www.mdpi.com/1424-8220/24/19/6426*

1.2.2 AI in Personalized Treatment and Rehabilitation

1.2.2a AI-driven rehabilitation programs:

Machine learning algorithms modify exercise programs based on patient improvement and recovery. AI-Powered Exercise and Goal-Setting System is illustrated in the image underneath; the exercise goal-setting system function within an interactive situation. The system incoporates AI and Internet-Of-Things for the purpose of real-time monitoring. Intially the evaluation takes place by AI agent where the agent evaluates the user's exercise patterns and accordingly selects a short-term fitness goal from a set of predetermined plans customized to their needs. Better the user performance is, the agent selects the appropriate fitness goal by continuous optimization of the exercise routine.

By analyzing historical data, AI generates realistic simulations to customize workout recommendations for improved effectiveness. Users follow the exercise prescribed to them via fitness app which is further monitored by AI agent. If any deviations are noted from the prescribed plan, the AI system dynamically fine-tunes the goal-setting approach, thus

enhancing population adherence and ensure optimal outcomes[8]. The below image (**Fig. 1-4**) demonstrates some of the rehabilitation program driven by AI.

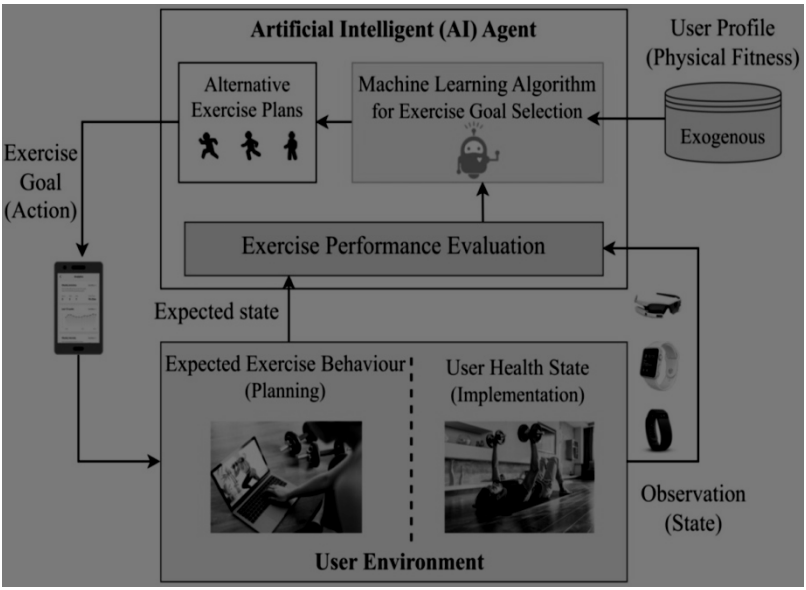

Fig. 1-4 The image illutsrtaes list of Artificial intelligence driven rehabilitation programs.
Source: https://journals.sagepub.com/doi/10.1177/20552076241233247?int.sj-full-text.similar-articles.2

- Smart exoskeletons and robotic-assisted therapy: AI-powered exoskeletons provide adaptive support to patients recovering from strokes, spinal cord injuries, or neuromuscular disorders.
- Virtual Reality (VR) and AI: Immersive AI-enhanced VR rehabilitation tailors exercises to individual patient needs, improving engagement and adherence.

1.2.3 AI in Predicting Recovery and Preventing Injuries

- Predictive analytics for injury prevention: AI can identify movement inefficiencies, muscle imbalances, and risk factors for potential injuries.

- Data-driven rehabilitation insights: AI assesses treatment effectiveness and suggests modifications for optimized recovery paths.

1.3 Highlight of Artificial Intelligence technologies used in physiotherapy

SeveralAI-based technologies are transforming physiotherapy:

1.3.1 Machine Learning (ML)

- ML algorithms can analyze large datasets of patient movements and rehabilitation progress to identify trends and improve treatment strategies.
- AI-powered motion tracking can predict gait abnormalities and recommend personalized exercises.
- The below image (**Fig. 1-5**) demonstrates the Machine Learning concept in identifying the required exercise for the individual[9].

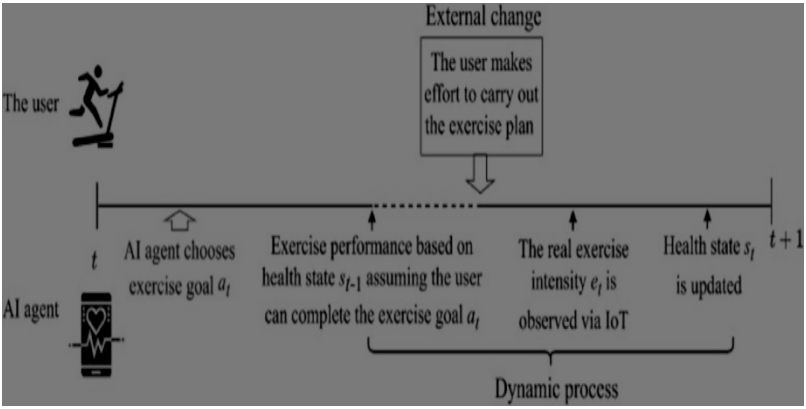

Fig. 1-5 Identification of a perfect exercise for an individual using machine learning.
Source:
https://pmc.ncbi.nlm.nih.gov/articles/PMC10880527/?utm_source=chatgpt.com

1.3.2 Deep Learning (DL)

- Deep learning, a subset of ML, is particularly useful for medical imaging analysis (e.g., detecting joint abnormalities in MRI scans).
- Neural networks can automatically classify movement disorders, aiding in faster and more accurate diagnoses.
- Convolutional Neural Networks (CNNs), a commonly used deep learning algorithm that is highly effective in classification and segmentation of the image by automatically extracting class-conscious features from visual data.
- A sample CNN architecture for MRI-based image segmentation give below illustrates (**Fig. 1-6**) its key components: the input layer (medical image), convolutional layers that detect patterns like edges and textures, pooling layers that downsample data while preserving essential features, and fully connected layers that integrate learned information for classification or segmentation. The final output layer the model precisely identifies abnormalities in medical scans. CNNs excel in maintaining spatial relationships, customizing to variations, and computerizing feature extraction. Because of their robustness and efficiency, these systems become vital in medical imaging and object detection[10].

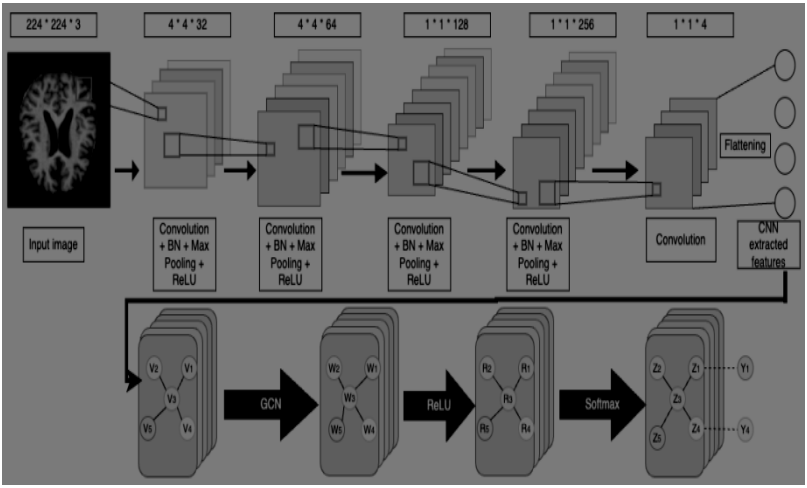

Fig. 1-6 Architecture of Convolutional neural network.
Source: https://www.mdpi.com/2673-2688/5/1/17

1.3.3Computer Vision (CV)

- AI-based pose estimation tools (e.g., OpenPose, Mediapipe) allow precise biomechanical movement analysis without the need for expensive motion capture systems.
- Applications include gait assessment, posture correction, and real-time movement feedback**.**
- OpenPose is one of the frameworks used for real-time multi-person that detects and tracks human body keypoints from images or videos. It operates on deep learning models, particularly Convolutional Neural Networks (CNNs), to recognize skeletal structures by distinguishing key joints such as the head, shoulders, elbows, knees, and ankles. OpenPose utilizes a Part Affinity Fields (PAFs) algorithm, which proficiently maps and associates body parts to differentiate multiple individuals in crowded panoramas. This system is widely used in applications like sports analysis, human-computer interaction, and rehabilitation monitoring to provide an accurate and non-invasive way to analyze human movement dynamics. The below image (**Fig. 1-7**) illustrates the Multibody OpenPose system[11].

Fig. 1-7 OpenPose illustration.
Source: https://www.researchgate.net/figure/Multi-person-Pose-Estimation-with-OpenPose_fig4_331336593

1.3.4 Predictive Analytics

- AI systems can predict rehabilitation outcomes based on patient history, movement patterns, and compliance with therapy.
- Physiotherapists can use these insights to adjust treatment plans proactively, ensuring better long-term results**.**
- The following image (**Fig. 1-8**) represents Predictive analytics for human gait with pose estimation system for analysis systems.
- In the conventional settings of Physical therapy, a physiotherapist first documents anthropometric measurements and places reflective markers on a patient's body. Afterwhich, the individual is made to perform a given task in the room where multiple specialized cameras can track these markers. The markers are used to reconstruct their positions into a 3D time series. These signals are subsequently converted into joint angles over time and processed using clinic- or lab-specific algorithms and tools. In contrast, the AI-driven system condenses data collection using a single standard camera. The OpenPose algorithm extracts keypoint trajectories from sagittal-plane video frames, automatically overlaying detected keypoints to visualize the patient's posture. These extracted signals are then analyzed by a neural network to derive clinically relevant metrics. This approach eliminates the need for manual data processing and specialized equipment, enabling convenient and at-home monitoring[12].

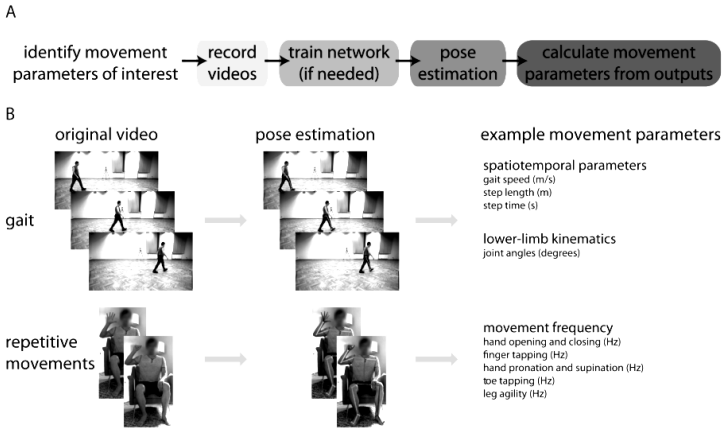

Fig. 1-8 Predictive analytics for human gait.
Source: https://www.mdpi.com/1424-8220/21/21/7315

1.3.5 Biomechanical Modeling

- AI-driven biomechanical models simulate human movement by analyzing joint mechanics, muscle forces, and kinematics, enhancing understanding of movement disorders.
- Physiotherapists can use these models to design personalized rehabilitation programs.
- The following image (**Fig. 1-9**) illustrates Biomechanical models and simulations combining human movement data such as joint kinematics, joint moments, and ground reaction forces to estimate muscle forces, activations, and joint reaction forces. However, data collection methods and measurement precision vary across research labs. Some datasets include additional parameters like muscle strength or clinical notes, while others may lack specific measurements. Biomechanical analysis is enhanced and much more accurately done using improved predictive neural controllers, optimization techniques, and statistical learning which will enhance the ability to extract significant insights from large-scale movement data. [13].

1.4 Challenges and Ethical Considerations in AI-Driven Physiotherapy

Several challenges and ethical considerations must be address as AI is continusly transfiguring Physiotherapy. The address is meant to ensure safe, effective, and unbiased implementation of it. One of the primary apprehension is data privacy and security. AI-driven methods rely on enormous patient data, inclusive of medical histories and movement analysis. Ensuring strict confidentiality and compliance with nation- and world-wide set regulations is crucial to protect rights of patient. Controlled data acess, Strong encryption methods, secure data storage must be implemented to prevent illegal breaches and abuse of sensitive information.

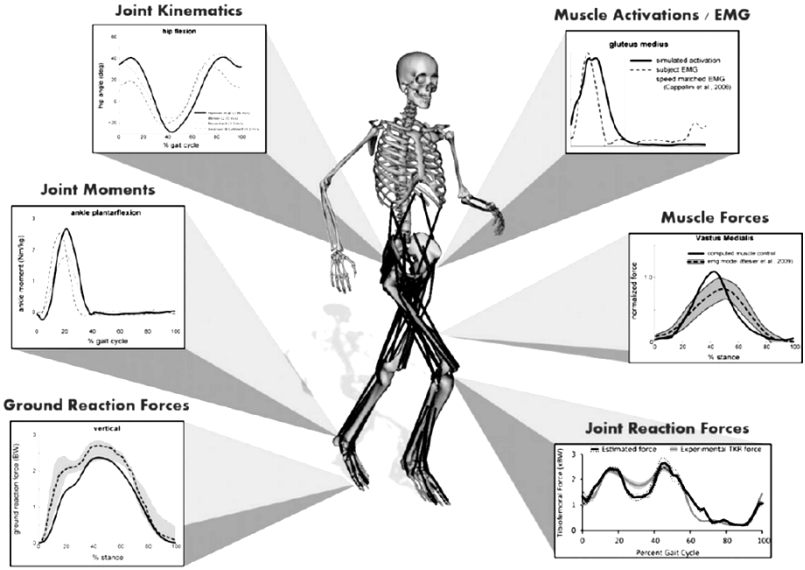

Fig. 1-9 Biomechanical models and its simulations combining human movement data.
Source: https://www.researchgate.net/profile/Scott-Delp/publication/281083670/figure/fig2/AS:284625470541824@1444871408139/Adapting-Biomechanical-Models-and-Simulations-to-Big-Data-Biomechanical-models-and.png

Another major confront is bias and consistency in AI models. AI algorithms are qualified on large datasets, and if these datasets are not varied or representative, they can lead to biased predictions that unreasonably affect assured demographics. In physiotherapy, biased AI models could result in incorrect diagnosis, improper treatment suggestions, or discrepancy in care for different patient groups. To avoid this, AI models must be trained on diverse datasets, regularly validated, and continuously updated to improve fairness and accuracy. Additionally, transparency in AI decision-making processes is essential to build trust among healthcare professionals and patients.

Furthermore, human-AI alliance remains a critical aspect of integrating AI into physiotherapy. AI should be viewed as an assistant that enhances a physiotherapist's capabilities rather than a replacement for human expertise. While AI can computerize data analysis, generate treatment insights, and improve efficiency, the human touch in patient care remains exceptional. Physiotherapists provide personalized treatment plans,

emotional support, and holistic decision-making that AI cannot fully replicate. Striking a balance between AI automation and human expertise ensures optimal patient care. AI thus acts as a supportive tool to enhance, rather than replace, clinical judgment.

1.5 References

1. Aggarwal, R., and S.S. Ganvir. 2021. "Artificial Intelligence in Physiotherapy." *Physiotherapy–The Journal of Indian Association of Physiotherapists*, No. 2: 55–57.
2. Ramanandi, V.H. 2021. "Role and Scope of Artificial Intelligence in Physiotherapy: A Scientific Review of Literature." *International Journal of Advanced Scientific Research*, No. 1: 11–14.
3. Teerthanker Mahaveer University. n.d. "Artificial Intelligence (AI) Applications in Physiotherapy." *TMU Blog*. https://www.tmu.ac.in/blog/artificial-intelligence-ai-applications-in-physiotherapy.
4. Han, X., D. Guffanti, and A. Brunete. 2025. "A Comprehensive Review of Vision-Based Sensor Systems for Human Gait Analysis." *Sensors*, No. 2: 498. https://doi.org/10.3390/s25020498.
5. Colyer, S.L., M. Evans, D.P. Cosker, et al. 2018. "A Review of the Evolution of Vision-Based Motion Analysis and the Integration of Advanced Computer Vision Methods Towards Developing a Markerless System." *Sports Medicine – Open*, No. 4: 24. https://doi.org/10.1186/s40798-018-0139-y.
6. Obuchowicz, R., J. Lasek, M. Wodziński, A. Piórkowski, M. Strzelecki, and K. Nurzynska. 2025. "Artificial Intelligence-Empowered Radiology—Current Status and Critical Review." *Diagnostics*, No. 3: 282. https://doi.org/10.3390/diagnostics15030282.
7. Malesevic, N., I. Svensson, G. Hägglund, and C. Antfolk. 2023. "An Integrated Approach for Real-Time Monitoring of Knee Dynamics with IMUs and Multichannel EMG." *Sensors*, No. 21: 8955. https://doi.org/10.3390/s23218955.
8. Fang, J., V.C. Lee, H. Ji, and H. Wang. 2024. "Enhancing Digital Health Services: A Machine Learning Approach to Personalized Exercise Goal Setting." *Digital Health*, No. 10. https://doi.org/10.1177/20552076241251338.
9. Fang, J., V.C. Lee, H. Ji, and H. Wang. 2024. "Enhancing Digital Health Services: A Machine Learning Approach to Personalized Exercise Goal Setting." *Digital Health*, No. 10. https://doi.org/10.1177/20552076241251338.