

Review Form2

Book Name:	Disease and Health Research: New Insights
Manuscript Number:	Ms_BPR_2486
Title of the Manuscript:	Harnessing the Power of Artificial Intelligence in Neuromuscular Disease Rehabilitation: A Comprehensive Review and Algorithmic Approach
Type of the Article	Book chapter

PART 1: Review Comments

Compulsory REVISION comments	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimumof 3-4 sentences may be required for this part.		
Is the title of the article suitable? (If not please suggest an alternative title)		
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.		
Are subsections and structure of the manuscript appropriate?		
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimumof 3-4 sentences may be required for this part.		
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. =		

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Minor REVISION comments Is the language/English quality of the article suitable for scholarly communications?		
Optional/General comments	My review for the chapter titled " Harnessing the Power of Artificial Intelligence in Neuromuscular Disease Rehabilitation: A Comprehensive Review and Algorithmic Approach" A- The introduction • Clarity and Focus: Simplify complex sentences to improve readability. For example, rephrase "Amidst these challenges, the convergence of artificial intelligence (AI) and rehabilitation emerges as a promising frontier" to "The convergence of artificial intelligence (AI) and rehabilitation offers a promising frontier amidst these challenges." • Context and Background: Introduce a brief comparison between traditional and AI-driven rehabilitation methods to highlight the innovation more clearly. • Significance of the Study: Explicitly state how this research fills a gap in existing literature or addresses a specific need, emphasizing its importance. • Structure and Flow: Enhance the flow by making some sentences more concise, like changing "This research embarks on a comprehensive journey to explore..." to "This research comprehensively explores..." • Technical Accuracy: Define or briefly explain technical terms to ensure they are accessible to the intended audience. • Engagement: Increase reader engagement by adding a brief anecdote or case study that illustrates the practical impact of AI on a patient with a neuromuscular disorder. • Conclusion of the Introduction: Strengthen the closing sentence by explicitly stating what the reader will gain from the paper, such as, "This exploration paves the way for..." B- Literature Review • Clarity and Structure: The review is well-organized, but to enhance readability, consider breaking down the content into smaller sections or bullet points, particularly when discussing multiple devices or technologies. • Contextual Background: The review effectively situates the evolution of rehabilitation robotics within a historical context. Adding a brief mention of challenges faced during the transition from industrial to healthcare applications would provide additional depth. • Technical Depth: The review thoroughly examines specific devices and machine learning integrations. However, adding brief explanations for advanced terms like "ensemble machine learning algorithms" or "root mean squared error (RMSE)" would make the content more accessible to a broader audience. • Relevance and Impact: The review successfully demonstrates the impact of these technologies on improving the quality of life for individuals with neuromuscular disorders. Including specific case	

	studies or statistical data would further strengthen this argument by providing concrete evidence. • Critical Analysis: While the review evaluates the functionality and impact of various devices, adding a discussion on limitations, challenges, or potential barriers—such as ethical concerns, cost issues, or adoption hurdles—would provide more critical depth. • Language and Tone: The language is formal and analytical, fitting for an academic literature review. To improve specificity, replace abstract phrases like "propels the entire field toward more adaptive, responsive, and effective treatment methodologies" with concrete examples or outcomes. • Conclusion of the Literature Review: The review concludes by emphasizing the potential of these technologies to revolutionize rehabilitation practices. Ending with a forward-looking statement about future research directions or the integration of these technologies into mainstream healthcare would enhance the conclusion's impact. C- Check point on Robotics and Assistive Technology for Neuromuscular Diseases This section effectively introduces the role of robotics and assistive technology in treating neuromuscular diseases, but it would benefit from a more structured and detailed approach. The introduction could be enhanced by clearly defining the scope, including brief descriptions of the specific diseases covered, such as muscular dystrophy, spinal muscular atrophy, arthrogryposis multiplex congenita, and cerebral palsy. Additionally, the overview of assistive technologies could be expanded to include specific examples and types of devices used, such as exoskeletons and robotic arms. The language is generally clear but would benefit from simplification in some areas, with a few minor grammatical errors needing correction. The discussion of challenges in implementing robotics in healthcare is comprehensive, addressing financial, technological, and cultural barriers. However, it could be strengthened by exploring potential solutions or ongoing research to overcome these challenges. Additionally, the impact of these technologies on patients' quality of life could be emphasized more, potentially through the inclusion of case studies, testimonials, or statistical data. Incorporating these suggestions would make the chapter more informative, readable, and impactful. Check Points: Define Scope: • Clearly outline the scope of the chapter. • Include brief descriptions of neuromuscular diseases like MD, SMA, AMC, and CP. Expand Technology Overview: • Provide specific examples of assistive technologies (e.g., exoskeletons, robotic arms). Language and Grammar: • Simplify complex sentences. • Correct any minor grammatical errors. Challenges in Robotics Implementation: • Discuss potential solutions or ongoing research to overcome financial,	
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	technological, and cultural barriers. Patient Impact: • Emphasize the impact of robotics on patients' quality of life. • Consider including case studies, testimonials, or statistical data. D- Review Checklist about Ensemble Machine Learning Clarity: The section is technically detailed and rich with information, which is beneficial for an expert audience. However, for readers who are not deeply familiar with machine learning and rehabilitation outcomes, the text may be challenging to follow. Some technical terms such as "xGBT," "LightGBM," "CatBoost," "Gradient Boosting," and "ridge regression" are mentioned without explanation. Including brief definitions or explanations would help make the content more accessible to a broader audience. The explanation of the equation for RMSE is clear but could benefit from a more intuitive explanation of what RMSE represents in the context of rehabilitation outcomes. Technical Accuracy: The description of the machine learning models, including the tree-based ensemble models and the custom stacked ensemble algorithm, appears accurate and well-articulated. The mathematical formulation provided is correct and demonstrates a strong understanding of the subject matter. The distinction between the models used for NP (neurological) and OP (orthopaedic) patients is well made, highlighting the tailored approach to different patient groups, which is essential in precision medicine. The mention of the loss function in the custom stacked ensemble algorithm, including the regularization parameter, is accurate and highlights the efforts to prevent overfitting. Structure: The structure of the section is logical and flows well. The text begins with an overview of the study, followed by detailed descriptions of the machine learning models used, and concludes with a discussion of the custom stacked ensemble algorithm. The use of figures to illustrate the differences between models for OP and NP patients is a good idea, as it provides a visual aid to support the explanations. However, since figures are mentioned (Figures 1(a) and 1(b)), ensure they are clear and well-labeled in the final manuscript. Additional Suggestions: - o Consider starting the section with a brief overview of why machine learning is particularly useful in predicting rehabilitation outcomes. This would set the stage for the detailed technical explanations that follow. - o It might also consider briefly discussing the potential impact of these predictive models on clinical practice. How might they change the way rehabilitation is approached for NP and OP patients? - o Ensure that any figures mentioned in the text are referenced appropriately and included in the document for easy cross-referencing by the reader.	
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	E- Check list for robots for upper limp Clarity and Explanation: - Simplify Technical Language: The text is dense with technical terms like "radial basis function neural networks (RBFNN)," "support vector machines (SVMs)," and "model predictive control (MPC)." Providing brief explanations or examples for these terms would make the content more accessible to readers who may not have a deep technical background. - Contextual Introductions: Before diving into specific technical details, introduce why these methods (like RBFNN, SVMs, and MPC) are relevant or important for upper limb rehabilitation. This helps the reader understand the purpose behind the techniques discussed. Structure and Flow: - Logical Flow: The text could benefit from a clearer structure that gradually introduces the concepts. For example, start with a general overview of the role of robots in rehabilitation, then move into specific examples of robots, followed by the integration of machine learning and AI, and finally, discuss advanced control methods and patient evaluation. - Segmentation: Break down the content into subsections with clear headings. For example: - Overview of Upper Limb Rehabilitation Robots - Machine Learning and AI in Rehabilitation Robotics - Control Methods and Challenges - Quantitative Evaluation of Patient Progress Technical Depth and Balance: - Balanced Technical Detail: Ensure that each machine learning technique or control method is explained with a balanced level of detail. For instance, some readers might need more background on how "neural-fuzzy adaptive controllers" or "CNNs" work in the context of rehabilitation. - Illustrative Examples: Where possible, include practical examples or case studies that show how these methods are applied in real rehabilitation scenarios. This could help in making the technical concepts more relatable. Additional Content Suggestions: - Highlight Benefits: Emphasize the advantages of integrating AI and ML in robotic rehabilitation, such as improved patient outcomes, personalized therapy, and better adaptability to individual needs. - Discuss Limitations or Challenges: Briefly mention any challenges or limitations in implementing these advanced techniques in clinical settings, such as the need for large datasets, computational complexity, or patient-specific calibration. F- Home-based shoulder check list Clarity and Explanation:	
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	- Clarify Terminology: The section introduces several key technologies like wearables, rehabilitation robots, exoskeletons, and virtual/augmented reality systems. While these terms are generally understood, providing brief explanations or examples for each would help readers who may not be familiar with them. - Simplify Language: Some sentences are lengthy and complex, which can make them harder to follow. Consider breaking down longer sentences into shorter, more direct ones to improve readability. Structure and Flow: - Logical Sequence: The section discusses various technologies but could benefit from a more structured flow. Consider reorganizing the content into clear subsections: - Introduction to Home-Based Rehabilitation Technology - Wearable Devices in Rehabilitation - Robotic Assistance in Home Rehabilitation - Virtual and Augmented Reality in Rehabilitation - Transition Between Topics: Ensure smooth transitions between topics. For example, after discussing wearable devices, you might introduce the concept of robotic assistance by explaining how it complements the data collected by wearables. Technical Depth and Balance: - Balanced Detail: While the section mentions the benefits of technologies like wearables and robots, it could provide more specific examples of how these technologies directly impact patient outcomes. For instance, what specific tasks are improved by exoskeletons? How does machine learning enhance virtual rehabilitation systems? - Illustrative Examples: Consider including specific examples or case studies that demonstrate the effectiveness of these technologies in real-world scenarios. For instance, you could mention a particular study that highlights the success of virtual reality in shoulder rehabilitation. Additional Content Suggestions: - Address Potential Challenges: Briefly discuss any challenges or limitations associated with home-based rehabilitation technology. For example, the need for technical support, patient compliance, or the cost of such technologies could be mentioned. - Highlight Benefits: Emphasize the benefits of home-based rehabilitation, such as increased accessibility, reduced need for hospital visits, and enhanced patient autonomy. This will help readers understand why these technologies are crucial.	
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PART 2:

	Reviewer’s comment	Author’s comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

Reviewer Details:

Name:	Safaa A. Ismaeel
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