

Review Form 3

Journal Name:	Journal of Engineering Research and Reports
Manuscript Number:	Ms_JERR_120892
Title of the Manuscript:	Application of Machine Learning in the Characterization and Classification of Hazards in Underwater Operations in the Oil and Gas Industry in Nigeria
Type of the Article	Original Research Article

General guidelines for the Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

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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>
<p>Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.</p>	<p>This manuscript is significant for the scientific community as it demonstrates the application of machine learning techniques to enhance risk management in underwater operations within the oil and gas industry. By effectively classifying hazards based on likelihood, frequency, and severity, it provides a data-driven approach to prioritize interventions and implement targeted control measures. This can lead to improved safety standards and reduced operational risks in a high-stakes industry. I appreciate this manuscript for its practical implications and the innovative use of clustering algorithms, which can be adapted and extended to other hazardous industrial environments.</p>	
<p>Is the title of the article suitable? (If not please suggest an alternative title)</p>	<p>Suggestion: The title of the article is suitable as it clearly conveys the focus of the study on the application of machine learning in characterizing and classifying hazards in underwater operations within the oil and gas industry in Nigeria. However, if a more concise alternative is desired, consider:</p> <p>"Machine Learning for Hazard Classification in Underwater Oil and Gas Operations in Nigeria"</p> <p>This alternative title retains the essential elements while being slightly more succinct.</p>	
<p>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.</p>	<p>Revised Abstract: Underwater operations in the oil and gas industry involve hazardous activities that can lead to significant health, safety, and environmental consequences, impeding operations if proper risk management is not implemented. Reports show a fatality rate 2.5 times higher in the oil and gas industry than in the construction industry. Effective classification of underwater hazards provides a risk profile that can guide the application of fit-for-purpose control measures. This study leverages clustering algorithms, such as K-Means and Agglomerative Hierarchical Clustering (AHC), to categorize hazards from underwater activities and distinguish high-risk hazard groups. Data were collected from 418 underwater workers across 5 Niger Delta oil and gas companies, assessing likelihood, frequency, and severity perspectives across 20 potential hazards. AHC and K-Mean clustering with k=3 revealed that Cluster 1 included hazards related to adverse weather, security threats, and structural failures; Cluster 2 included hazards related to falling objects and loss of containment; and Cluster 3 included hazards related to fire, explosion, and blowout. These classifications provide data-driven taxonomies for hazards based on risk attributes, highlighting areas requiring managerial focus. Grouped hazards may benefit from common control measures, enhancing the efficiency and effectiveness of risk management in underwater oil and gas operations.</p> <p>Suggestions:</p> <ul style="list-style-type: none"> • Explicitly state the importance of using machine learning for hazard classification. • Mention the number of hazards identified in each cluster. • Highlight the practical implications of the findings for risk management. 	
<p>Are subsections and structure of the manuscript appropriate?</p>	<p>The subsections and structure of the manuscript appear to be well-organized and appropriate for a scientific paper.</p>	
<p>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 minimum of 3-4 sentences may be required for this part.</p>	<p>The manuscript is scientifically robust and technically sound due to its rigorous methodology and comprehensive data analysis. The use of clustering algorithms such as K-Means and Agglomerative Hierarchical Clustering is appropriate for categorizing hazards based on their likelihood, frequency, and severity. The study is well-grounded in existing literature, and the data collection from a significant sample size of 418 respondents adds to the reliability of the findings. Additionally, the results are clearly presented and interpreted, providing valuable insights for risk management in underwater operations in the oil and gas industry.</p>	
<p>Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. -</p>	<p>The references in the manuscript are generally sufficient and provide a solid foundation for the study. However, some references could be updated to include more recent studies to ensure the findings are supported by the latest research. For instance, incorporating recent publications on advancements in machine learning applications in hazard assessment could strengthen the manuscript.</p>	

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<p>Minor REVISION comments</p> <p>Is the language/English quality of the article suitable for scholarly communications?</p>	<p>Regarding the language quality, the English is mostly clear and suitable for scholarly communication. However, minor revisions for grammatical accuracy and clarity could enhance readability. Here are a few suggestions for improvement:</p> <ol style="list-style-type: none"> 1. Ensure consistent use of tense throughout the manuscript. 2. Clarify ambiguous sentences to avoid misinterpretation. 3. Proofread for typographical errors and awkward phrasing. <p>Additional References:</p> <ol style="list-style-type: none"> 1. A Review of Machine Learning Applications in Offshore Oil and Gas Industry Risk Assessment - This could provide a broader context for the use of machine learning in risk assessment. 2. Recent Advances in Clustering Algorithms for Hazard Classification in Industrial Operations - To highlight recent developments in clustering techniques. <p>Minor Revisions:</p> <ol style="list-style-type: none"> 1. In the abstract and introduction, provide clearer definitions for technical terms to ensure accessibility for a wider audience. 2. Ensure that all figures and tables are clearly labeled and referenced in the text. <p>Overall, the manuscript presents a valuable contribution to the field, and with these minor revisions, it will be well-suited for publication.</p>	
<p>Optional/General comments</p>		

PART 2:

	Reviewer's comment	Author's comment (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)
<p>Are there ethical issues in this manuscript?</p>	<p><i>(If yes, Kindly please write down the ethical issues here in details)</i></p>	

Reviewer Details:

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