Review Form 3

Journal Name:	**Archives of Current Research International**
Manuscript Number:	**Ms_ACRI_129780**
Title of the Manuscript:	**Application of Artificial Neural Networks for Detecting Diabetes Mellitus Using Demographic, Clinical, Lifestyle, and Dietary Risk Factors: A Case Study from Kaura Namoda, Nigeria**
Type of the 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:

https://r1.reviewerhub.org/general-editorial-policy/

PART 1: Comments

	Reviewer's comment	Author's Feedback *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part.	This manuscript provides a significant contribution to the scientific community by addressing the urgent need for improved early detection of Diabetes Mellitus (DM) at the grassroots level. By leveraging a robust dataset and employing advanced analytical techniques, it demonstrates the exceptional predictive power of the Multi-Layer Perceptron Neural Network (MLPNN) model in identifying DM and non-DM patients. Notably, the inclusion of dietary risk factors alongside demographic, clinical, and lifestyle data enhanced the model's accuracy, achieving near-perfect detection rates.	
Is the title of the article suitable? **(If not please suggest an alternative title)**	The title is generally suitable and informative, as it clearly outlines the key elements of the study, including the method, the application, the type of data used, and the context. However, it could be slightly refined for better readability and focus. Here are my suggestions: 1. The title could be shortened slightly to make it more reader-friendly without losing essential details. 2. Consider emphasizing the innovative or key aspect of the study (e.g., the improvement in detection accuracy due to dietary factors). **Suggested Revised Title:** "Application of Artificial Neural Networks for Early Detection of Diabetes Mellitus: Insights from a Case Study in Kaura Namoda, Nigeria"	

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.	The abstract is comprehensive but could benefit from slight adjustments to enhance its clarity and impact. Here are my suggestions for improvement: 1. Clearly state the main objective of the study upfront. For example: "This study aims to assess the efficacy of predictive modeling in detecting Diabetes Mellitus (DM) based on patient risk factors." 2. Briefly mention why the chosen hospital and region are significant (e.g., unique characteristics of the population or prevalence of DM in the area). 3. Consider summarizing the detailed performance metrics for both datasets to avoid overwhelming the reader. For instance: "The MLPNN model demonstrated high accuracy in detecting DM and non-DM patients, with improved performance when dietary risk factors were included." 4. The specific version of R software (3.13) is not critical to the abstract and can be omitted unless particularly relevant. 5. While the time frame is useful, it could be streamlined (e.g., "Data from 400 patients collected between 2019 and 2023").
Is the manuscript scientifically, correct? Please write here.	The manuscript appears to be scientifically accurate and provides a structured approach to the application of artificial neural networks (ANNs) for detecting diabetes mellitus (DM) using patient data. However, there are several points that require clarification or validation: • A dataset of 400 patients might be small for training, validation, and testing of machine learning models. The study should specify how the data was split (e.g., proportions for training, validation, and testing). • Given the high performance metrics, there is a risk of overfitting, especially since the test accuracy for the second dataset is 100%. This should be addressed. • It is unclear whether ethical approval was obtained for the use of patient data. A statement confirming ethical compliance should be included. • Anonymization and privacy of patient data need to be addressed explicitly. • The manuscript should clarify whether the dataset was balanced (e.g., equal representation of DM and non-DM patients). Imbalanced datasets can inflate performance metrics. • Since the data is from a single hospital in Kaura Namoda, the results may not generalize to other regions or populations. A discussion of limitations and suggestions for external validation using data from different geographical or cultural contexts is necessary. • The hyperparameter tuning process for the MLPNN (e.g., learning rate, momentum rate) needs more details. • The manuscript states "targeted learning error" was achieved during training. Specify the threshold used. • Although related works are cited, the manuscript does not compare the MLPNN model's performance to other machine learning algorithms (e.g., decision trees, random forests, logistic regression, support vector machine, etc.). This comparison would strengthen the study. • While the AUROC values are impressive, the manuscript should include confidence intervals for these values to account for variability. • The ROC curves themselves should be presented with labeled axes and discussed in more detail. • The inclusion of dietary risk factors significantly improved the model's performance. However, the rationale for selecting specific dietary variables (e.g., preference for salty food, energy drinks) over others should be explained. Were these factors identified based on prior literature or exploratory analysis? • Include a discussion section focusing on the study's strengths, limitations, and future directions, particularly the potential for real-world applications and integration into healthcare systems. • Discuss the clinical implications of this work, particularly how it can aid in early diagnosis and intervention in resource-limited settings.
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	The references cited in the article include a mix of older and recent sources, with some references dated as far back as 2004 and others as recent as 2024. However, for a scholarly article focusing on the application of artificial neural networks (ANNs) and diabetes prediction, it is essential to have a robust and up-to-date bibliography that reflects the most recent advancements in these rapidly evolving fields. 1. Although a few 2024 references are included, the majority of the citations are outdated (e.g., WHO 2004, NIH 2021). This is a concern, as AI and machine learning evolve rapidly, and older sources may not reflect state-of-the-art methods or algorithms. 2. There are limited references to cutting-edge developments in artificial neural networks, such as deep learning frameworks, optimization techniques, and hybrid models that could provide additional insights. 3. The article does not cite enough studies conducted in Nigeria or similar contexts, which would have strengthened the regional relevance of its findings. To improve the quality of the references, may include the following types of studies: **For recent developments in ANNs for medical diagnostics:** • LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *Nature*, 521(7553), 436-444. • Choi, E., Bahadori, M. T., Schuetz, A., Stewart, W. F., & Sun, J. (2016). Retain: An interpretable predictive model for healthcare using reverse time attention mechanism. *Advances in Neural Information Processing Systems*, 29. **For specific to diabetes prediction using AI:** • Kavakiotis, I., Tsave, O., Salifoglou, A., Maglaveras, N., Vlahavas, I., & Chouvarda, I. (2017). Machine learning and data mining methods in diabetes research. *Computational and Structural Biotechnology Journal*, 15, 104-116. • Bora, D., & Barman, M. P. (2022). Diabetes Risk Classification Comparison of Machine Learning Techniques. *NeuroQuantology*, 20(14), 303. **On Diabetes Trends and Dietary Risk Factors:** • Saeedi, P., Petersohn, I., Salpea, P., et al. (2019). Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas. *Diabetes Research and Clinical Practice*, 157, 107843. • Mozaffarian, D., Hao, T., Rimm, E. B., Willett, W. C., & Hu, F. B. (2011). Changes in diet and lifestyle and long-term weight gain in women and men. *New England Journal of Medicine*, 364(25), 2392-2404.

	• Hu, F. B. (2011). Globalization of diabetes: The role of diet, lifestyle, and genes. *Diabetes Care*, 34(6), 1249-1257. References should be formatted according to a standard citation style (e.g., APA, MLA, or IEEE). Some references lack sufficient detail, like publication years or complete titles.	
Is the language/English quality of the article suitable for scholarly communications?	The language and English quality of the article are generally clear and appropriate for scholarly communications. However, there are areas where the writing could be refined There are several grammatical errors, such as "Similarly, the Model also detected 94.9% of patients as non-DM..." (use "detected 94.9% of non-DM patients"). "Today's emerging DM hotspots include countries in the Middle East, Europe, Western Pacific and South-East Asia, where economic development has transformed lifestyles." This sentence could be rewritten for better flow. Phrases like "Similarly, Table 2 also revealed that..." could be streamlined. Repetition of "similarly" and "also" is unnecessary. Some sections provide overly detailed descriptions that may overwhelm readers (e.g., repeated explanation of model metrics for different datasets). Headings like "Materials and method" should follow standard academic formatting (e.g., "Materials and Methods"). Ensure consistent use of abbreviations (e.g., "DM" and "Diabetes Mellitus") after the initial introduction. Some sentences are overly conversational or casual, such as "Today's emerging DM hotspots..." Replace with a more formal tone, e.g., "Emerging diabetes hotspots include regions in the Middle East, Europe, the Western Pacific, and Southeast Asia, driven by economic transitions and lifestyle changes." The equations and their explanations could benefit from clearer labeling and accompanying figures or examples for better comprehension. "Deaths related to DM in Nigeria in 2023 were estimated to be 2I5, 137..." likely contains a typographical error in the number. Ensure proper spacing and punctuation throughout the text.	
Optional/General comments	The study relies on medical records from a single hospital (General Hospital Kaura Namoda). This may not represent the larger population of Nigeria or other regions. Limited geographic and demographic diversity may introduce bias and affect the generalizability of the findings. Acknowledge this limitation and, if possible, discuss steps to mitigate bias in future studies. The manuscript focuses on using a predictive model for detecting diabetes. However, it does not address the potential risks of relying on machine learning models for clinical decision-making without proper medical oversight. If the model is deployed without validation in real-world settings, it could lead to misdiagnoses or discrimination against certain groups. Include a discussion on the ethical implications of deploying the model, emphasizing the need for thorough validation and medical oversight before use in clinical settings.	

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)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

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