Enhancing breast cancer diagnosis using deep learning and Gradient Multi-verse optimizer: A robust biomedical data analysis approach
ID-98325

1. Basic Reporting:

1- Clarity and Ambiguity:

- **Inconsistency in Terminology:** The article employs the terms "GMOV" and "GMVO" interchangeably. Consistency is essential for achieving clarity.
    - ➢ **Improvement**: Employ a solitary and uniform term throughout the entirety of the article. For example, if "GMVO" is the accurate terminology, make sure it is employed consistently.
- **Verbose Sentences:** Certain sentences can be lengthy and intricate, rendering them difficult to comprehend.
    - **Improvement**: Divide intricate sentences into shorter, more easily comprehensible ones.

2- Professional English:

- **Informal Phrasing:** Some expressions are relatively casual for a technical document.
    - **Improvement**: Use more formal language.

3- Insufficient Background and Context:

- **Lack of Background Information:** The article lacks sufficient context regarding the present condition of optimization algorithms for deep neural networks and their utilization in breast cancer classification.
    - **Improvement:** Provide an elaborate introduction that summarizes the current research in the field, identifies the obstacles encountered, and highlights the importance of enhancing

optimization algorithms for deep neural networks in medical diagnosis.

4- Literature References:

- **Missing References:** The current research lacks substantial references to prior work that establish its foundation.
  - **Improvement**: Provide citations for studies that have played a significant role in the advancement of optimization algorithms and their utilization in deep neural networks (DNNs).

5- Figures and Tables:

- **Insufficient Description and Labeling**: The text lacks sufficient description or labeling of the figures and tables mentioned.
  - **Improvement**: Every figure and table must be cited in the text along with a concise explanation of its content and importance.

6- Explicit Hypothesis Statement:

- **Lack of Clear Hypothesis**: The article lacks a clear statement of the hypothesis or research question that the study intends to investigate.
  - **Improvement**: Clearly express the hypothesis or research question in a concise manner within the introduction.

7- Absence of Proofs: The article lacks comprehensive demonstrations for the theorems or assertions presented.

- **Improvement**: Present comprehensive evidence to support all theorems or significant assertions. If the study asserts that the GMVO optimizer enhances accuracy to a significant degree, it is imperative to provide mathematical or statistical evidence to substantiate this assertion.

2. Experimental design

1- Research Question Definition:

- **Lack of Explicit Research Question:** The article lacks a clearly stated research question at the beginning.
  - **Improvement**: Commence the article by formulating a research question that is unambiguous and well-defined. For instance, what is the effect of incorporating a gradient-based search mechanism into the Multi-Verse Optimizer (MVO) on the efficacy of training deep neural networks for breast cancer classification?

2- Identifying Knowledge Gap:

- **Unclear Identification of Knowledge Gap:** The article does not clearly specify a particular deficiency in the current body of research that the study intends to address.
  - **Improvement**: Precisely express the deficiency in existing research. For instance, even though there have been improvements in deep learning optimization methods, there is still a requirement for efficient algorithms that can enhance classification accuracy without imposing a substantial computational burden. This study aims to fill this gap by suggesting a new incorporation of gradient-based techniques into the MVO framework.

3- Technical Detail Omissions:

- **Missing Technical Aspects:** The user's text lacks detailed explanations of crucial technical elements, including any preprocessing techniques applied to the WBCD dataset, the specific architecture of the deep neural network used, and the incorporation of gradient-based adjustments into the MVO framework.
  - **Improvement**: Provide a clear and detailed explanation of each preprocessing step, including the architecture details such as the number of layers and activation functions used. Additionally,

explicitly describe how gradients were computed and utilized within the MVO framework.

3.Validity of the Findings:

1- Lack of Impact Assessment:

- **Impact Not Clearly Stated:** The article does not explicitly evaluate the influence or originality of the proposed optimization algorithm in comparison to existing methods.
- ➢ **Improvement**: Explicitly state in the introduction or discussion sections the reasons why the proposed algorithm is a substantial improvement compared to existing methods. Emphasize particular elements such as performance metrics, computational efficacy, or suitability for wider datasets or domains.

2- Novelty and Advance:

- **Novelty Not Clearly Demonstrated:** Although the article discusses enhancements in precision and the rate at which the model reaches a solution, it fails to adequately emphasize the unique aspects or the substantial progress of the proposed methodology within the field.
  - ➢ **Improvement**: Explain the uniqueness of incorporating gradient-based search into the MVO framework in a comprehensive manner. Emphasize distinctive characteristics, novel approaches, or modifications that set it apart from previous methodologies.

3- Clarity and Connection to Research Question:

- **Lack of Direct Linkage:** The conclusions should explicitly relate to the initial research question and clearly articulate how they address or contribute to addressing that question.
- ➢ **Improvement**: Make sure that every conclusion directly relates to the research question that was initially presented at the start of

the study. To illustrate, explain how the observed enhancements in precision and rate of convergence directly target the primary objective of optimizing the training of deep neural networks for the classification of breast cancer.

4-General comments

Conclusion and Future Directions: The conclusion succinctly encapsulates the findings and underscores the possible ramifications of the research. To enhance this section, contemplate elaborating on prospective avenues for investigation, encompassing potential implementations in alternative domains or expansions to diverse categories of neural networks or datasets.

Overall, the article demonstrates potential in its methodology and discoveries. By addressing these comments, the research can be improved in terms of clarity, rigor, and impact, making it more persuasive for publication in the desired journal.