



ISSN NO. 2320-5407

ISSN(O): 2320-5407 | ISSN(P): 3107-4928

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-57535

Title: AI-Based Predictive Modeling of Sustainable Geopolymer Concrete Using 1 Agricultural Waste Materials

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision ...yes.....

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		Y		
Techn. Quality		Y		
Clarity		Y		
Significance		y		

Reviewer's ID: JPR-Dr.Shaweta Sachdeva

Detailed Reviewer's Report

1. The manuscript addresses an important and contemporary research problem related to sustainable geopolymer concrete and the application of AI-based predictive modeling. However, several areas require improvement before the work can be considered for publication.
2. The abstract contains repeated content and should be rewritten in a more concise and structured manner. Several sentences appear duplicated, reducing readability and overall presentation quality.
3. The novelty of the work is not clearly highlighted. The authors should explicitly explain how the proposed framework differs from existing AI-based geopolymer concrete prediction studies and what unique contribution is provided beyond the use of standard regression models.
4. The literature review is descriptive but lacks critical comparative analysis. The authors should include a discussion comparing previous machine learning approaches, datasets, and achieved performances to better position the proposed work within existing research.
5. The dataset description is insufficient. Important details such as dataset size, number of samples, train-test split ratio, preprocessing techniques, normalization methods, and handling of missing values are missing and should be clearly provided.
6. The methodology section requires more technical depth. Hyperparameter settings for Ridge Regression, Elastic Net, PLS, and SVR are not discussed. The optimization strategy and parameter tuning procedure should be included for reproducibility.
7. The paper lacks statistical validation of model performance. The authors should include cross-validation, confidence intervals, or statistical significance testing to demonstrate the robustness of the results.
8. The experimental analysis focuses mainly on performance metrics, but graphical comparisons such as prediction-error plots, residual analysis, feature importance visualization, and learning curves would improve the quality of interpretation.

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9. The discussion section should include practical implications for real-world construction applications and scalability of the proposed framework in industrial environments.
10. The manuscript repeatedly states that Fly Ash Type C negatively affects concrete performance; however, the scientific explanation behind this behavior is not adequately discussed. The authors should provide material-science-based justification supported by literature.
11. The web-based application mentioned in the manuscript is not sufficiently explained. Screenshots, system architecture diagrams, implementation details, or deployment information should be added to demonstrate practical usability.
12. Several grammatical issues, spacing inconsistencies, and formatting problems are present throughout the manuscript. Careful proofreading and language editing are required to improve readability and professionalism.
13. The references should be updated with more recent studies from 2023–2026 related to explainable AI, deep learning models, and sustainable geopolymer concrete prediction systems.
14. The conclusion section currently summarizes the findings but should also include quantitative comparisons and clearer future research directions supported by identified limitations.