ISSN: 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-52017 Date: 02-06-2025

Title: Rainfall Prediction using Machine learning

Recommendation:
Accept as it is……**YES……**
Accept after minor revision……
Accept after major revision ……
Do not accept (*Reasons below*) ……

Rating	Excel.	Good	Fair	Poor
Originality			√	
Techn. Quality		√		
Clarity		√		
Significance			√	

Reviewer's Name: Tahir Ahmad

Reviewer's Decision about Paper: **Recommended for Publication.**

Comments (*Use additional pages, if required*)
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Reviewer's Comment / Report

Research Importance:

This study tackles the important and challenging problem of rainfall prediction, which has significant implications for agriculture, disaster management, urban planning, and water resource management. The application of machine learning (ML) to this problem is timely and relevant, given the complex and nonlinear nature of meteorological data and the limitations of traditional forecasting methods.

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Abstract Summary:

The abstract clearly outlines the research scope, focusing on the use of multiple ML models (regression, SVM, decision trees, neural networks) implemented via MATLAB to analyze meteorological data for rainfall prediction. It mentions preprocessing techniques and the adaptability of the framework to large datasets and different geographic regions, which emphasizes the study's practical relevance.

Introduction:

The introduction effectively establishes the significance of rainfall forecasting and highlights the shortcomings of traditional statistical and physical models. It clearly motivates the use of ML as a sophisticated alternative capable of handling complex data patterns. The inclusion of meteorological features (temperature, humidity, wind speed, pressure, past rainfall) as predictors is well-founded and appropriate.

Literature Review:

The literature study provides a comprehensive overview of prior research on ML-based rainfall forecasting. It discusses various models including SVM, ANN, decision trees, random forests, and gradient boosting, and underscores the importance of preprocessing and feature selection. The review appropriately references comparative studies and highlights the trend towards hybrid models to enhance prediction accuracy and reliability. The discussion on MATLAB's neural network toolbox and network architecture optimization is pertinent and shows alignment with the study's methodology.

Methodological Clarity:

Although detailed methodological aspects are not included in the excerpt, the mention of model types, key meteorological features, and data preprocessing techniques indicates a structured approach. The use of MATLAB as a platform for model development and evaluation adds robustness to the computational aspect.

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Scientific Context and Relevance:

The paper situates itself well within the current research landscape on rainfall prediction and ML applications in meteorology. The integration of traditional meteorological knowledge with modern computational tools is well articulated, reflecting a balance between domain expertise and data-driven approaches.

Contribution to the Field:

This study contributes by applying a range of ML models to rainfall forecasting with an emphasis on preprocessing and model optimization, potentially improving predictive accuracy. Its focus on scalability and adaptability to various climatic zones adds practical value. The work also complements existing literature by consolidating insights on ML techniques within a MATLAB-based framework.

Organization and Clarity:

The paper is well-organized with a logical flow from abstract through introduction and literature review. The language is clear and academic, facilitating understanding of the study's purpose and background.

Overall Evaluation:

This research is a valuable addition to the field of meteorological forecasting using machine learning. It demonstrates awareness of existing challenges and incorporates a diverse set of ML models supported by relevant literature. The focus on preprocessing and feature selection reflects good scientific rigor. The study is positioned to provide useful insights for researchers and practitioners working on climate prediction and environmental management.
