

REVIEWER'S REPORT

Manuscript No.: **IJAR-53600**

Date: 30-08-2025

Title: Predicting Student Academic Performance: A Machine Learning Analysis of Study Habits and Lifestyle Factors

Recommendation:

Accept as it isYES.....

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

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

Reviewer Name: **Mir Bilal**

Reviewer's Comment for Publication.

The **abstract** clearly outlines the objectives, methodology, and major findings of the study. It identifies the central aim of predicting student academic performance through machine learning while emphasizing the importance of key lifestyle and behavioral factors. The dataset size of 1,000 university students provides a solid foundation for statistical and computational analysis. Quantitative findings are presented with precision: the strong correlation of study hours with exam performance ($r = 0.825$), moderate correlation of mental health ratings ($r = 0.322$), and the superior predictive accuracy of ridge regression ($R^2 = 0.9015$, $RMSE = 5.03$). The role of feature engineering, particularly polynomial terms and study hour derivatives, is highlighted as crucial in model improvement. The clustering analysis and threshold analysis further enhance the study by identifying performance groups and critical behavioral benchmarks, such as the significant performance difference between students studying 4+ hours daily versus those studying less than 2 hours. The findings are framed in terms of actionable insights, directly linking the analysis to potential educational interventions and student support frameworks.

The **keywords**—covering machine learning, educational data mining, student performance prediction, academic analytics, feature engineering, and clustering analysis—accurately reflect the scope and technical orientation of the paper.

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The **introduction** provides a strong contextual basis for the study. It situates the research within the broader transformation of education in the digital era, where large-scale data availability opens opportunities for deeper academic insights. The contrast drawn between traditional performance prediction methods (focused narrowly on demographics or grades) and modern, multidimensional approaches effectively justifies the research. The integration of factors such as digital habits, mental health, and lifestyle patterns underscores the study's holistic orientation and its relevance in the contemporary academic environment.

Overall, the paper demonstrates a clear research problem, well-articulated methodology, and rigorous presentation of results. It combines statistical robustness with educational relevance, contributing significantly to both machine learning applications and educational policy discussions.