

PROJECT CODE:2024 -P01

Title: An Adaptive Feature Selection Algorithm for Student Performance Prediction

Abstract

Novelty Added in this Project: Implementation of Genetic algorithm

Educational Data Mining (EDM) has emerged as a potent tool to optimize the teaching and learning process by harnessing the power of data analytics. One of the critical challenges in EDM lies in accurately predicting students' academic performance and dropout rates amidst the plethora of variables encompassing academic, behavioural, and health metrics. In this study, we introduce a novel Adaptive Feature Selection Algorithm (AFSA) designed to address this complexity and enhance the robustness of predictive models.

Our proposed AFSA amalgamates an ensemble approach for initial feature ranking with normalized mean ranking derived from five distinct methods. This fusion of techniques aims to mitigate the limitations of individual ranking methods and provide a more comprehensive assessment of feature importance. By iteratively selecting the most salient features and adjusting thresholds based on their ranks, AFSA ensures significant contributions to model accuracy while effectively reducing dataset complexity.

The effectiveness of AFSA is demonstrated through empirical evaluations on real-world educational datasets. Comparative analysis reveals that AFSA outperforms traditional feature selection methods by achieving higher predictive accuracy and model generalization. Moreover, AFSA exhibits resilience to noise and outliers, making it suitable for handling the inherent variability in educational data.

Furthermore, AFSA offers insights into the underlying factors influencing students' academic outcomes and instructors' performance. By identifying and prioritizing relevant features, educators can tailor interventions and instructional strategies to better support student success and enhance teaching effectiveness. Additionally, the adaptive nature of AFSA enables continuous refinement of predictive models as new data becomes available, thereby ensuring the scalability and longevity of EDM applications.