



AI-Based Student Performance Prediction

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Abstract

Predicting student academic performance has long been a critical concern in education, as early identification of at-risk students enables timely interventions and improved learning outcomes. With the increasing availability of educational data and advancements in artificial intelligence (AI), data-driven student performance prediction has become both feasible and impactful. AI-based prediction models utilize machine learning, deep learning, and learning analytics to analyse academic, behavioural, and demographic data for forecasting student success. This paper presents a comprehensive review of AI-based student performance prediction systems, discussing underlying techniques, system architectures, applications, challenges, and ethical considerations. The study highlights the effectiveness of AI models in enhancing academic decision-making while emphasizing the importance of fairness, transparency, and privacy. Future research directions are proposed to improve accuracy, interpretability, and responsible deployment in educational contexts.

