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**Research Title:** A Data-Optimized Platform of Student Performance Monitoring and Early Warning System for Teacher-Parent Collaboration Using Cumulative Score Deviation Analysis.

**Rationale**

In today’s educational landscape, early intervention plays a critical role in ensuring student success. However, traditional academic monitoring systems often lack a real-time, data-driven approach that enables teachers and parents to collaboratively address student performance concerns before they escalate.

This study proposes the development of an Algorithmic Student Performance Monitoring and Early Warning System that utilizes Cumulative Score Deviation Analysis to detect academic trends and trigger timely interventions. By analyzing progressive performance changes rather than relying solely on static grading thresholds, this system can identify students at risk earlier, reduce academic failure rates, and enhance communication between teachers and parents.

The rationale behind this research is to bridge the gap between data-driven decision-making and proactive academic intervention, ensuring that students receive targeted support when they need it the most. This initiative aligns with modern educational methodologies that prioritize continuous assessment, behavioral trend analysis, and parent-teacher collaboration, ultimately fostering a more responsive and effective academic support system.

**Importance of the Study**

The significance of this study lies in its potential to redefine how student performance is monitored, assessed, and communicated between educators and parents. By incorporating Cumulative Score Deviation Analysis, this system introduces a dynamic, adaptive approach that accounts for individual learning patterns rather than relying solely on fixed grade thresholds.

For educators, this platform serves as a data-driven tool to track student progress, identify academic risks, and implement timely interventions, enhancing their ability to provide personalized support.

For parents, it strengthens engagement in their child’s academic journey by providing real-time insights into performance trends, behavioral progress, and critical alerts when necessary.

Furthermore, for educational institutions, the system promotes a more proactive and structured monitoring framework, minimizing the likelihood of academic underperformance going unnoticed until it is too late.

The study contributes to the field of educational technology, academic analytics, and performance-based intervention systems, demonstrating the practical application of algorithmic methodologies in enhancing student outcomes.

**Statement of the Problem**

Despite various efforts to enhance student performance monitoring, traditional academic tracking systems often fall short in providing real-time, trend-based insights that enable timely intervention. Most existing systems rely on static grading models, which assess student progress based on fixed thresholds rather than continuous performance deviations.

As a result, teachers and parents frequently become aware of academic struggles only after a student has already fallen significantly behind, reducing the effectiveness of intervention strategies. Furthermore, conventional monitoring approaches lack the ability to detect gradual performance declines or anomalous score fluctuations, which are critical early indicators of potential academic difficulties.

This study seeks to address these challenges by developing an Algorithmic Student Performance Monitoring and Early Warning System that leverages Cumulative Score Deviation Analysis to identify at-risk students based on progressive academic trends rather than static assessments.

Specifically, this research aims to determine how an algorithmic approach can enhance real-time performance tracking, evaluate the impact of early risk detection on student outcomes, and assess the system’s effectiveness compared to traditional grading-based models.

Additionally, this study will examine key factors influencing the accuracy and reliability of the algorithm in predicting academic struggles.

By addressing these concerns, this research aspires to create a highly responsive and adaptive performance monitoring system, fostering stronger teacher-parent collaboration and significantly improving student success rates through proactive intervention strategies.