Automated Grading System with Student Performance Analytics

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Introduction: The Student Performance Analytics and Grading Automation System was developed to address the challenges and inefficiencies in traditional grading systems at educational institutions. The system aims to automate the grading process while offering robust analytics to track student performance, helping educators make data-driven decisions to enhance teaching strategies and improve student outcomes.

Methodology: This study was designed and implemented using Laravel and modern web technologies to ensure seamless cross-platform functionality. It features integrated modules for grading, user management, analytics, and settings, with capabilities for both online and offline operation through local deployment. Grading tasks are automated based on configurable weight parameters, while real-time performance insights are delivered through interactive dashboards. Data security is upheld through encrypted credentials, role-based access control, and HTTPS protocols. Tailored for low-spec school computers, the project also supports scalability to accommodate future growth. Comprehensive unit and integration testing validated its performance, security, and reliability. Challenges such as limited technical resources, user proficiency, and data migration were addressed through intuitive design and meticulous planning. Infrastructure dependencies and stakeholder collaboration were also managed to ensure successful implementation.

Results: The Automated Grading System effectively streamlines grading and tracks student performance. Predictive analytics help educators anticipate academic trends and adjust teaching strategies. User evaluations rated the system's performance as "Excellent," with backup and security features reinforcing reliability. The intuitive interface ensures smooth adoption with minimal training required.

Conclusion: This study provides a transformative solution to the inefficiencies of traditional grading at Colegio de Santa Rita de San Carlos Inc. By improving grade calculations and offering detailed performance analytics, it enhances grading efficiency and supports data-driven decisions. The system ensures data security through role-based access control and functions both online and offline. Proven in terms of performance, scalability, and security, it aligns with the institution's digital transformation goals and opens opportunities for collaboration with other schools, fostering broader research and scalable adoption across educational networks.

Practical Value: The Automated Grading System enhances grading efficiency and supports data-driven decision-making, making it ideal for educational institutions. By automating grading and offering real-time performance analytics, it helps educators improve teaching strategies and student outcomes. The system's scalability, offline functionality, and robust security features make it a practical solution for schools of varying sizes, ensuring smooth implementation with minimal training required.

Direction for Future Research: Future versions of the Automated Grading System should incorporate advanced analytics like predictive modeling to strengthen data-driven decisions. A dedicated support team and regular system upgrades will ensure long-term stability. Ongoing monitoring and audits are essential for compliance with data privacy laws such as GDPR and FERPA. As the system demonstrates effectiveness, forming partnerships with other institutions will support scalable adoption and collaborative research. User feedback mechanisms will guide continuous improvement and system refinement over time.

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