WWW.IJRPR.COM

**International Journal of Research Publication and Reviews**

Journal homepage: www.ijrpr.com ISSN 2582-7421

# AI Based Test Management System

***Sayeda Masrath Sulthana***

M.Tech Software Engineering, Department of Information Technology, JNTUH University College of Engineering, Science and Technology, Hyderabad, Telangana, India

**ABSTRACT:**

This project presents an AI-powered academic management system designed to streamline the process of test creation, assignment evaluation, and student performance tracking within a university environment. The system enables faculty members to generate customized test questions using artificial intelligence, administer tests, and evaluate student-submitted assignments with integrated plagiarism detection tools. Faculty and students each have access to personalized dashboards tailored to their respective roles—faculty can create and manage assessments, review plagiarism reports, and track student progress, while students can attempt tests, submit assignments, and view their performance analytics. An administrative module oversees user accounts and permissions, ensuring secure and efficient management of platform operations. This integrated approach enhances academic transparency, promotes fairness, and improves the overall educational experience through the use of intelligent automation and data-driven insights.

***Keywords-AI in Education, Academic Management System, Automated Test Generation, Assignment Evaluation, Plagiarism Detection, Student Performance Tracking, Intelligent Automation, Educational Technology, Personalized Dashboards, Data-Driven Insights***

## INTRODUCTION

In recent years, educational institutions have increasingly turned to technology to enhance the efficiency and transparency of academic operations. The traditional approach to managing academic tasks—such as test preparation, assignment evaluation, and student performance tracking—often places a considerable administrative burden on faculty and staff. This challenge becomes more pronounced with growing class sizes, diverse student needs, and heightened expectations for academic integrity and personalized learning experiences.

To address these challenges, this paper presents an **AI-powered academic management system** designed to automate and streamline key educational processes within a university setting. The proposed system leverages artificial intelligence to generate customized test questions, evaluate student-submitted assignments, and detect plagiarism, thereby reducing manual workload and increasing consistency in evaluation.

The system features distinct user interfaces for faculty and students, providing tailored dashboards that align with their specific roles. Faculty members are equipped with tools to create and manage assessments, review plagiarism reports, and track individual and class-wide performance metrics. Students, on the other hand, can access test modules, submit assignments, and monitor their academic progress through interactive analytics. Additionally, an administrative module ensures secure user management and system oversight.

By integrating intelligent automation with data-driven insights, the system aims to improve educational outcomes, promote fairness in assessment, and support informed decision-making for both faculty and students. This paper outlines the architecture, features, and impact of the proposed system, and discusses its potential as a scalable solution in modern academic environments.

This project introduces an AI-powered Academic Management System designed to automate and simplify core educational tasks in universities and colleges. The system is aimed at reducing the manual workload of educators and enhancing the academic experience for both students and faculty.

Using artificial intelligence, faculty members can automatically generate test questions tailored to specific subjects or topics, making exam preparation faster and more dynamic. The system also supports automated assignment evaluation with integrated plagiarism detection tools, ensuring academic honesty and consistent grading.

Both students and faculty have access to personalized dashboards. Faculty dashboards allow instructors to create assessments, monitor student performance, and access plagiarism reports. Student dashboards let learners take tests, submit assignments, and track their academic progress through performance analytics.

An admin module manages user roles, permissions, and platform security, making the system suitable for institutional deployment.

By incorporating AI and data analytics, the system promotes transparency, fairness, and efficiency in academic processes, helping institutions move towards smarter, technology-driven education.

## OBJECTIVES

1. To develop an AI-driven academic management system that automates the creation of test questions based on subject-specific inputs or learning objectives.
2. To implement automated assignment evaluation with integrated plagiarism detection to ensure academic integrity and reduce faculty workload.
3. To design personalized dashboards for faculty and students, enabling easy access to tests, assignments, performance data, and feedback.
4. To provide real-time student performance tracking and analytics, helping educators make informed decisions and students understand their learning progress.
5. To ensure secure, role-based access control through an administrative module that manages user accounts and permissions effectively.
6. To enhance the overall teaching-learning experience by promoting fairness, transparency, and efficiency using intelligent automation and data insights.

## PROBLEM STATEMENT

In traditional academic environments, faculty and administrative staff often face significant challenges in managing routine yet critical tasks such as test preparation, assignment evaluation, plagiarism detection, and student performance tracking. These processes are typically time-consuming, prone to human error, and lack the scalability required to efficiently handle large volumes of students. Additionally, there is limited personalization in the feedback provided to students, and real-time performance analytics are rarely available to guide academic improvement.

Moreover, maintaining academic integrity through manual plagiarism detection methods is not only inefficient but also inconsistent. The absence of a centralized, intelligent system results in fragmented workflows, delayed evaluations, and diminished transparency in academic decision-making. There is a clear need for an integrated platform that can intelligently automate these tasks while ensuring fairness, accuracy, and timely communication between students and faculty.

## EXISTING SYSTEM

In most educational institutions today, academic tasks such as test creation, assignment evaluation, and student performance monitoring are handled manually or using basic digital tools like spreadsheets, word processors, and general-purpose learning management systems (LMS). Faculty typically spend significant time designing question papers, grading assignments, and manually checking for plagiarism using standalone tools. Student performance data is often recorded in fragmented systems, with little or no analytical insight. Communication between students and faculty is also limited to email or classroom interaction, lacking a centralized academic interface.

Limitations of the Existing System

1. Time-Consuming Processes: Manual test creation and grading require extensive faculty involvement and delay feedback.
2. Lack of Automation: Most systems do not use AI to automate repetitive academic tasks.
3. Fragmented Tools: Plagiarism detection, evaluation, and student tracking often rely on multiple disconnected tools.
4. Limited Personalization: No customized feedback or performance analytics for students.
5. Scalability Issues: As class sizes grow, the manual workload becomes unmanageable.
6. Low Transparency: Students have limited visibility into their academic performance and feedback history.

## PROPOSED SYSTEM

The proposed system is an AI-powered Academic Management Platform that unifies test creation, assignment evaluation, plagiarism detection, and performance tracking under a single intelligent interface. The system allows faculty to generate subject-specific questions using AI, automatically evaluate assignments with integrated plagiarism scanning, and monitor each student's academic progress through real-time dashboards. Students can view their grades, attempt assessments, and receive personalized performance insights. An administrative module manages users, roles, and security protocols to ensure secure operations.

**Purpose**

The primary purpose of this system is to:

- Automate routine academic tasks using AI.
- Ensure academic integrity through reliable plagiarism checks.
- Improve communication and feedback between faculty and students.
- Provide timely insights into student performance for better academic planning.
- Enhance the overall educational experience using intelligent, data-driven tools.

**Scope** The system is designed for use in:

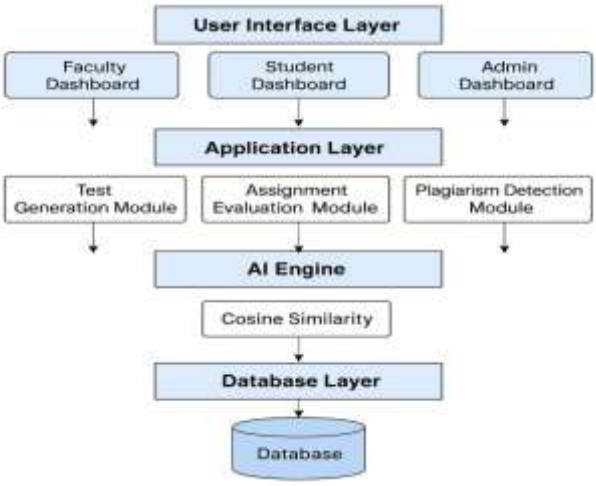
- Universities, colleges, and educational institutions offering digital academic services.
- Faculty members who require tools for automated assessment management.
- Students who need access to performance feedback, test modules, and assignment submission tools.
- Administrators who manage users, roles, and security within the system.

The platform can be scaled across departments, institutions, or integrated into existing learning management ecosystems.

**Advantages of the Proposed System**

1. Automation of Core Tasks: Saves time for faculty by automating test generation and grading.
2. Integrated Plagiarism Detection: Ensures originality and fairness in student submissions.
3. Real-Time Analytics: Offers visual dashboards and insights into student performance.
4. Enhanced Transparency: Both students and faculty can track progress and feedback instantly.
5. Role-Based Access: Secure user management with personalized interfaces.
6. Improved Efficiency: Reduces errors, delays, and inconsistencies in academic processes.
7. Scalability: Can be extended to support large-scale academic environments.

## SYSTEM ARCHITECTURE




The proposed AI-powered Academic Management System follows a modular, layered architecture that ensures scalability, security, and efficient communication between components. The architecture can be broadly divided into the following layers:

1. User Interface Layer:

   This is the front-end layer where users (faculty, students, and administrators) interact with the system through web or desktop dashboards. It handles input from users and displays relevant outputs such as test results, assignment feedback, and performance analytics.

2. Application Layer:

   This layer contains the core logic of the system, including modules for test generation, plagiarism detection, assignment evaluation, and analytics. It communicates with both the UI and backend layers.

3. AI Engine:

   The AI engine is responsible for generating question papers using NLP-based models and evaluating assignments. It includes the Cosine Similarity algorithm for plagiarism detection.

4. Database Layer:

   A secure and structured database stores all system data including user profiles, test content, assignment submissions, results, and plagiarism reports. Relational databases like MySQL or PostgreSQL can be used for efficient data management.

5. Admin and Security Layer:

   This layer controls authentication, authorization, and user role management to ensure data privacy and secure access.

## SYSTEM MODULES

The system is composed of the following key modules:

1. Test Generation Module:
   - Uses AI and natural language processing to generate customized questions based on course topics or keywords.
   - Supports multiple question types: MCQs, short answers, and descriptive.
2. Assignment Evaluation Module:
   - Facilitates student assignment uploads.
   - Automatically evaluates content using similarity checks and pre-defined rubrics.
   - Integrates with the plagiarism detection module.
3. Plagiarism Detection Module:
   - Uses Cosine Similarity and NLP techniques to compare student submissions.
   - Generates plagiarism percentage and highlights matched content.
4. Performance Analytics Module:
   - Visualizes individual and class-level performance.
   - Tracks scores, improvement trends, and assessment feedback.
5. User Dashboard Module:
   - Faculty Dashboard: Create/manage tests, review results, check plagiarism.
   - Student Dashboard: Take tests, view grades, upload assignments.
   - Admin Dashboard: Manage users, roles, and permissions.
6. Authentication & Security Module:
   - Role-based access (admin, faculty, student).
   - Secure login and session management.

**Algorithm: Cosine Similarity for Plagiarism Detection**

Cosine Similarity is a commonly used algorithm to measure the textual similarity between two documents. It treats each document as a vector in a multi-dimensional space, where each dimension corresponds to a term (word) from the document corpus.

➤ Mathematical Formula:

Cosine Similarity=A·B/ ||A||·||B||Where:

- A·B is the dot product of vectors A and B
- ||A||||A||||A|| and ||B||||B||||B|| are the magnitudes (Euclidean norms) of the vectors

➤ Steps Involved:

1. Convert each document into a vector using TF-IDF (Term Frequency-Inverse Document Frequency) or Bag-of-Words.

2. Compute the dot product of the two vectors.
3. Compute the magnitude of each vector.
4. Apply the cosine similarity formula.
5. The result is a value between 0 and 1:
    - 1 indicates the texts are identical.
    - 0 indicates no similarity.

➤ Use Case in the System: In the assignment evaluation module, each submitted assignment is compared to other students' submissions and known content repositories. If the cosine similarity value exceeds a defined threshold (e.g., 0.75), the assignment is flagged for potential plagiarism.

## FUTURE ENHANCEMENT

The proposed academic management system has the potential for several future enhancements to further improve functionality, scalability, and user experience:

1. Integration with Learning Management Systems (LMS): The system can be integrated with platforms like Moodle, Google Classroom, or Blackboard for seamless academic workflow.
2. AI-based Descriptive Answer Evaluation: Future versions can incorporate machine learning models to automatically evaluate long-answer responses and provide accurate grading with feedback.
3. Voice and Chatbot Assistance: An AI-powered chatbot or voice assistant can be added to guide users through tasks like test scheduling, assignment uploads, or performance queries.
4. Mobile Application Support: Extending the system as a cross-platform mobile app can increase accessibility and convenience for students and faculty.
5. Multilingual Support: Supporting multiple languages will make the system more inclusive and adaptable to diverse educational settings.
6. Predictive Performance Analysis: AI models can be trained to predict student success or identify at-risk students early for timely intervention/

## CONCLUSION

This paper presents an AI-powered Academic Management System that aims to automate and streamline key educational tasks such as test generation, assignment evaluation, plagiarism detection, and student performance tracking. By integrating artificial intelligence and automation, the system reduces faculty workload, enhances academic integrity, and provides real-time feedback to students. The modular design, user-specific dashboards, and centralized architecture make it a scalable and efficient solution for modern educational institutions. With future enhancements, the system holds great promise for transforming the way academic activities are managed and monitored in digital learning environments

### REFERENCES

[1] J. Holmes, B. Bialik, and R. Fadel, "Artificial Intelligence in Education: Promises and Implications for Teaching and Learning", Center for Curriculum Redesign, 2019.

[2] T. Landauer, P. Foltz, and D. Laham, “An Introduction to Latent Semantic Analysis,” Discourse Processes, vol. 25, no. 2–3, pp. 259–284, 1998.

[3] P. Gupta, R. Katarya, “A Review on Educational Data Mining and Learning Analytics,” Education and Information Technologies, vol. 26, pp. 2749–2768, 2021.

[4] J. Carbonell, "Machine Learning and Statistical Techniques for Automated Essay Scoring," in *Handbook of Automated Essay Evaluation*, Routledge, 2013.

[5] M. Mozgovoy, “An Efficient Algorithm for Plagiarism Detection Using Suffix Trees,” *Journal of Software*, vol. 2, no. 1, pp. 1–8, 2007.

[6] K. D. Bhatia, M. Sharma, and D. R. Sharma, "Use of Artificial Intelligence in Plagiarism Detection Tools: A Study," *International Journal of Computer Applications*, vol. 179, no. 47, 2018.

[7] R. Sahu, P. Sahu, "Cosine Similarity Based Text Comparison for Plagiarism Detection," *International Journal of Computer Applications*, vol. 179, no. 4, pp. 1–4, 2018.