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COLLEGE MANAGEMENT SYSTEMS AND AUTOMATED EXAM SYSTEM

Aryan Fender[*1], Rupesh Tembhare[*2], Sagar Mahakulkar[*3],
Ritesh Suryavanshi[*4], Shivendra Tiwari[*5]

[*1,2,3,4,5]Computer Science Engineering Department Priyadarshini College Of Engineering, Nagpur, India.

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ABSTRACT

The College Management System aims to streamline all the administrative tasks in an educational institute using a single software solution through the usage of Enterprise resource planning or ERP technology. Automated Exam Systems are software solutions that allow smooth and fair conduction of exams online. This literature review dwells into the various technologies, modules, methods and techniques used to implement these systems to increase efficiency and accuracy of the administrative tasks in educational institutes.

Keywords: Computer Management System (CMS), Automated Exam System (AES), Cloud Computing, Haar Classifier, ADA Boosting (Adaptive Boosting), OpenCV (Computer Vision), Item Analysis, Automated Report Generation, Artificial Intelligence (AI).

I. INTRODUCTION

The College Management System provides a user friendly and efficient software solution that manages and streamlines all the important administrative tasks in an educational institute. This system acts as a hub for many processes such as student enrollment, faculty management, attendance tracking, course management, exam scheduling as well as online exam conduction. The online conduct of exam is done through the AES or Automated Exam system which leverages various computer vision technology to maintain the integrity of exams while smoothly conducting them and generating results using AI.

II. LITERATURE REVIEW

1.1 Research Paper on College Management System

This paper by Rohit Jain, Aman Modi and Ishan Kashyap (2023) aimed to develop an Online Intranet College Management System (CMS) for use in educational institutions or colleges. The intranet-based system could be accessed across the institution or specific departments and was used to monitor attendance. Developed for an engineering college, the system ensured easy access to information for the college staff as well as students. This system focus on keeping track of attendance of staff as well as students. It also allowed staff to update the marks of students while allowing the students themselves to view their scores. This system was developed using PHP, SQL Server, HTML and Javascript. It being a web based system stored all the records in MySQL database. The main objective of this system was to overcome the challenges that arose due to the traditional methods of handling data such as paperwork. The system had various modules such as student module, placement module, notice module, registration module, and room allotment module. Each module had its own functionality which ensured efficiency while carrying out all the administrative tasks.

1.2 Research on Design Scheme of Multi-campus College Student Management System Based on Cloud Computing

This paper by Chengyi Niu (2021) outlines the system's analysis, module design, key technologies, and implementation. The system enhances multi-campus student management, promoting autonomy, self-positioning, and continuous improvement. With growing enrollments, student numbers and information have surged, and the expansion of multi-campus institutions has added to the complexity of management. To address this, a cloud-based multi-campus student management system was developed, integrating information management, statistical analysis, and online publishing.

1.3 Detection of Anomalous Behavior in Online Exam towards Automated Proctoring

The rapid advancement of e-learning and online evaluation seeks to create a model that accurately identifies behaviors, such as discussions during tests. Current systems require significant computational power, are slow, and can only support one invigilator for twenty students. This system by Susithra V, Reshma A, Bishruti Gope,

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Sanskar S (2021) uses textural features with a Haar Cascade classifier and ADA Boosting to analyze pre-recorded clips for behavioral detection. It serves as an automated support system for test administration and identifies misconduct making proctoring automation effective.

1.4 Admission Examination System Utilizing Item Analysis with Automated Report Generation

Academic institutions use various sources to identify suitable applicants, with admission examinations being key. Many institutions struggle with admission data. This system by Kenneth R. Gunay, Chloe Sophia D. Bonifacio, Paolo Miguel S. Alasco, Roben A. Juanatas, Christian J. Caduldulan, Jondon C. Villanueva and Emeliza R. Yabut (2022) aimed to develop an admission examination system to enhance the process and provide tailored solutions for universities.

1.5 The Technology Interface and Student Engagement Significant Stimuli in Sustainable Student Satisfaction

This study by Alka Pandita and Ravi Kiran (2023) examines how technology interfaces and student engagement enhance student satisfaction in higher education. It highlights technology's role in teaching and learning, emphasizing that engaged students gain satisfaction by actively participating. Surveying 400 respondents, the study confirms a positive link between technology, engagement, and satisfaction. Findings suggest that institutions should foster intuitive tech use and engaging environments to improve satisfaction and academic outcomes.

1.6 Application of Artificial Intelligence (AI) in Educational Management

Artificial intelligence (AI) is reshaping education by enhancing learning, improving student outcomes, and optimizing administration. This study by Innocent Chiawa Igbokwe(2023) reviews AI's role in educational management, highlighting its benefits—such as increased engagement, personalized learning, and cost-effectiveness—as well as challenges like ethical concerns and workforce re-skilling. The research concludes that AI can significantly advance educational management if implemented thoughtfully.

III. DISCUSSION

This literature highlights the importance of CMS and technology for high quality education and student satisfaction. It also highlights that AES can be a very useful tool to conduct examination online. The significance of having proctoring tools in such systems is also highlighted. The implementation of such proctoring tools can be computationally very expensive, but using OpenCV technologies such as Haar Cascade in combination with ADA boosting can help resolve those issues. The research on various design schemes

of multi-campus CMS based on cloud computing emphasizes on the importance of the design of CMS systems to ensure efficiency and high availability of such systems. It also explains how AI technologies can assist with implementation of all the solutions for the problems involved with such complex systems.

IV. RESEARCH GAP

CMS is always evolving with the increasing complexity of student data and administrative tasks. Yet there are some research gaps:

- **Computation cost efficiency:**

Various modules involved with CMS are computationally expensive such as dynamically updating available staff while also keeping track of the engaged staff members. Even in AES, algorithms for behavioral detection and identification such as Haar Cascade can be very expensive in terms of computational cost. With increasing volumes of data and its complexity, this is a research gap.

- **Combination of CMS and AES:**

There are separate research papers on CMS (Rohit Jain, Aman Modi and Ishan Kashyap; 2023) and AES (Susithra V, Reshma A, Bishruti Gope, Sanskar S; 2021) but there is very little research on the systems that deploy both these systems as one.

- **Implementation of AI in modules:**

There are have been various studies that explore the application of AI in order to improve the quality of education as well as the impact of AI in educational management like that by Innocent Chiawa Igbokwe(2023). But the in depth use of AI in individual modules of CMS and the potential for its optimization remains a research gap.

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- **Efficient and user-friendly dynamic interface:**

The study by Alka Pandita and Ravi Kiran (2023) explains how the technology interface and student interaction help achieve increased student satisfaction in higher education. It further explains the role of technology in teaching and learning. There are many such studies but there is a research gap when it comes down to the actual design and implementation of interfaces that help achieve student satisfaction and increase the effectiveness of teaching and learning.

V. FUTURE SCOPE

This review has led to the discovery of various potential paths of research to be explored in the future:

- **Leveraging AI and ML:** Future CMS can leverage AI or ML for their different modules. They can make use of AI to figure out the most optimal class schedule, predict future student performances, personalize learning experiences and automate administrative tasks even more which is also what the study by Chiawa Igbokwe (2023) suggested.
- **Making use of Cloud Based technologies:** Making use of technologies such as cloud storage or cloud computing to increase the efficiency of the CMS and to make it cost effective to implement it. It also makes maintenance of the CMS very easy. Technologies such as Hadoop Distributed File Systems can also be used to leverage distributed file management to increase efficiency.
- **Applying Blockchain Technologies:** Utilizing blockchain in CMS for secure record-keeping of student credentials and achievements can enhance data integrity and authenticity.
- **Implementing Virtual Reality (VR) or Augemented Reality:** Making use of VR/AR technologies in CMS to implement virtual classrooms and give virtual campus tours to potential students looking to take admission in the college.
- **Using Advanced Data Analytics:** Implementing advanced analytics in CMS or AES can provide deeper insights into student performance, attendance trends, and financial management, enabling proactive decision-making.
- **Customization and Modular Design:** Future CMS could offer more customizable and modular solutions that allow institutions to select features according to their unique needs.
- **Advanced Cybersecurity measures:** As digital solutions evolve, enhancing security measures to protect sensitive data will be paramount, ensuring user trust and compliance with regulations. Thus making it necessary to implement better and improved cybersecurity measures in CMS and AES.

VI. CONCLUSION

The College Management System (CMS) plays a pivotal role in modernizing and streamlining the administrative processes of educational institutions. By automating tasks such as admissions, course management, attendance tracking, and financial operations, a CMS significantly reduces the administrative burden, enhances communication, and improves the overall student experience. The centralized data management and reporting capabilities empower institutions to make informed decisions based on real-time analytics, fostering a more effective learning environment.

Furthermore, the implementation of AES allows for transparent and fair conduction of examination by making use of various proctoring tools. It can also allow teacher and students to asses and test their knowledge in ways that have not been done before.

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