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CEE: Exam Monitoring System

Ms. Tanishka Pingale[1], Ms. Maheshwari Sawant[2], Ms. Mayuri Kore[3], Mrs. Harshali Patil[4]

Student, Department of Computer Technology[123]

Lecturer, Department of Computer Technology[4]

Bharati Vidyapeeth Institute of Technology, Navi Mumbai, Maharashtra, India

Abstract: The Computerized Examination Engine (CEE) is an online exam monitoring system designed to ensure a fair and secure examination process. This system allows teachers to create and schedule exams while providing students with a platform to take tests efficiently. CEE enhances the traditional online examination system by integrating advanced security features to prevent cheating. It includes a tab change detection system, which warns students if they switch tabs or minimize the browser. After multiple warnings, the exam is either terminated or restarted. Additionally, camera access is mandatory to monitor students during the exam. If a student does not grant camera permissions, they cannot start the test. The system also captures screenshots and records screen activity to further prevent dishonest practices. Developed using HTML, JavaScript, and MySQL, CEE ensures a user-friendly interface for both teachers and students. The platform is efficient, reliable, and provides a seamless examination experience while maintaining integrity and fairness in online assessments.

Keywords: Secure examination, teachers, students, schedule exams, take tests, security features, prevent cheating, tab change detection, warnings, exam termination, exam restart, camera access, monitor students, camera permissions, screenshots, screen recording

I. INTRODUCTION

The advancement of technology has revolutionized the education sector, particularly in the way examinations are conducted. Traditional exams are being replaced by online assessments due to their efficiency, accessibility, and ease of management. However, this transition has introduced new challenges, such as preventing malpractices, ensuring fairness, and maintaining exam integrity. The Computerized Examination Engine (CEE) is designed to address these issues by integrating advanced monitoring features that create a secure and transparent online examination system. Unlike conventional online exams, CEE incorporates tab change detection, camera access enforcement, and screen monitoring to minimize the chances of cheating. One of the major concerns in online exams is the ease with which students can engage in unfair practices. Many students switch tabs to search for answers, use external devices, or collaborate with others through social media. Some even engage in impersonation, where another person takes the test on their behalf. To counteract these issues, CEE includes features that actively detect, prevent, and respond to such activities in real-time. The system warns students when they change tabs or minimize the browser and terminates or restarts the exam after multiple warnings. It also mandates camera access before the exam starts, preventing students from proceeding without enabling their camera. Additionally, CEE takes periodic screenshots and records screen activity, allowing teachers and administrators to review any suspicious behaviour. The CEE system is designed with multiple functionalities to enhance the online examination experience. It provides a secure login system to ensure only registered users can access exams. Teachers can schedule, modify, and manage exams, while students can take their tests in a controlled environment. A timer-based system ensures that exams are submitted automatically when the time runs out. After the exam, students can view their results and leaderboard rankings, which add a competitive element to the system. The teacher dashboard allows educators to monitor exams in real time and access security logs to review flagged cases.By integrating real-time monitoring and security features, CEE ensures a cheating-free and reliable examination environment. It enhances transparency, reduces manual effort for teachers, and ensures that online assessments are conducted fairly. This system is ideal for schools, colleges, corporate training programs, and competitive exams, providing an efficient and trustworthy solution for modern online assessments.

II. LITERATURE SURVEY

Online examination systems have evolved to address issues like logistics, security, and cheating prevention. Traditional methods lacked robust monitoring, leading to solutions like login authentication, AI-based proctoring, and tab change detection. However, challenges such as privacy concerns and high computational needs persist.

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The Computerized Examination Engine (CEE) enhances security by enforcing camera access, automated tab change detection with strict consequences, and screen monitoring through screenshots and recordings. Unlike existing systems, CEE integrates multiple security measures to create a fair and cheat-proof exam environment. Future improvements may include AI-driven behaviour analysis and voice detection, ensuring a balance between security, accessibility, and privacy.

III. METHODOLOGY

The Computerized Examination Engine (CEE) is designed to make online exams secure, fair, and easy to use. It includes different features to prevent cheating and ensure smooth exam management. Below is a step-by-step explanation of how CEE works.

3.1 System Design and Working: CEE is built using HTML, JavaScript, and MySQL to ensure a simple and efficient system. It has three main sections:

- Student Panel: o Students log in to take exams and check their results. o They must keep their camera on during the exam. o They can see a timer to know how much time is left.
- Teacher Panel: o Teachers can create exams, enter questions, and schedule tests.
- They can see student responses and check exam results.
- o Teachers can also monitor students using security features.
- Admin Panel: o The admin manages the whole system, ensuring everything runs smoothly.
  - o They can handle user accounts and monitor security settings.

3.2 User Authentication & Login Security: Before starting an exam, students must verify their identity. This helps prevent cheating and impersonation.

- Login System: Each student and teacher has a unique username and password.
- Camera Access: Students must allow their webcam before starting the exam.
- Role-based Access: Students, teachers, and admins have different permissions to ensure security.

3.3 Exam Security & Cheating Prevention: CEE includes multiple security measures to stop students from cheating.

- Tab Change Detection: o If a student switches to another tab or minimizes the browser, they get a warning.
  - o After multiple warnings, the exam gets automatically terminated.
- Screen Recording & Screenshots: o The system takes screenshots at regular intervals.
  - o The teacher can later review these to check for any suspicious activity.
- Camera-based Monitoring:

o The student's face must always be visible in the camera.

o If the camera is turned off, the exam gets paused or terminated.

3.4 Exam Process: The student logs in and selects the scheduled exam, after which the exam begins with a countdown timer displaying the remaining time. During the exam, students must answer the questions within the given time limit. If a student violates any rule, such as switching tabs or turning off the camera, they receive warnings. Repeated violations may result in the automatic termination of the exam. Once the timer runs out, the exam is auto-submitted, ensuring that all responses are recorded within the allotted time.

3.5 Result Processing and Leaderboard: After the exam is submitted, the system automatically evaluates the answers and calculates the scores. Students can check their results once the evaluation is complete. Additionally, a leaderboard is displayed, showcasing the top-performing students to encourage healthy competition and motivate others to improve their performance.

3.6 Future Improvements: To make CEE even better, we plan to add:

- AI-based cheating detection (face tracking, eye movement analysis).
- Voice monitoring to detect if students are talking to someone.
- Better privacy protection to ensure student data is safe.

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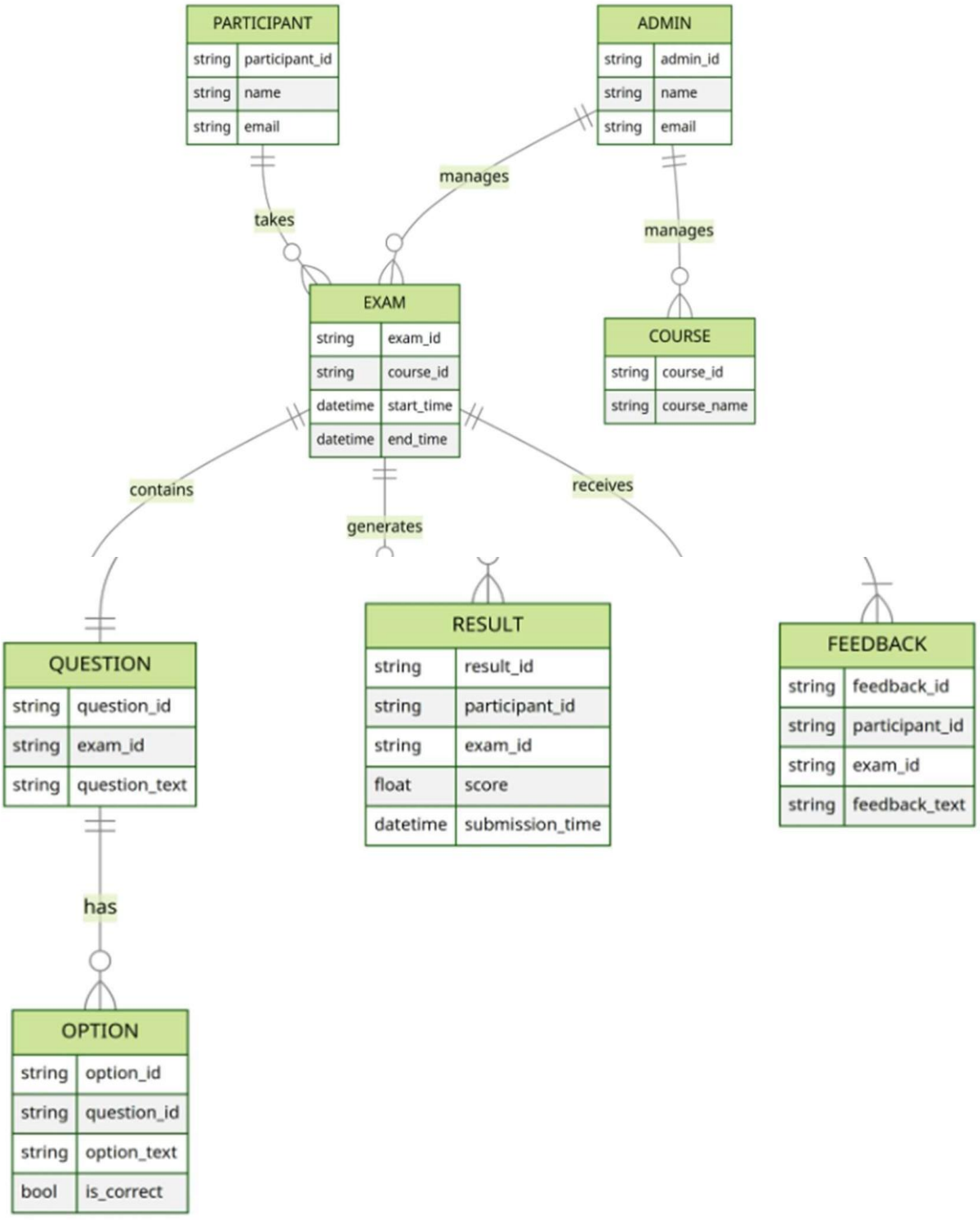

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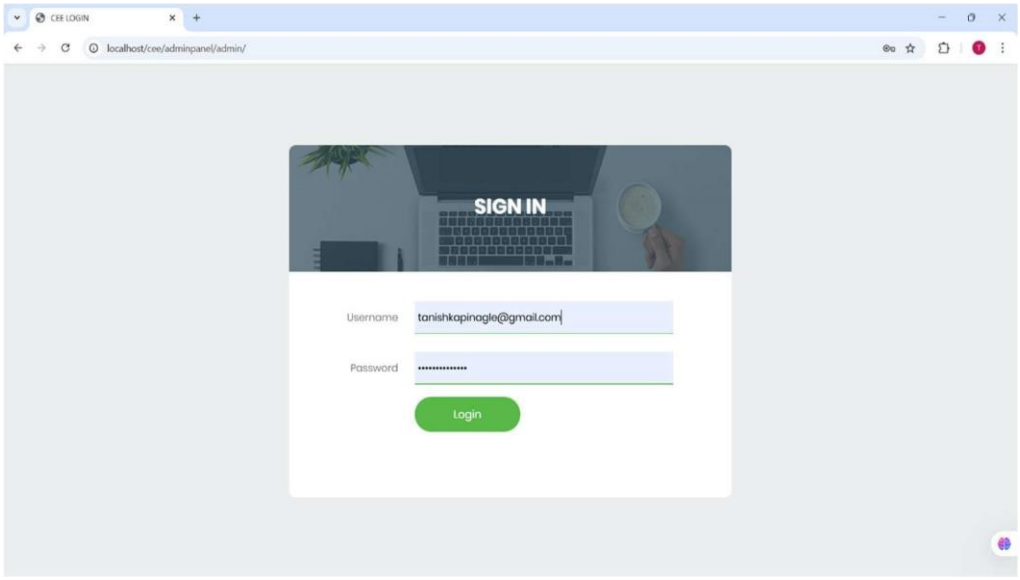
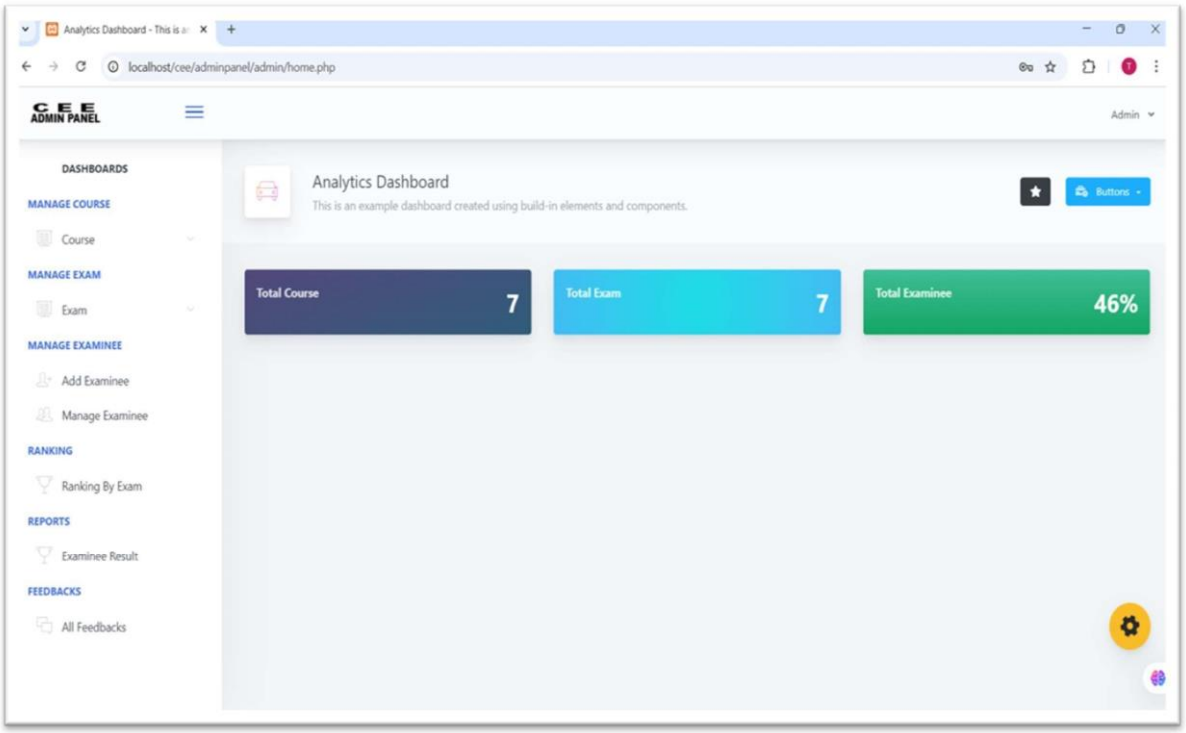
IV. RESULTS





V. CONCLUSION

The future of Computerized Examination Engine (CEE) is promising, with immense potential to revolutionize the online examination process by ensuring fairness, security, and efficiency. As advancements in artificial intelligence, machine learning, and real-time monitoring technologies continue to evolve, CEE will become more robust, adaptable, and effective in preventing malpractice during online assessments. The integration of AI-based proctoring, biometric authentication, and advanced monitoring techniques such as face tracking and voice recognition will further enhance the credibility of online exams.CEE can be expanded beyond educational institutions to be utilized in corporate training, certification programs, and competitive exams, making it a valuable tool for various industries. However, challenges such as data privacy, infrastructure requirements, and ensuring accessibility for students with disabilities must be addressed for the system to achieve its full potential.

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Future research should focus on refining CEE by incorporating ethical considerations, minimizing false positives in proctoring, and ensuring a balance between security and user experience. In conclusion, the development of CEE represents a significant step toward creating a secure and transparent online examination system. By continuously improving monitoring mechanisms and leveraging emerging technologies, CEE has the potential to transform digital assessments into a more reliable and standardized process. With ongoing research, innovation, and collaboration, CEE can set new benchmarks for online examinations, making them fair, accessible, and efficient for all.

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