

SMART EDUCATIONAL ECOSYSTEM WITH AUTOMATED MONITORING AND COLLABORATIVE TOOLS.

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College: Angadi Institute of Technology and Management, Belagavi

Branch: Department of Computer Science and Engineering

Guide: Prof. Mr. Vilas jarali

Student(s): Mr. Pramod Topannavar

Mr. Prathamesh Manohar Kumbhar

Mr. Yugant D. Koulgekar

Mr. Siddappa Irappa Totager

Keywords:

Remote Education, Automated Monitoring, Attendance Management System, Real-Time Collaboration.

Introduction:

The Smart Educational Ecosystem with Automated Monitoring and Collaborative Tools is designed to ensure focus and integrity during practical exams and lab sessions. It restricts unauthorized activities such as using AI tools, search engines, and personal applications. The system enables teachers to assign tasks and monitor student activities through real-time tracking. Teachers can review student compliance with academic guidelines. Students are required to log into a desktop application to access the system. The desktop app enforces restrictions to prevent unauthorized activity. It captures periodic screenshots of the student's screen during sessions. The application also tracks usage of applications to ensure task compliance. This system ensures that students adhere to the given academic requirements. Additional features include automatic attendance logging for every session. The platform allows students to submit their tasks through the dashboard. Teachers can easily manage and track task submissions. Video conferencing is integrated for supervise discussions between teachers and students. These discussions ensure proper communication and monitoring during sessions. Overall, the system creates a secure and productive learning environment that upholds academic integrity.

Objectives:

1. To stop students from using AI tools, search engines, or personal apps during lab sessions and exams.
2. To mark student attendance automatically with login time, logout time, IP address, and location.
3. To help teachers give tasks, check progress, and review student work easily.
4. To track how well students follow their tasks using activity logs and performance data.
5. To let students send leave requests and make it simple for teachers to approve them.
6. To provide a simple and easy-to-use system for both students and teachers.

Methodology:**The project involves:****1. Feature Identification and Requirement Analysis:**

Identify and list the key features essential for the teacher and student dashboards. This includes functionalities such as student enrolment, task assignment, attendance tracking, screen monitoring, and leave management.

2. Interface Design:

Design user-friendly and intuitive interfaces for both teachers and students. Ensure that the interfaces are non-intrusive and easy to navigate while maintaining functionality and accessibility.

3. Desktop Application Development:

Develop a lightweight desktop application for students that runs in the background. This app logs attendance automatically, captures periodic screenshots, tracks device/application usage, and enforces academic restrictions during sessions.

4. Frontend, Backend, and Database Integration:

Build the system's frontend and backend using modern web development technologies. Design a scalable and secure MySQL database to manage user records, attendance logs, activity tracking data, and task submissions.

5. Real-Time Communication Features:

Integrate video conferencing using technologies like WebRTC to support supervised virtual discussions and online academic interactions. Enable real-time data connectivity between the dashboards and the desktop client.

6. Technology Stack and Tools Utilized:

Use tools such as Visual Studio Code, Anaconda Navigator, and MySQL Workbench. Employ frameworks and libraries like Django, Electron JS, Node.js, WebRTC, and Pillow for full-stack development and media handling.

7. Testing and Debugging:

Conduct thorough testing of individual modules and the complete system to ensure performance, security, and usability. Resolve any bugs and refine the user experience through continuous testing and feedback

8. Cloud Deployment:

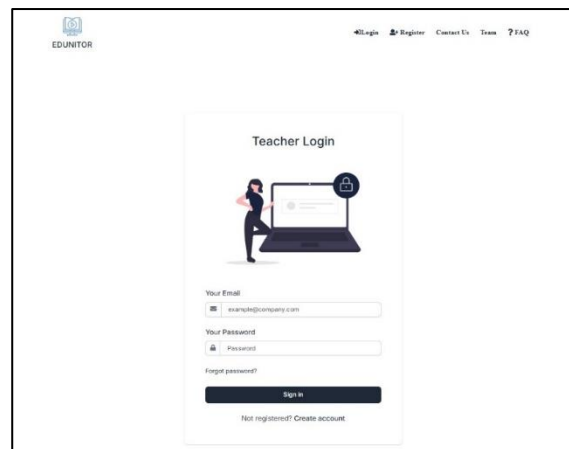
Deploy the final system on a scalable cloud platform. This enables anytime-anywhere access, efficient resource management, and readiness for future updates or expansion.

Result and Conclusion:

In conclusion,

The Smart Educational Ecosystem with Automated Monitoring and Collaborative Tools addresses critical challenges in maintaining academic integrity, monitoring student activities, and managing practical exams and lab sessions effectively. By integrating features such as real-time activity tracking, automated attendance logging, task management, and secure video conferencing, the system creates a controlled and productive academic environment. It bridges the gap between existing tools by providing a unified platform tailored to educational needs, ensuring students remain focused on their tasks while enabling teachers to supervise and evaluate performance

efficiently. This solution not only fosters integrity but also enhances the overall efficiency of academic workflows.



The future scope of this project includes:

1. Mobile App Version
2. More Secure Monitoring
3. Better Performance Reports
4. Offline Access and Sync
5. Integration with Other Platforms
6. Smart Notifications
7. Multi-Institute Support
8. AI-Based Behaviour Analysis