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Skill Navigator Application with Proctoring AI

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ABSTRACT

The proposed Skill Navigator Application will provide simplified course enrollment, module navigation, and assessments. This will make sure that learning is effective and structured. It provides role-based access to allow students to enroll in courses, complete video-based modules, and take proctoring-enabled assessments to evaluate knowledge while ensuring exam integrity. Proctoring tool can be linked with google forms or Microsoft forms. It enhances exam integrity by detecting suspicious activities, restricting unauthorized access, and providing detailed reports for administrators. Once a satisfactory score is achieved, students can unlock certificates and provide feedback, which is analyzed for sentiment to improve the platform continuously. Administrators can track enrollments, review student feedback, and leverage AI-driven insights to understand user experiences. Built with React, Tailwind CSS, and MySQL, and featuring Google OAuth and standard login, Skill Navigator ensures a secure, seamless, and data-driven learning journey.

Keywords: Proctoring, Assessments, Certificates, Feedback analysis, Google OAuth, MySQL, Artificial Intelligence.

1. INTRODUCTION

Skill Navigator is an innovative learning management system designed to provide an interactive and seamless learning experience for students while offering vital analytical insights for administrators. The platform allows students to enroll in courses, navigate structured learning modules, and evaluate their knowledge through assessments. Once the student completes the assessment successfully, they can unlock certificates that will show their progress and achievements.

A critical deficiency of the conventional e-learning system is ineffective progress tracking, recommendations, and security measures. The Skill Navigator deals with these challenges by providing AI-driven insights into user behavior, facial recognition login for secure authentication, and sentiment analysis for the best possible recommendations on courses to pursue. This system has modules with video, structured assessment.

It ensures that student is learning the updated video modules by looking at the “Last updated” context below the videos.

Skill Navigator employs role-based access control, distinguishing between students and administrators. While students focus on learning and certification, administrators can monitor enrollments, review

sentiment-based feedback, and refine content based on user experiences. The AI-powered feedback system classifies responses as positive, neutral, or negative, providing valuable insights that drive continuous platform improvements and informed decision-making.

The project is built on React, Tailwind CSS, and MySQL with a modern scalable and responsive architecture. The user authentication is implemented using Google OAuth and standard login. The user session management would also help with the resumption of learning so that no loss of data occurred, and that makes the site very reliable.

With advanced web technologies and AI-driven feedback analysis, Skill Navigator optimizes the efficiency of learning, improves administrator decision-making, and provides a personalized, engaging, and structured learning environment. The system guarantees real-time insights for students, while educators gain data-driven improvements in course content and assessments.

Beyond the organized learning and testing process, competency-based learning is further enhanced in the Application because certificates are unlocked only after the student attains a qualifying score. Also, the feedback mechanism based on sentiment continuously enhances course content, thereby keeping it current and relevant for effective use. Bridging traditional education and digital learning, it ensures secure, intelligent, and adaptive learning through modern technology stacks, authentication, and AI-based analytics. It mainly focuses assessment proctoring.

2. RELATED WORK

A module for course management provides facilities of adding new courses, managing or updating existing courses, assigning teachers to courses and other course-related details. The student management module contains student enrollment and student registration for regular and elective courses. It is very important in order for the other modules to work properly with accuracy. The online examination module is typically used for the automation of student assessment. It is really helpful to a teacher since it saves much time. Since no human interaction is taken into this module, it gives 100% accuracy. In an online assessment module, a student can submit the assignment electronically. Thus, no need to submit it with paper. It saves much paper, therefore. There is online course material management module through which teacher can upload tutorials, videos, and other useful materials. Using this module student can view and download these materials for study purpose. A module for managing feedback where students are able to give feedback for each of the subjects and teachers and only authorized person can view the feedback. This is very helpful module for teacher assessment [1].

The system will allow users to access training sessions in audio, video, and text formats. This system will help users save time, money, and effort. The proposed system was very easy to use and operate and proved to be an efficient way to complete the training [2].

LMS platforms allow the teacher to order and deliver course material in structured and accessible ways. The lecture notes, presentations, videos, and all forms of multimedia can be shared promptly with the students, allowing them to learn, review, or prepare from anywhere at any time. With this platform, the teaching position grants the educator with a comprehensive admin role. This enables them to create,

manage, and update their course content so that they are fully in control of their learning materials. Educators can manage their students (e.g., enrolling students, tracking progress, providing feedback), while administrators retain overall platform control fostering a secure and well-organized learning environment. There are some security challenges that need to be kept in mind when developing such a learning platform. Some of the major challenges are Data Privacy, Content Security, Authentication and Authorization, Inter process communication, Access controls, Data loss [3].

The interface has been designed keeping in mind that the intended users would be teachers, students, and parents. The platform would provide an interface to teachers to upload attendance, circulars, notes, and schedule tests. Students would be able to view their attendance records, course status, test performances, and access online study resources. Our platform is made to make education easier by unifying all that a student and a teacher need for communication, access to resources, and updates into one platform. The administrator would be responsible for keeping track of the database, ensuring that everything is running perfectly [4].

Our methodology is multi-pronged. We conducted surveys with students and instructors who have used e-learning platforms based on projects, whereas for the traditional method, we compared those experiences. Most of these were quantitative analyses in terms of engagement level, skill development, and satisfaction. Qualitative analysis was carried out in the form of feedback and testaments from both learners and educators. To develop a comprehensive perception of project-based e-learning, this data has been supplemented with a review of existing academic literature [5].

To make eLearning more effective, gaps like this need to be filled in by administrators. That is where the importance of sentiment analysis lies. It can help educators analyze student feedback and teach accordingly for perfect results. We also discussed some of the combined approaches used for Sentiment Analysis in online learning. The paper ends with a discussion of the limitations and challenges faced by researchers and the further scope for work in this field [6].

By tracking user activity, test scores, and progress in learning, the system learns to tailor content delivery to achieve maximum learning. Adaptive learning systems employ intelligent tutoring technology, learning analytics, and customized learning paths to offer suggestions and feedback. The technologies enable the e-learning process to be flexible and engaging, ensuring that candidates learn material relevant to their skill level. AI-powered adaptive learning facilitates lifelong learning by showing the right content to the right user at the right time [7].

It explains why AI-powered proctoring mechanisms like speech recognition, audio monitoring, and anomaly detection are necessary to guarantee the integrity of exams. It also explains how adaptive learning technology and role-based access control enhance accessibility in online tests. The research also highlights the importance of secure session management, authentication processes, and feedback analysis in order to make the overall e-learning experience better [8].

3. PROGRAM DESIGN METHODOLOGY

A. Proposed System

The proposed system, is a systematic structured e-learning system aimed at offering student easy access to courses, genuine assessments with secure proctoring, and systematic feedback collection. It provides a systematic learning process in which users can register for courses, take assessments, and receive certificates while admin can the students who enrolled for different course and review their feedback to enhance course content regularly.

TABLE I. CORE FEATURE OF SKILL NAVIGATOR

Metrics	Implement Stack
Authentication Security	Google OAuth, Standard Login
Video-Based Learning	Self-paced, Pre-Recorded Lecture to watch & learn
Certificate Issuance	MySQL Score Validation, React UI for Certificate Unlocking
Feedback & Sentiment Analysis	AI-Based Sentiment Analysis, MySQL Data Processing
Session Management	JWT Authentication, MySQL Session Storage
Proctored Assessments	AI-Powered Activity Monitoring, Tab Switching and

The approach of design to enhance the Application is based on development of a well-organized, scalable, and e-learning platform for optimizing student experience and administrator effectiveness. The system prioritizes role-based access control, ensuring a secure and structured learning environment for students and administrators. A role-based access control system guarantees students and administrators have distinct functionalities, with a secure learning environment. Security measures such as JWT authentication and session management guarantee data integrity and secure access.

The assessment module includes Google Forms-based proctoring to ensure examination integrity. The website is built using, responsive design in React, Tailwind CSS, Node.js, and MySQL for scalability, smooth operation, and usability. Payment gateway integration for course enrollment and feedback

analytics for course improvement enhance the learning experience.

TABLE II. SKILL NAVIGATOR FUNCTIONALITY

Functionality	Description	Implementation
Student & Admin Login	Student & admin has different login and secure authentication.	Google OAuth, standard login.
Course Enrollment	Student view: Browsing and enrolling the courses available	React for frontend and MySQL for database to store courses
Course Module Navigation	Structured learning in the form of modules, video-based	React UI, APIs at the backend for fetching module data
Proctored Assessments	AI-based monitoring for test malpractice	Python Model
Certificate unlocking	Certificates issued only after student scores well	Validation of scores from Spreadsheet
Payment for enrolling course	Integration of payment gateways	Stripe for payment integration.
Sentiment-based Feedback	Students provide feedback, analyzed using AI for sentiment classification.	AI sentiment analysis on stored feedback data.
Secure Session Management	Admins track enrollments and review sentiment-based feedback.	React frontend with MySQL queries for analytics.
Scalable and Responsive UI	Modern, user-friendly interface for seamless learning.	Built with React & Tailwind CSS.

B. System Architecture

The Skill Navigator system architecture combines authentication, role-based access, course registration, AI-proctored tests, feedback analysis, and AI-powered insights to facilitate learning. Users log in through facial recognition, providing access based on roles—students or administrators. In case of failed authentication, access is not provided; otherwise, students can register for courses, complete structured video-based modules, and take AI-proctored tests. If they score a satisfactory score, they get certificates unlocked; otherwise, they have to retake tests. Administrators monitor enrollments, analyze student feedback, and leverage AI-based sentiment analysis to derive insights for course enhancement. This architecture provides a secure, scalable, and smart learning experience with automated monitoring, malpractice avoidance, and data-driven decision-making.

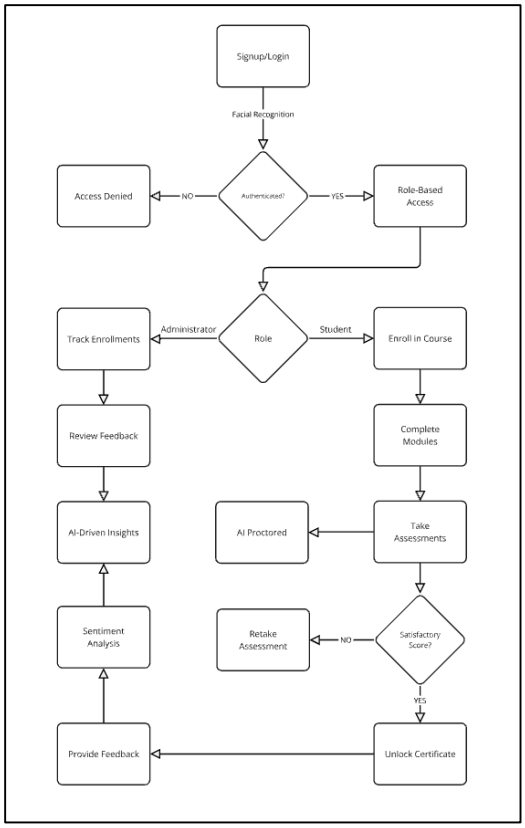

Fig 3.1

4. IMPLEMENTATION MODULES

Authentication Module:

Handles standard login and Google OAuth for secure user authentication.

Highlights candidates and trainers, providing required access.

Assessment & Certification Module:

Delivers quizzes and exams to assess candidate performance.

Installs certificates on successful assessment completion.

Proctoring Module:

Enables trainers to use Google Forms-based proctoring for secure testing.

Assists in keeping exam integrity intact and averts malpractice.

Feedback Module:

Gathers candidate feedback upon course completion.

Allows trainers to analyse responses and enhance course content.

5. PERFORMANCE

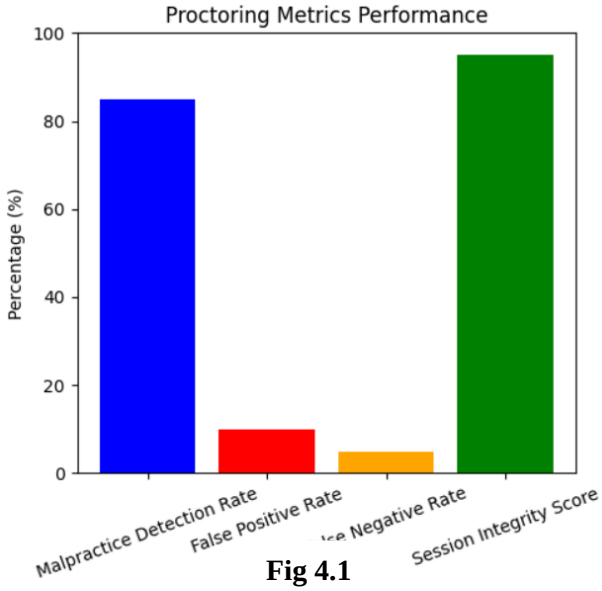

Fig 4.1

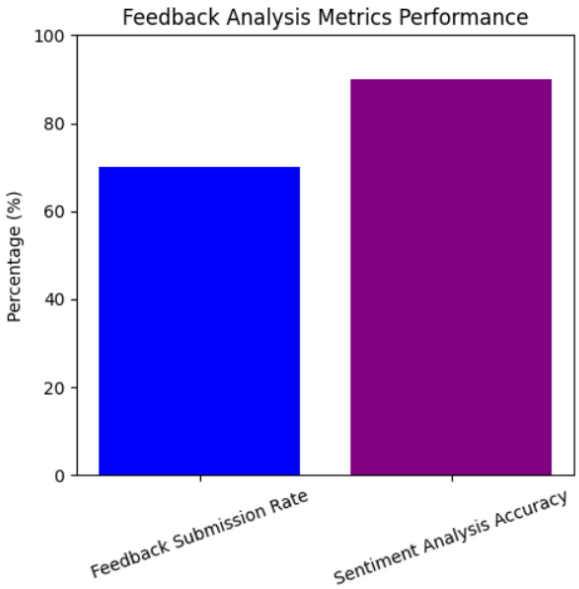

Fig 4.2

6. CONCLUSION

In conclusion, the Skill Navigator web application has a strong learning platform with ongoing improvements to solve its current flaws. While issues such as real-time features, scalability, and manual feedback collection exist, it is through constant optimizations and automation that the entire user experience will be improved. It is changing according to the evolving needs of users for seamless and efficient learning.

7. FUTURE ENHANCEMENTS

AI-Powered Personalized Learning Paths:
Utilize AI-powered recommendations to offer courses based on candidate interests, historical performance, interactive chatbots and career objectives for candidates.

Automated Grading System:
Use AI-driven assessment evaluation for coding tasks and descriptive responses to minimize manual effort.

Blockchain-Based Certificate Verification:
Use blockchain technology for safe, tamper-proof certification that employers and institutions can instantly verify.

Multilingual Support for Global Accessibility:
Extend the platform by providing courses and navigation in multiple languages to make it more accessible.

Gamification & Leaderboards:
Add badges, leaderboards, and reward points to drive engagement and encourage learners by giving daily login points.

Virtual Labs & Hands-On Practice Environments:
Add cloud-based virtual labs for programming, cloud computing, and networking courses to provide hands-on practice.

Live Interactive Sessions with Trainers:
Add live video conferencing for real-time interaction between trainers and candidates to facilitate improved engagement.

These additions will enhance efficiency, engagement, and scalability, making Skill Navigator a more effective e-learning solution.

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