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Academia Tracker

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ABSTRACT

The proposed system is a Role-Based Project Monitoring System designed using the MERN (MongoDB, Express.js, React.js, Node.js) stack. This system facilitates project tracking and monitoring for students, mentors, and Heads of Departments (HODs). Students work in teams of three and are responsible for daily updates, including GitHub repository links, research paper and patent submission statuses, and improvement logs. Mentors can review these updates, suggest changes, and monitor progress. HODs ensure mentors are actively guiding students and that students are consistent with their project development. The system enhances collaboration, accountability, and efficient tracking in academic projects.

KEYWORDS: The **Role-Based Project Monitoring System**, built using the **MERN stack**, streamlines academic project management with **real-time progress tracking**, **GitHub integration**, and **automated notifications**. It offers a **user-friendly interface** for students, mentors, and HODs to collaborate, track tasks, and provide feedback. With **secure authentication** and **role-based access control**, it ensures efficient project supervision and accountability.

INTRODUCTION

The Role-Based Project Monitoring System is a web-based application developed using the MERN (MongoDB, Express.js, React.js, Node.js) stack, aimed at improving the tracking and supervision of academic projects. It addresses the inefficiencies of traditional manual tracking by providing a structured platform where students, mentors, and Heads of Departments (HODs) interact based on defined roles. Students, working in teams, can submit daily updates including GitHub links, research paper statuses, and progress logs. Mentors review these submissions, provide feedback, and track student development, while HODs oversee mentor involvement and overall project progress. By enhancing transparency, accountability, and collaboration, the system ensures effective project execution and timely guidance throughout the academic lifecycle.

SYSTEM ARCHITECTURE

The system is structured as a multi-role web platform. Each role is given a secure login and specific dashboard functionalities. Data flows through a React-based frontend to a Node.js/Express backend, with MongoDB used as the database. Authentication is managed securely for role-specific access.

FEATURES AND FUNCTIONALITIES

- **Student Login:** Students can log in individually within their project team, allowing them to submit daily updates and track their own progress. Each student can log specific project tasks, such as progress on GitHub repositories, research papers, and patent submissions.
- **Mentor Login:** Mentors have access to the project updates of the teams they are assigned to. They can review the submitted progress, provide feedback, and monitor the overall project health to ensure that students meet deadlines and quality expectations.
- **HOD Login:** Heads of Departments (HODs) can view the activities of all assigned mentors and ensure that students are submitting regular updates. HODs can also monitor mentor involvement and overall student compliance with project timelines.
- **GitHub Integration:** Students are required to submit daily GitHub repository links, which mentors can review to track project code development and collaboration. This integration ensures real-time tracking of code commits, fostering efficient code management and version control.
- **Daily Logs:** Students can log daily updates detailing their progress and challenges faced during the project. The log includes improvement descriptions, allowing mentors and HODs to monitor the progress over time and identify areas needing attention.

- **Paper/Patent Upload:** An interface is provided for students to upload research papers, patent applications, or other project-related documents. This functionality helps keep all project documentation centralized and easily accessible for mentors and HODs.

TECHNOLOGY STACK

The Role-Based Project Monitoring System is built using the MERN stack, which includes **MongoDB** for storing user data, daily updates, and project logs; **Express.js** as the backend framework to manage API endpoints and server logic; **React.js** for building an interactive and responsive user interface; and **Node.js** as the runtime environment to execute backend services. Additionally, the system utilizes **GitHub** for hosting and tracking student project repositories, enabling mentors and HODs to monitor real-time development progress directly through repository links.

REAL-TIME PROGRESS TRACKING AND FEEDBACK

The Role-Based Project Monitoring System (RPMS) enables real-time tracking of student project updates, providing mentors and HODs with immediate insights into completed milestones and pending tasks. Visual feedback, such as progress bars and status indicators, helps students recognize their performance, stay organized, and focus on areas that need attention, fostering a sense of achievement and accountability throughout the project cycle.

INTELLIGENT RECOMMENDATIONS AND ANALYTICS

Based on project activity patterns, RPMS offers intelligent suggestions to optimize team productivity and mentor guidance. Using analytics derived from MongoDB-stored data, the system can help users refine their approach, improve deadline adherence, and ensure project consistency. These insights support mentors and HODs in making informed decisions while encouraging students to enhance their development strategies.

SECURE FILE MANAGEMENT AND COLLABORATION TOOLS

Students can upload and manage project-related files, such as reports, GitHub links, research papers, and patent drafts, in a secure and organized manner. The system supports structured file storage and sharing across team members and mentors. With built-in access control, users can confidently collaborate while maintaining data privacy. Regular summaries and downloadable reports allow students and faculty to review progress, adjust strategies, and promote continuous project improvement.

FUNDAMENTAL TECHNIQUE

A fundamental technique behind the development of the Role-Based Project Monitoring System is the structured management of roles, data, and workflows to ensure accountability, transparency, and collaboration in academic projects. The system is designed to break down the complex process of project tracking into clearly defined tasks for each user role—students, mentors, and HODs—while automating communication and monitoring using modern web technologies. Through real-time updates, guided supervision, and centralized project documentation, the system creates a streamlined and goal-driven environment for academic project development.

TECHNIQUES FOR STRUCTURED MONITORING

PROPOSED METHOD

1. **Role-Based Data Management with MongoDB:**

MongoDB is used to store structured and unstructured data related to users, roles, project updates, GitHub links, and submission logs. Separate schemas are maintained for students, mentors, and HODs to enable role-specific functionalities. Project update logs, feedback comments, and team performance records are stored and retrieved dynamically to provide a continuous record of progress.

2. **Workflow Control and Task Routing with Express.js and Node.js:**

The backend built with Express and Node.js handles task-specific routing and API logic based on the logged-in user's role. This enables mentors to receive only student updates under their guidance, HODs to oversee all teams and mentor feedback, and students to interact only with their own project modules. Custom APIs handle feedback submission, task updates, and role transitions.

3. **Interactive Progress Dashboard using React.js:**

The frontend interface is designed with React to be intuitive and role-sensitive. Students have access to modules for daily updates, improvement logs, and resource uploads. Mentors and HODs see real-time dashboards displaying team performance, feedback summaries, and flagged issues. Visual cues such as colored status indicators and progress bars help users monitor development stages.

4. **Real-Time Monitoring and Analytics:**

The system continuously tracks key project metrics like update frequency, submission timeliness, and feedback turnaround using MongoDB's time-stamped entries. These are visualized through charts and reports in the frontend, giving all stakeholders insights into project health and engagement levels.

5. **Notification System for Updates and Feedback:**

The backend includes a notification service to alert users about pending tasks, unread feedback, or upcoming deadlines. Email or in-app notifications are sent when a student misses updates, a mentor provides feedback, or an HOD raises a review flag. This ensures timely actions and keeps all participants aligned with their responsibilities.

6. **Collaborative Feedback and Review Loop:**

The system supports a structured feedback loop where mentors can comment on updates, request clarifications, or approve milestones. HODs can oversee these interactions, ensuring mentors are active and students are responsive. This loop fosters accountability and promotes active engagement between all participants.

Results and Discussions

The implementation of the Role-Based Project Monitoring System using the MERN stack has demonstrated effective results in streamlining academic project supervision and enhancing communication among students, mentors, and Heads of Departments (HODs). Leveraging MongoDB's flexibility, the system efficiently stores user credentials, project updates, and feedback logs, enabling real-time access and historical tracking. The backend, powered by Express.js and Node.js, supports dynamic routing and role-based functionalities, ensuring that each user accesses only relevant data and tasks. React.js significantly improves the user experience by providing an intuitive and responsive interface where users can submit updates, review feedback, and track project progress visually. The system fosters accountability through structured workflows, timely notifications, and progress analytics, helping institutions ensure consistent project development and mentorship. Overall, the MERN-based architecture proves to be robust and scalable, offering real-time collaboration, efficient data handling, and role- based access control, making it a practical and valuable tool for managing academic projects in a transparent and organized manner

Conclusion and Future Enhancements

In conclusion, developing the Role-Based Project Monitoring System using the MERN stack offers a robust and scalable solution for managing academic projects with improved transparency, accountability, and collaboration. By utilizing MongoDB for flexible data storage, Express.js and Node.js for custom backend logic, and React.js for an intuitive and responsive frontend, the system successfully facilitates real-time updates, role-specific dashboards, and efficient tracking of student progress and mentor feedback. The platform ensures streamlined communication between students, mentors, and HODs, creating a well- structured environment that supports consistent project development and timely intervention. For future enhancements, the system could integrate data analytics and machine learning models to assess student performance trends and predict potential delays or issues. Implementing real-time chat or video conferencing features would improve mentor-student interaction and collaboration. Additionally, incorporating mobile support via React Native would enhance accessibility, enabling users to monitor and manage projects from any device. These advancements would make the system even more adaptive, interactive, and effective in supporting academic project workflows across institutions.

FUTURE SCOPES

Advanced Personalization with Machine Learning Integration

Future versions of the Role-Based Project Monitoring System can integrate machine learning algorithms to analyze project activity patterns and team performance. This would enable personalized dashboards and predictive insights, such as identifying teams at risk of delay or mentors needing to increase engagement. Using historical data from MongoDB, the system can offer suggestions for improving project management and flag inconsistencies or inactive contributors early on.

AI-Powered Adaptive Feedback and Evaluation

AI-driven tools can be implemented to adapt the system’s feedback mechanisms based on project complexity and team performance. For example, if a student group consistently struggles with research submissions or misses deadlines, the system could automatically recommend resources, issue reminders, or escalate the case to the HOD. Smart evaluations and dynamic milestone generation could make project monitoring more responsive and efficient.

Cross-Platform and Offline Functionality

Expanding the platform to support mobile and offline access would enhance usability for all stakeholders. Leveraging React Native and Progressive Web App (PWA) technologies, users could submit updates, review feedback, and track progress even without an internet connection. All data would sync with MongoDB once connectivity is restored, ensuring continuous access and uninterrupted workflow.

Data-Driven Insights and Analytics

Enhancing the analytics module to include deeper insights—such as mentor activity heatmaps, student consistency charts, or comparative performance metrics—would empower HODs with valuable data. These visual reports could help identify bottlenecks in the project process and support institutional decision-making regarding academic supervision effectiveness.

REVIEW:

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