RESEARCH ARTICLE

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Web Implementation of the Smart Project Allocation

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Abstract
Final year projects are integral to graduation, showcasing students' depth of knowledge and essential soft skills like creativity and problem-solving. Recognizing the challenges of managing these projects manually, our project introduces a web-based Student Project Allocation and Tracking system. This system recommends project titles, prioritizes teams, matches projects and teams, manages project progress, and generates reports. Notably, it includes unique project title functionality to eliminate redundancy in project proposals, streamlining selection. The system aids Project Internal Guides, facilitating project selection and allocation, while empowering students to submit preferences. Heads of Departments (HODs) can utilize it to track project progress with involvement from Project Coordinators, supervisors, HODs, and students. The system also offers administrative tools such as project status reports, supervisor workload analysis, and automated reminders for upcoming submissions .By leveraging automation and intelligent allocation, the platform reduces administrative workload, enhances transparency, and fosters seamless collaboration ultimately improving the overall project management experience for students, supervisors, and academic coordinators, this application enhances collaboration, making the supervision process more formal and professional, thereby improving overall efficiency and quality.

1. Introduction

Electronic mart project allocation system for final year students, Final-year projects are a difficult part of undergraduate education allowing students to demonstrate their technical knowledge, creativity and teamwork skills. Notwithstanding, the hand-operated access to cast allotment and trailing much results in inefficiencies, duplicated topics and sick workload among supervisors. These problems not only delay the project initiation method but also hinder effective academic supervision. To overcome these challenges, we propose a smart project allocation and tracking system. A web-based platform layout to simplify project assignments, watch progress and ensure transparency. Throughout the project lifecycle. The unit showing intelligence suggests alone cast titles allocates topics founded along pupil preferences, pedantic operation and accessibility of in guides and provides dashboard for real-time accessing students and

provides dashboards for real-time trailing away staff and section heads. The unit offers bespoke connections for students, supervisors, cast coordinators and HODs. Integration important role abilities such as arsenic automatic deadline reminders, supervisory program workload psychoanalysis and cast condition coverage. Also the platform highlights eliminating redundancy in project proposals by validating the uniqueness of suggested titles. Minimizing administrative aerial and facultative information-driven decision-making. Traditional project management methods are supply-intensive and frequently result in duplicated project titles, biased allocations and limited tracking capabilities. Thither is an amp light take for amp focused digital root that simplifies cast twin spell ensuring equity and transparency. Our proposed system addresses these concerns through mechanization smart allocation procedures. Collaborative tools that streamline supervision and progress assessment Contribution this unit adds importantly to pedantic organization introducing a forward ascendable program that revolutionizes final-year cast treatment through characteristics like unique title enforcement, dynamic allocation, and faculty workload balancing. It promotes productivity and standardization. The program ensures sander coordination among students, supervisors, mentors and HODs. It enables collaboration between students, guides, project coordinators, and department heads in real time. The system also provides useful features for administration, such as reports on supervisor workload, dashboards showing project status, and automatic reminders for deadlines. By integrating smart automation and centralized access it cuts down manual work ensures fair project distribution and improves communication among all parties involved. A motivation with more students entering higher education managing final year projects with traditional methods has become tougher. Manual processes often result in repeated project titles and project progress. There is a strong need for a scalable system that can efficiently assign projects streamline supervision. Addresses these challenges by digitizing the allocation process and incorporating tools for progress tracking and reporting which makes supervision more organized, efficient and collaborative b research

contribution. This system presents a smart role-based and automated framework for handling final year academic projects. It shifts away from inefficient manual methods to a dynamic data-driven platform. Key contributions include ensuring unique project titles, automating team and supervisor matching, managing faculty workload and tracking progress in real time. By centralizing the project lifecycle into one platform, the system enhances communication, builds accountability and provides transparency, leading to better student outcomes and a more organized academic environment.

2. Literature Review

The effective management of final year student projects is a recurring challenge in academic institutions notably in terms of allocation progress tracking and supervision. Different technical answers have been planned to work these problems ranging from obtuse spreadsheets to general web-based platforms. This section examines previous research and developments related to project allocation and tracking systems outlining their contributions limitations and opportunities for Improvement.

2.1. Existing Project Management Practices in Academia

Traditional project allocation and tracking methods in academic settings are often manual involving physical records or basic tools such as Excel sheets and emails. These methods are prone to errors, duplicate miscommunication and inefficiencies in treatment aggregate stakeholders, student's supervisors and administrators. Studies have highlighted Problems such as redundant project titles, uneven workload distribution among supervisors and lack of centralized tracking which collectively reduce the quality and effectiveness of project supervision.

2.2. Web-Based Systems for Academic Project Management

To mitigate the limitations of manual Methods researchers and developers have introduced web-based systems that simplify project allocation watching and reporting. These systems enable real-time information debut focused approach to pupil and supervisory program inputs and efficient cast lifecycle direction. Several academic institutions have adopted such tools to improve transparency communication and documentation.

Notwithstanding numerous present systems are modest inch range deficient characteristics care smart claim recommendations pupil penchant treatment and supervisory program workload analysis.

2.3. Mart allotment and trailing mechanisms

Recent studies center on integration of smart characteristics into cast direction systems such as arsenic automatic project-title suggestions. Preference-based twin procedures and dashboards for supervisors and administrators. These characteristics are layout to support informed decision-making and fair allocation. Around systems to admit automatic alerts and notifications enhancing exploiter employment and deference with deadlines. Nonetheless researchers note that personalization, real-time analytics and end-to-end collaboration tools are still underdeveloped in many applications.

2.4. Limitations of Existing Research Gaps

Despite improvements current academic project management systems face limitations in terms of expandability customization and operator adoption. About miss back for department-wide lapse cross-platform availability and consolidation with institutionalized pedantic systems.

3. Proposed System

The proposed web-based Student Project Allocation and Tracking System aims to streamline and digitize the Method of final year project management in academic institutions. Organized to work the inefficiencies of conventional hand-operated systems this program simplifies name methods including cast claim check up the team-project twin construct trailing and account propagation. The system Improves transparency, reduces redundancy and improves decision-making for all academic stakeholders. The system comprises role-based access for students project internal guides, project coordinators and Heads of Departments (HODs). Students get state cast preferences done associate in nursing visceral port spell the unit approves cast titles for singularity thereby eliminating iterative or superfluous cast proposals. Based on predefined criteria such as student effectiveness preferences and supervisor availability the system allocates projects and supervisors automatically ensuring fair distribution and minimizing administrative delays. To aid project watching the system offers real-time progress tracking and Produces comprehensive reports at various stages of the project lifecycle.

Guides and coordinators get proctor pupil submissions, survey milepost completions and value operation. The system also provides characteristics such as supervisor workload analysis, deadline tracking and simplified reminders to ensure timely submissions and balanced supervision. [1]

3.1. System Architecture

The architecture of the student project allocation and tracking system is designed to make sure efficient venture management, seamless collaboration and clever automation. It incorporates three principal layers: the presentation layer frontend, the application logic layer backend and the data layer database (as fig.3.3.1). The frontend is a responsive web interface that allows students to register, put up challenge preferences and song progress while faculty members along with supervisors, project coordinators and heads of departments. HOD scan assessment allocations reveal workloads and generate reviews; the backend handles core functionalities which include specific venture title validation and sensible crew-mission. (Figure 1)
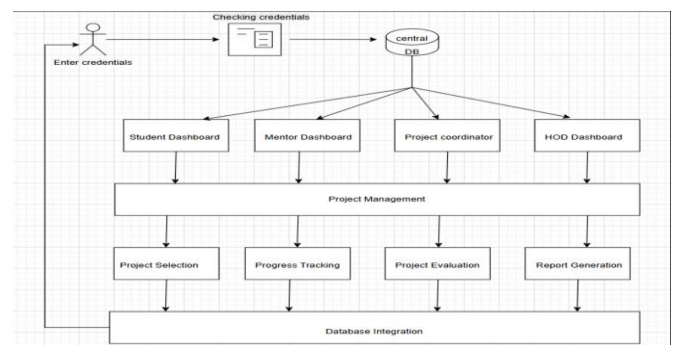

Figure 1 System Architecture

4. Working Process

- **User Authentication:** Students supervisors undertaking coordinators and hods authenticate through a steady login gadget to make certain handiest legal customers can get right of entry to the platform project preference submission after logging in college students can browse encouraged project titles, publish their possibilities and shape teams through the net interface project allocation.

- **Validation:** The gadget makes use of wise algorithms to fit initiatives with scholar groups primarily based on options availability and identify forte warding off duplicate or redundant proposals, progress,

tracking and collaboration throughout the task lifecycle college. Students replace their progress at the same time as supervisors and coordinators display milestones the device gives equipment for conversation task tracking and milestone verification.

- **Automated Reporting and Notification:** He system generates mission status reports, analyzes manager workloads and sends automatic reminders for submission cut-off dates to all stakeholders.

- **Automated Result Computation:** Smart contracts automatically count votes and generate election results without manual intervention.

- **Project Preference Submission:** After logging in college students can browse encouraged project titles, publish their possibilities and shape teams through the net interface.

5. Security and Transparency

- **Security:** That most effective legal users, college student's supervisor's coordinators and hod scan get admission to applicable functions and facts maintaining confidentiality and stopping misuse. [2]

- **Transparency:** Transparent environment for all stakeholders by way of imposing the following concepts: data integrity project information pupil preferences and progress updates are saved securely within the gadget to save you unauthorized changes.

- **Decentralization:** Progress updates are saved securely within the gadget to save you unauthorized changes.

6. Advantages of the Proposed System

- **Efficient and Automated Allocation:** The system intelligently matches projects with student teams based on preferences and title uniqueness eliminating manual effort and reducing redundancy in project proposals.

- **Improved Collaboration:** By involving students, supervisors, coordinators and hods in a centralized platform the system enhances communication ensures real-time progress tracking and promotes fairness in supervision and evaluation.

- **Reduced Administrative Workload:** automated reports reminders and supervisor workload analysis streamline project

oversight saving time for academic staff and enabling better focus on mentoring and quality assurance.

7. Methodology

The implementation of the net-based student project allocation and tracking system follows an established methodology to ensure performance transparency and smart automation. The development manner is divided into several key degrees consisting of system design, person authentication choice submission, challenge allocation progress tracking and reporting.

- **System Design and Architecture:** The device is designed as a centralized web software that integrates a user-friendly frontend, a robust backend and a steady database; it incorporates core additives and the net interface used by students, faculty and coordinators. The backend server dealing with business logic and communique between users and statistics and the database storing all assignment-related information this modular design supports clean upkeep scalability and secure information waft throughout special consumer roles.

- **User Authentication and Registration**: To ensure that handiest legal customers access the system a stable authentication mechanism is carried out user's log in the use of institution-issued credentials scholar id or faculty credentials role-based totally get admission to manipulate is enforced allowing distinct degrees of interaction based totally on consumer roles students can put up alternatives supervisors can monitor progress and hods can oversee the complete procedure.

- **Project Preference Submission and Allocation:** Once authenticated, students can discover endorsed assignment titles and post their preferences thru the internet interface the machine validates undertaking titles to avoid redundancy and fits groups with suitable tasks the use of predefined allocation guidelines allocation logic considers elements which include undertaking strong point crew size and availability of supervisors. [3]

- **Progress Tracking and Supervisor Interaction**: After allocation students

regularly update their progress in the system supervisors can provide feedback, approve milestones and track deliverables through an intuitive dashboard project coordinators and hods monitor overall progress ensuring deadlines are met and workloads are balanced across faculty members. [4]

8. Implementation

The implementation of the web-based Student Project Allocation and Tracking System involves several critical components, including intelligent matching algorithms, web interface development, database design, and administrative automation. The following outlines the step-by-step implementation process. [5]

8.1. System Architecture

The smart project allocation is designed with the following:

- **Frontend (User Interface):** A responsive web application that allows students, supervisors, coordinators, and HODs to interact with the system, submit preferences, view allocations, and monitor project progress.
- **Backend (Server & Logic Layer):** Built using a modern backend framework (Node.js) this layer handles business logic, request handling, and integration with the database. [6]
- **Database:** A relational database (PostgreSQL) stores all user data, project details, allocation records, progress updates, and submission logs.
- **Notification System:** Manages alerts and automated reminders for deadlines and submission events via email or in-app messaging.

8.2. Intelligent Allocation Logic

At the core of the system lies a dynamic project-team matching algorithm. This algorithm handles:

- **Preference Collection:** Captures student team preferences and supervisor interests.
- **Eligibility Checks:** Validates inputs to ensure only eligible teams and valid project titles proceed.
- **Project Uniqueness Enforcement:** Prevents title duplication using hashing or comparison checks to ensure every proposal is distinct.
- **Allocation Prioritization:** Assigns projects

based on criteria such as availability, supervisor workload, and team priority scores.

8.3. Web-Based Interface

- The frontend is developed using frameworks like React.js or Vue.js to deliver a seamless user experience. The interface provides:
- Submit preferences, view assigned projects, and track progress updates. [7]
- Review proposals, allocate projects, and monitor student submissions.
- Oversee all departmental projects, manage deadlines, and generate performance reports.

8.4. Security Mechanisms

To protect user data and project information, several security practices are implemented:

- **Role-Based Access Control (RBAC):** Ensures users only access features and data relevant to their roles (Student, Guide, Coordinator, HOD).
- **Encrypted Communication:** SSL/TLS protocols secure all communication between users and servers. [8]
- **Audit Logs:** Tracks system actions for transparency and accountability storage.

8.5. Deployment & Testing

The system undergoes comprehensive testing and validation before live deployment:

- **Unit & Integration Testing:** Validates individual modules and interactions between components.
- **User Acceptance Testing (UAT):** Gathers feedback from real users (students and faculty) to refine workflows. [9]
- **Load & Performance Testing:** Simulates high usage scenarios to ensure scalability.

8.6. Final Deployment and Execution

The system is deployed on a cloud platform (e.g., AWS, Heroku, or Azure) with proper CI/CD pipelines. Key aspects of final execution include a dedicated domain used for accessibility within the institution. Real-time monitoring through services like Grafana or New Relic ensures uptime and performance. [10]

9. Result and Discussion

User Registration: The user registration feature has been successfully developed, allowing students, supervisors, coordinators, and HODs to sign up and access the system according to their roles. Each user is authenticated through a secure login system and

stored in the backend database with unique identifiers to prevent duplicate entries. The registration process includes input validation, email verification, and role-based classification. This ensures that only authorized users access the appropriate features. Future enhancements could incorporate two-factor authentication (2FA) or institutional single sign-on (SSO) integration for added security. [11]

Admin Panel: A fully functional admin dashboard has been implemented to provide centralized control for administrators and project coordinators. Using this interface, admins can monitor project proposals, oversee student submissions, manage supervisor assignments, and track overall project progress. The interface is intuitive and built for ease of use, enabling quick access to key functions. Role-based access is partially implemented; extending this with granular permission levels (e.g., view-only or edit rights) would strengthen security. Adding real-time analytics and audit logs could further improve administrative oversight. [12]

9.1. Create Project & Allocation Setup

The system supports guided creation of project proposals by both students and supervisors. Each project submission is checked for title uniqueness, eliminating redundancies and streamlining selection. Project coordinators and HODs can configure allocation settings, such as project limits per supervisor and priority handling based on student preferences. The allocation process has been tested successfully, delivering accurate and conflict-free team-project assignments. Incorporating automated workload balancing and intelligent project suggestions could enhance this module in the future. [13]

9.2. Project Progress Tracking

A dedicated tracking module allows students to update their project status while supervisors can monitor and approve accountability across the entire project lifecycle. The system restricts backdated or unauthorized entries, maintaining the integrity of progress updates. Though basic progress tracking is operational, adding milestone templates, automated reminders, and deadline countdowns would improve team time management and engagement. [14]

Reporting and Notifications: The reporting system generates real-time summaries for students, supervisors, and administrators. Reports include project status, submission history, and supervisor workload summaries. Automated notifications alert users about submission deadlines, allocation updates, and pending tasks. While the current reporting features are functional, visual enhancements like charts, Gantt views, and performance heat maps could make insights more actionable. Notifications currently rely on email; expanding this to SMS or in-app alerts would ensure timely communication. [15]

9.3. Student Login Page

This is the login interface of students. This page allows Students to login to create or join a team for the final year project. Students can login with their register number and their assigned password (as Figure 2) [16]

Figure 2 Student Login Page

9.4. Staff Login Page

This is the login interface for the staff. This page (as Figure 3) allows the staff to login with their mail id and assigned password. This gives access for the staff to check out the project team and also their approval. [17]

Figure 3 Staff Login

9.5. Student Dashboard

The dashboard displays information about the student's project team and also shows (Figure 4) their lead a team code which allows the other members to join in the team. It also shows up the approval status of the review. [18]
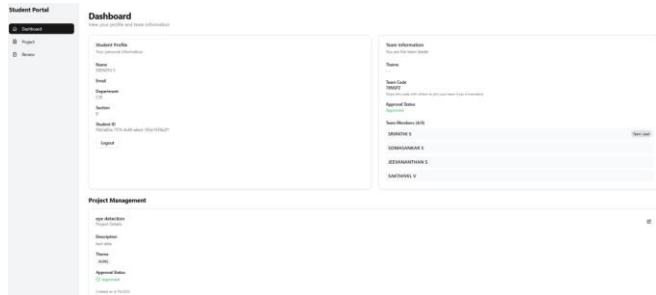

Figure 4 Student Dashboard

9.6. Student Project Details Page

This is the student project detail page. It shows (as Figure 5) the information of the project, it's description, theme and also approval status.
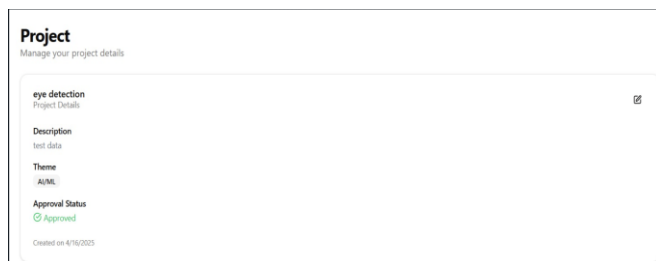

Figure 5 Student Project Details Page

9.7. Staff Dashboard Page

The dashboard displays information about the staff and their access (as Figure 6) The role of the mentor is to approve the project title, maintain the project proposal and also daily updates. [19]

Figure 6 Staff Dashboard

9.8. Add New Staff

This page allows the super admin to add new staff for a separate login with the responsible password (as Figure 7) It shows the role after the role is selected according to the role the next category will be chosen.
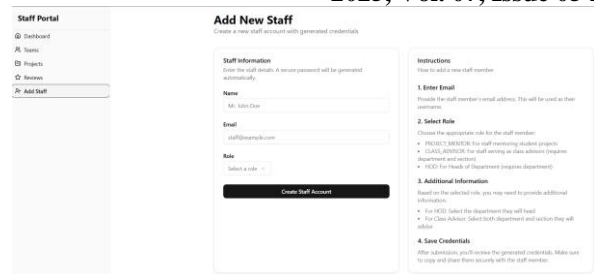

Figure 7 New Staff

9.9. Review Update Page

This page is used to allow the super admin to update the team review status and evaluate it with a result (as Figure 8) It can be either excellent or needs improvement then the action shows up the date of the review and it is assigned according to the project updates [20]
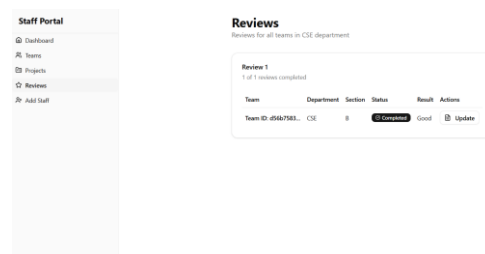

Figure 9 Review Update Page

Conclusion

The Student Project Allocation and Tracking System delivers a modern and efficient approach to handling final year project workflows in academic institutions. By automating tasks such project assignment, progress monitoring, and report enhances the overall management process. Key functions like secure user registration, supervisor allocation, and real-time updates simplify collaboration between students, guides, and department heads. The intuitive dashboard makes it easy for all users to stay informed and engaged throughout the project lifecycle. Although the system operates smoothly, there is room for future upgrades such as deeper analytics, mobile compatibility, and smarter allocation logic. With continued improvements, this platform can become a long-term solution for academic project management, supporting transparency, accountability, and productivity across departments.

Future Enhancements

- **Feedback & Evaluation Automation:** Implement automated feedback forms and rubrics that help supervisors evaluate projects consistently and efficiently.

- **AI-Based Project Title Suggestions:** Integrate natural language processing (NLP) and machine learning to provide intelligent project title recommendations based on students' academic history, interests, and current industry trends.
- **Performance-Based Supervisor Allocation:** Introduce a system that evaluates both student and supervisor performance from past projects to make smarter allocation decisions.
- **Mobile Application Support:** Develop a cross-platform mobile app version of the system to allow students and faculty to track progress, receive notifications, and submit updates on-the-go.
- **Integration with Plagiarism Detection Tools:** Automatically check submitted reports and project titles for originality using plagiarism detection APIs to maintain academic integrity.
- **Collaboration & Communication Module:** Add features like built-in chat, video conferencing links, or discussion boards for smoother communication between students and supervisors.

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