Streamlining Academic Information Management Using a Role-Based Web Application

A Case Study at JSS Science and Technology University AdminHub

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***Abstract*— This article introduces the development and design of a web platform, JSS AdminHub, that intends to simplify faculty information management for teaching staff and academic administrators. By going digital with data streams like publications, workshops, and student grades, the system alleviates manual load and enhances administrative insight. The platform is built using Node.js, Express, MongoDB, and EJS and has customized interfaces for faculty members and department heads (HoDs). This paper discusses the architecture, implementation, and effect of the system on academic work efficiency.**

***Keywords*— Academic Management, Faculty Portal, Information Streamlining, HoD Dashboard, Workshop Reporting, Node.js, MongoDB, PlantUML Architecture.**

I. OVERVIEW

Managing faculty information, including publications, workshops, and patents, in academic institutions frequently entails disjointed, manual procedures. In order to solve these inefficiencies, this paper presents JSS AdminHub, a centralized portal that automates and standardizes the reporting and review of academic data.

The solution was put into practice at JSS Science and Technology University's Department of Computer Science & Engineering. Reducing the administrative load, facilitating oversight at the HoD level, and giving faculty members a straightforward, safe interface to submit and monitor their academic work were the goals.

II. PROBLEM STATEMENT

In academic institutions, managing and reporting faculty activities such as publications, workshops attended or conducted, and patents filed remains a cumbersome and disjointed process. Traditionally, Heads of Departments (HoDs) rely on Excel sheets, emails, and inconsistent manually prepared documents submitted by faculty members. These disparate formats not only introduce inconsistency and redundancy but also create delays in compiling departmental data, especially during accreditation reviews like NAAC and NBA. The absence of a centralized platform limits the ability to efficiently monitor, review, and archive faculty contributions over semesters.

III. SOLUTION DESIGN

To address these challenges, we developed "JSS AdminHub" — a centralized web-based portal designed to streamline information flow within academic departments. The system provides role-based access for two primary user types: Faculty and HoD. Faculty members can log in to submit data related to:

- Marks management
- FDP, KDP, SDP workshops attended or conducted
- Patents filed (with file uploads)
- Publications (Conference or Journal)

The HoD role grants access to a departmental dashboard where submitted records can be viewed department-wide, organized per faculty, and downloaded for reporting purposes. Each submission is uniform and timestamped, ensuring consistency and data traceability. The system is modular and easily customizable for other departments across the institution.

IV. TECHNOLOGY STACK

- Backend: Node.js with Express
- Database: MongoDB (with Mongoose for schema modeling)
- Frontend: EJS (Embedded JavaScript Templates), HTML, CSS
- File Uploads: Multer Middleware for handling PDFs and certificates
- Session Management: Express-session for authentication

This technology stack allowed for rapid development and easy scalability. With a low learning curve and high configurability, it enabled a lightweight yet powerful solution compared to traditional ERP systems.

V. Role-Based User Experience

Faculty Users: After logging in, faculty members are greeted with a dashboard to add records. Each module (FDP, KDP, SDP, patents, and publications) supports file uploads and stores records with relevant metadata (e.g., dates, institutions, conference names).

HoD Users: The HoD logs in to a distinct dashboard view that lists all faculty members in the department. By clicking on a faculty name, the HoD accesses structured data across all categories. Files can be viewed inline or downloaded, allowing for informed decision-making and seamless reporting.

VI. System Architecture

Refer to Figure 1 below for a simplified architecture of the JSS AdminHub system.

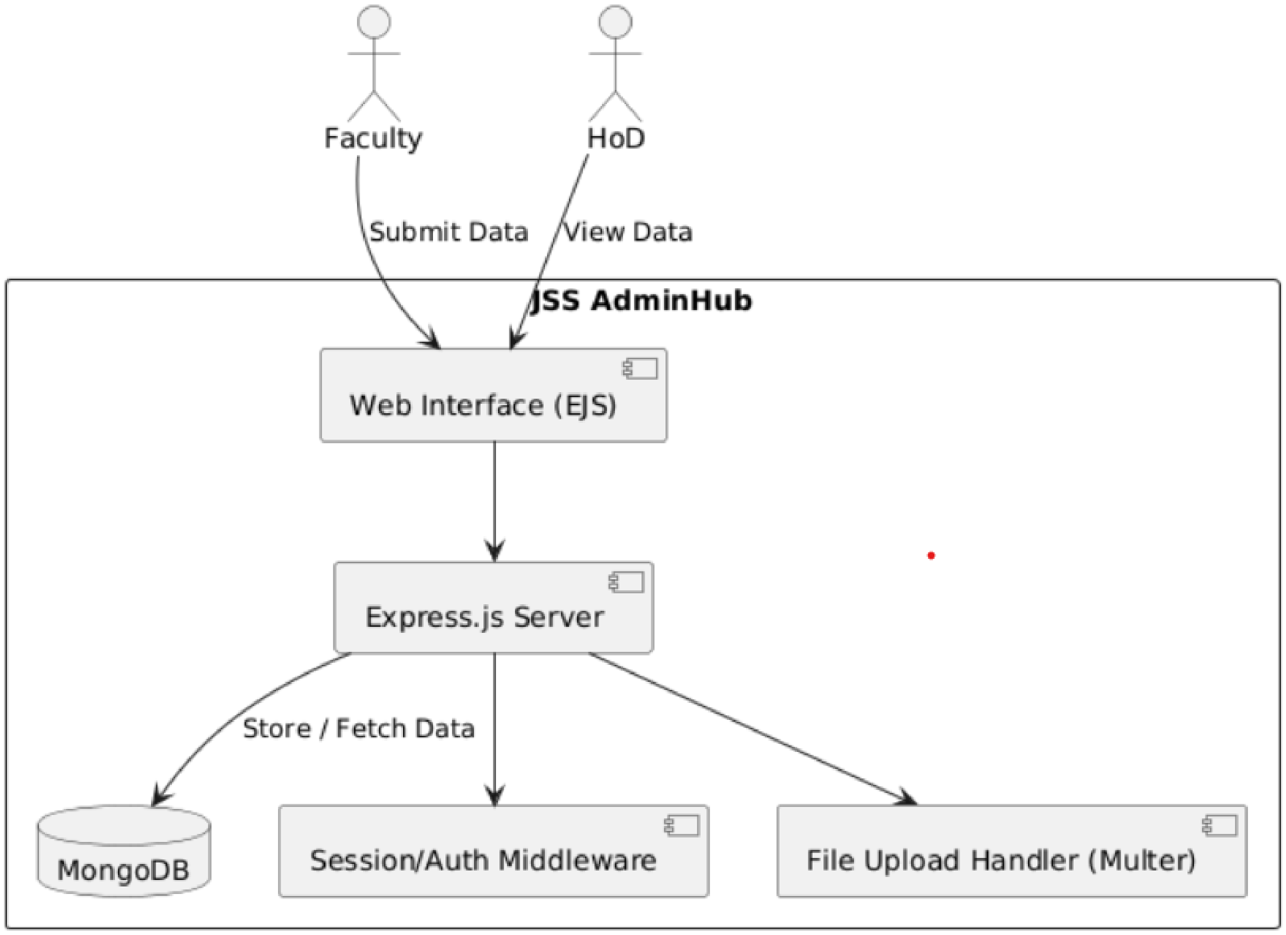

Figure 1: System Architecture of JSS AdminHub

VII. Impact Evaluation

Before deployment, HoDs manually compiled data over weeks using emails and spreadsheets. After implementing JSS AdminHub:

- Submission timelines can be reduced by approximately 50%
- HoDs reported improved data consistency across faculty submissions
- Faculty reported a simplified data entry process
- Generated reports helped during internal audits and accreditation reviews

VIII. Benefits to Academic Institutions

- Scalability: JSS AdminHub is built with modularity at its core. This makes it straightforward to extend to other departments by simply mapping their faculty members to the same report submission architecture. It doesn't require fundamental rework—just basic schema-level adjustments, making it ideal for scale-out deployment.
- Archival: The digital-first nature of the platform ensures that every piece of academic input—be it publications, patents, or workshop details—is stored systematically. This creates a centralized academic repository per faculty, fostering a culture of clean digital archival and retrieval for years to come.
- NAAC/NBA Compliance: One of the core motivations for developing this system was to reduce the overhead during NAAC/NBA reviews. The system helps generate institutionally compliant documentation without last-minute follow-ups. It keeps all necessary evidence just a few clicks away.
- Efficiency: The workflow reduces reliance on email threads, phone calls, or WhatsApp messages to chase submissions. Everything is user-initiated and deadline-driven, reducing administrative noise and allowing faculties to focus on their core academic roles.

IX. Challenges Faced During Development

- A significant hurdle was ensuring that document uploads (certificates, patents, reports) did not linger in temporary local storage. We implemented direct parsing and in-memory buffering using Multer to address this, thereby mitigating data exposure risks.
- Handling conditional logic for HoD and Faculty dashboards, because the system supports dual-role access (Faculty and HoD), careful consideration was needed to ensure the right dashboard appeared, with the appropriate permissions. Maintaining two perspectives in one codebase without interference required granular session tracking and conditional rendering.
- Session-based login with express-session initially created issues with persistence, especially in cases of simultaneous logins or idle users. We handled this by explicitly controlling session state across login, logout, and view-transition flows.

X. Comparison With Existing Systems

Compared to full-scale ERP platforms, JSS AdminHub is:

- Unlike monolithic ERP systems, JSS AdminHub doesn't attempt to generalize everything. It is purpose-built for department heads and faculty. This makes it lightweight, much easier to customize, and free of unnecessary clutter.Requires less training
- ERP systems often require training. JSS AdminHub works via a clean, intuitive interface. If a professor knows how to fill a Google Form, they can use this system. That was a design goal—and we achieved it.
- No expensive licensing, no bulky servers. Our stack runs comfortably on a basic VPS and MongoDB instance. Even data backups and restores are simplified compared to vendor-dependent systems.
- ERPs often force institutions to adapt to their model. Here, it's the opposite—we shaped the app around how our faculty and HoDs already worked. This reversed design philosophy made adoption effortless.

XI. Future Scope / Enhancements

- Add **in-app notifications** for submission reminders
- **Export data** to Excel or PDF formats
- Develop a **HoD analytics dashboard**
- Integrate **OTP/Aadhaar-based login** for security

XII. Conclusion

JSS AdminHub has demonstrated how targeted, role-based web solutions can significantly streamline administrative burdens in academic institutions. By centralizing faculty activity reporting and making the process more structured, it paves the way for improved efficiency, institutional transparency, and scalable digital transformation. Its modular architecture ensures that it can be replicated across other departments and institutions with minimal customization.

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