

ROLE-BASED FACULTY MANAGEMENT SYSTEM USING FLASK AND MYSQL

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Abstract - In the digital age, managing academic personnel data efficiently is vital for educational institutions. This paper presents the design and development of a Faculty Management System (FMS) tailored to streamline faculty data handling. monitoring. attendance and leave management using modern web technologies. The system is built using the Flask web framework with MySQL as the backend database and incorporates role-based access differentiate **functionalities** control to between administrators (HoDs) and faculty members.

The HoD has exclusive privileges to register faculty via email, triggering an autogenerated temporary password which is securely delivered through email. Upon first login, faculty are required to reset their password and complete a comprehensive profile form consisting of over 20 key academic and personal fields, ensuring structured and complete data entry. Secure authentication is ensured through the integration of Flask-Login and Flask-Bcrypt, email while Flask-Mail is used for communication.

INTRODUCTION

In academic institutions, effective management of faculty information plays a crucial role in ensuring smooth administrative operations. Traditional methods of handling faculty records, such as maintaining physical documents or using fragmented spreadsheets, often result in inefficiencies, data inconsistency, and limited accessibility. To address these challenges, there is a growing need for a centralized, secure, and user-friendly digital system that can manage faculty profiles, attendance, and leave applications in an organized manner.

This paper introduces a Faculty Management System (FMS) developed using the Flask web framework and MySQL database. The system to automate and simplify various aims administrative tasks by offering role-based access for Heads of Department (HoDs) and individual faculty members. The HoD is empowered to onboard faculty by entering their email addresses into the system, which triggers automated process for generating a an temporary password and emailing it securely to the concerned faculty member. On their first login, faculty are required to reset their password and complete a detailed profile form academic. consisting of personal, and professional information.

Key features of the system include secure login and session handling using Flask-Login, password encryption with Flask-Bcrypt, and email communication facilitated by Flask-Mail. Additionally, the platform enforces a one-time profile completion on first login, ensuring comprehensive and structured data collection. A role-specific dashboard enhances user experience by displaying relevant information and functionalities based on the user's role.

The Faculty Management System serves as a step toward digital transformation in academic administration, offering improved data management, enhanced security, and reduced manual intervention. This paper details the design, architecture, implementation, and testing of the proposed system, highlighting its potential to be scaled and customized for various educational institutions.

I.PROBLEM STATEMENT

Managing faculty data in educational institutions is often inefficient due to reliance on manual processes or disjointed digital tools, leading to data inconsistency, limited and administrative overhead. accessibility. Existing systems typically lack centralized control, secure authentication, and role-based access, making it difficult to streamline tasks facultv onboarding. such as profile management, leave tracking, and attendance monitoring. Moreover, the absence of a structured, digital-first solution hinders scalability and increases the risk of data errors. There is a pressing need for a secure, centralized. and user-friendly Faculty Management System that enables role-based access for administrators and faculty, enforces profile completion on first login, and digitizes workflows kev to enhance operational efficiency and data integrity.

II. LITERATURE SURVEY

Several studies and projects have focused on digital systems for managing institutional workflows, particularly in academic settings. Traditional faculty management methods, as discussed in [1], often rely on spreadsheets or paper-based documentation, which are prone to human error, data loss, and inefficient processing. These limitations have driven the development of web-based management systems aimed at improving data handling and administrative efficiency.

In [2], a role-based access control (RBAC) model was implemented to restrict unauthorized access and ensure data confidentiality in academic portals. This concept has become a foundation for modern educational platforms. Similarly, [3] proposed a faculty portal system with features such as attendance tracking and performance evaluation but lacked a comprehensive user onboarding system and secure password handling.

Research in [4] highlights the importance of secure authentication mechanisms like hashed passwords and session handling to prevent unauthorized access. However, many of these systems are either limited to specific functionalities or lack integration across modules such as leave management, profile creation, and communication.

Recent frameworks, including those built with Flask and Django, as noted in [5], have provided developers with flexibility to implement modular and scalable systems. Flask's lightweight nature makes it suitable for rapid development of customized web applications, especially when integrated with libraries such as Flask-Login, Flask-Mail, and Flask-Bcrypt for authentication, mailing, and encryption.

In their paper titled "Design and Development of an Online Faculty Management System," S. Kumari and M. S. Bhamare [6] present a comprehensive approach to developing a webbased portal aimed at efficient faculty data management. The authors emphasize the importance of usability and the implementation of role-based access control to ensure secure and organized access to information. The system discussed in the study facilitates easy maintenance of faculty profiles, streamlines administrative tasks, and enhances data retrieval through an intuitive interface. Their work serves as a foundational reference for systems focused on managing faculty information digitally and highlights best practices in system architecture and user-role segregation.

III. METHODOLOGY A. BLOCK DIAGRAM



Fig. 1 Block Diagram of Proposed System

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In order to implement the proposed Faculty Management System, the block diagram must be configured as shown in Figure 1, integrating the Admin (HoD), Faculty Registration, Authentication, Role-Based Dashboards, and Database.

B. WORKING

Admin (HoD): The system begins with the HoD who registers faculty members via email. Each faculty member is sent an auto-generated password for their first login.

Login & Authentication: After receiving the password, faculty log in, and the system authenticates them based on their role (HoD or Faculty).

Faculty Profile & Dashboards: Upon first login, faculty members are required to complete their profile. They can then access their personal dashboard to view or update their information, apply for leave, and manage their data.

HoD Dashboard: The HoD can manage faculty profiles, monitor attendance, and approve or review leave applications.

Database: All faculty data, authentication credentials, and leave requests are securely stored in a MySQL database, managed via SQLAlchemy.

C. FLOWCHART



Fig. 2 Flow chart of proposed system

The flowchart outlines the key process of faculty registration and profile completion within the Faculty Management System. The process begins with the HoD (Head of Department) registering the faculty, which triggers the system to send an email containing login credentials to the newly registered faculty member. Once the faculty receives the credentials, they log in to the system.

A critical decision point follows, where the system checks if it is the first login of the faculty. If it is, the faculty is prompted to complete their profile, ensuring that all necessary information is provided and up-todate. If it's not their first login, the process simply ends without any additional actions required.

This flowchart figure 2, ensures that the registration process is streamlined and that faculty members complete their profiles for effective use of the system, while also highlighting the role of the HoD in initiating faculty registration.



IV. RESULT

Fig. 3 Admin(HoD) dashboard

As shown in Figure 3, the HoD dashboard provides a clear, four-option navigation panel: Profile, Register Faculty, Faculty Profile List, and Logout. The Profile section lets the Head of Department view and edit their own account details, ensuring contact information and credentials are up to date. Through Register Faculty, the HoD can onboard new faculty members by entering their email addresses and triggering the automated credential-generation workflow. The Faculty Profile List presents a list of all registered faculty, allowing the HoD to review and manage individual profiles. Finally, the Logout button securely ends the session, protecting sensitive data and preventing unauthorized access.

Register Faculty
Faculty Email
Enter faculty email
Register Faculty

Fig.4Register faculty page

As shown in Figure 4, the **Register Faculty** view presents a single, full-width input bar labeled "Faculty Email" where the HoD types the new staff member's email address. Accompanied by a clearly styled **Add Faculty** button immediately to its right, this minimalist design focuses the user's attention on the essential task of entering a valid email. Once the HoD clicks **Add Faculty**, the system automatically generates and sends login credentials to that address, streamlining onboarding without any extraneous fields or distractions.

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Faculty ID	Name	Designation	Actions
1KG21EC084	Shashank S	STUDENT	Vew Delete Download
1KG21EC081	Sathvik A N	STUDENT	Vew Delete Download
1KG22EC416	Shashank Ramakrishna	STUDENT	View Delete Download
1KSTE0000266	Dr. Dileep J	Asst. Professor	Vew Delete Download

Fig.5Faculty list page

As shown in Figure 5, the Faculty Profile List page displays a table with the following headers: Faculty ID, Name, Designation, and Action. Under the Action column, three options are provided for each faculty profile: View Complete Details, allowing the HoD to access a detailed overview of the faculty's information; Delete, which enables the HoD to remove a faculty profile from the system if needed; and Download, which gives the option to download the faculty's profile in a chosen format for external use or record-keeping. This structured layout ensures easy management and access to faculty data.



Fig.6Basic faculty information profile

This Figure 6, displays the basic information of a faculty member relevant to paper publication. It includes the faculty's name, designation, department, and institutional affiliation. Additional key details such as faculty ID, email address, and contact number are also presented. This concise profile helps identify the faculty member and verify their association with the institution for academic and publication purposes.

Complete Profile Details		
Hide Profile		
Gender	Male	
Date of Birth	1991-02-17	
Date of Joining	2015-07-13	
Address	No.183, 6th cross, Naidu Layout, BSK III Stage, Bengaluru-560061	
Experience (KSSEM)	10.0 years	
Experience (Teaching)	10.0 years	
Experience (Industry)	0.0 years	
Total Experience	20.0 years	
Subjects Handled	EMW, ES, NS	
Subjects Handling	EMT	
Areas of Interest	Machine learning, IOT, Embedded System	

Fig 7 Complete faculty information

This Figure 7, showcases the complete faculty profile containing detailed academic and professional information. It includes the faculty's full name, designation, department, faculty ID, institutional affiliation, email address, and contact number. Additionally, it covers personal details like gender, date of birth, address, and date of joining the institution. The academic qualifications section lists undergraduate (BE), postgraduate (MTech), and doctoral (PhD) degrees along with the names of institutions and year of passing. The professional section outlines total experience, current subjects handled, previous subjects handled, and areas of interest. The profile also features a professional photograph and status of profile completion, ensuring a comprehensive overview essential for administrative, academic, and publicationrelated activities.

V. CONCLUSION

This paper has presented the design and implementation of a modular Faculty Management System that streamlines the

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onboarding. profile completion. and administration of academic staff. By leveraging a role-based architecture-where the HoD registers faculty, enforces first-login profile completion, and manages records through intuitive dashboards-the system ensures both security and usability. The integration of automated credential generation and centralized data storage via a SOL-based backend enhances efficiency and reduces manual overhead. Comparative analysis with existing solutions [1]–[5] demonstrates that our approach offers a lightweight, scalable alternative tailored to the needs of higher-education institutions. Future work will focus on extending the platform with attendance tracking, performance analytics, and mobile-friendly interfaces to further support faculty and administrative workflows.

VI. FUTURE SCOPE

The Faculty Management System, while effective in its current state, has significant potential for future enhancements. Some of the key areas for further development include:

- 1. Attendance Tracking: Incorporating an attendance management feature that allows faculty to mark and track their daily attendance, which can then be reviewed and analyzed by the HoD.
- 2. **Performance Analytics**: Integrating a module that tracks and evaluates faculty performance, including metrics such as student feedback, research publications, and teaching evaluations.
- 3. **Mobile Access**: Developing mobile applications for both iOS and Android platforms to ensure that faculty and HoD can access and manage profiles, submit leaves, and perform administrative tasks on-the-go.
- 4. Advanced Reporting: Adding functionality to generate reports on faculty attendance, leave history, and profile completion status, enabling HoD to make data-driven decisions.
- 5. Integration with Learning Management Systems (LMS): Connecting the Faculty Management System with existing LMS platforms (e.g., Moodle, Canvas) to synchronize faculty course assignments, evaluations, and grading.

VII. REFERENCES

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