

Hostel Management System With Room Allocation

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ABSTRACT

The Hostel Management System is a web-based application developed to digitalize and simplify hostel operations such as student registration, secure login, room allocation, and fee management. The system provides separate dashboards for students and administrators, ensuring clear role-based access and smooth data flow. Students can view their personal and room details, track fee records, and access information conveniently through a user-friendly interface. Administrators can manage student records, allocate or deallocate rooms, and monitor hostel occupancy efficiently. Developed using HTML, CSS, JavaScript, Node.js, and MongoDB, the system ensures scalability, security, and data reliability. MongoDB serves as the centralized database for storing all student and room data. JWT authentication and encryption techniques safeguard user information. The system significantly reduces manual workload and eliminates errors common in traditional hostel record management. Overall, it enhances transparency, accuracy, and operational efficiency in hostel administration.

KEYWORDS:

Hostel Management System, Room Allocation, Web Application, Room Deallocation Authentication and Data Security.

INTRODUCTION

Hostel management is an integral function of educational institutions that provide accommodation facilities to students from different regions. Traditionally, these activities such as student registration, room allocation, and fee management have been handled manually using registers or spreadsheets. Such conventional systems are prone to human errors, data duplication, inefficiency, and lack of transparency, resulting in delays and poor record maintenance. Therefore, there is a growing need to adopt automated solutions that simplify hostel administration and improve data accuracy. The proposed Hostel Management System is a web-based application

designed to digitalize hostel operations and enhance efficiency for both students and administrators.

It allows students to register, log in securely, and view their personal, room, and fee details through an interactive interface. Administrators can manage student records, allocate or deallocate rooms, and monitor hostel occupancy in real time. The system ensures transparency and smooth coordination between students and management, thereby reducing manual workload and improving overall productivity. This system is developed using HTML, CSS, JavaScript, Node.js, and MongoDB, ensuring scalability, flexibility, and data reliability. MongoDB serves as a centralized database for efficient data storage and retrieval, while JSON Web Token (JWT) authentication ensures security and controlled access. By automating hostel processes, the proposed system minimizes administrative errors, saves time, and provides a transparent, user-friendly digital platform for hostel management in modern educational institutions..

LITERATURE SURVEY

Research confirms that traditional attendance methods like roll calls are slow and vulnerable to proxy attendance, creating a clear need for automated solutions. During my literature survey, I examined several recent papers highlighting different technological approaches. The first paper, “Automated Attendance System Using Face Recognition” by “Wadalkar et al”. (2022), proposes a system using continuous observation to improve detection accuracy. Another study by “Jha et al”. (2023) explores the use of Haar cascades and LBPH for a user-friendly, real-time system. A significant contribution comes from “Boe et al”. (2024), who demonstrated that a system using HOG + SVM and CNN achieves higher accuracy than QR code-based methods. Furthermore, “Rao's” “Atten Face” (2022) introduces a scalable architecture that reduces computational needs while effectively preventing proxy marking. Collectively, these studies validate that face recognition integrated with web frameworks

offers a scalable, secure, and efficient alternative to conventional attendance systems.

RELATED WORK

Hostel management systems have evolved from traditional manual methods to modern web-based platforms that enhance efficiency and transparency in institutional operations. Earlier systems relied on physical registers and spreadsheets, leading to errors, data loss, and time-consuming processes. Researchers such as Kumar et al. (2019) emphasized that web-based hostel systems reduced allocation errors by over 70% compared to manual methods. Sharma and Verma (2021) highlighted the importance of automation in improving administrative decision-making and student satisfaction. Open-source and commercial ERP tools like Fedena and EduSys introduced digital hostel modules but remained costly and complex for small institutions. Recent studies focus on cloud-based and database-driven systems that offer scalability and security through role-based authentication. However, many existing solutions still lack customization and affordability for medium-sized colleges. The current project addresses these gaps by developing a lightweight, cost-effective, and secure web-based Hostel Management System using HTML, CSS, JavaScript, Node.js, and MongoDB. This system ensures efficient room allocation, fee management, and record maintenance, making it suitable for educational institutions seeking a reliable digital alternative to manual hostel administration.

EXISTING SYSTEM

In traditional hostel administration, most processes such as student registration, room allocation, and fee management are performed manually using physical registers, spreadsheets, or standalone record books. Students are required to submit forms in person, and administrators manually record the details in logs, which increases the chances of human error and data duplication. Fee collection and tracking are also handled manually, often leading to delays, miscalculations, or missed records. Monitoring room occupancy and availability is time-consuming, as administrators must check records individually for each allocation. There is no centralized system to maintain or retrieve historical data efficiently, which complicates reporting and decision-making. Additionally, security and privacy of student information are weak since physical records can be misplaced or accessed by unauthorized personnel. Existing commercial ERP solutions provide some automation but are often expensive, complex, and unsuitable for small or medium-sized educational institutions. Most of these systems also require continuous

maintenance and technical expertise. Therefore, there is a need for a lightweight, cost-effective, and secure web-based solution to automate hostel operations.

PROPOSED SYSTEM

The proposed Hostel Management System is a web-based application designed to automate student registration, room allocation, and fee management processes. The system follows a role-based approach, providing separate dashboards for administrators and students. Administrators can manage student records, allocate or deallocate rooms, and monitor hostel occupancy efficiently. Students can securely log in, view their personal and room details, and track fee records. The frontend is developed using HTML, CSS, and JavaScript to provide a responsive and user-friendly interface. Node.js handles server-side operations, while MongoDB serves as a centralized database for storing student and room information. JSON Web Token (JWT) authentication ensures secure access and data privacy. CRUD operations allow administrators to perform real-time updates efficiently. The system minimizes manual errors, improves transparency, and reduces administrative workload. Overall, it provides an effective, scalable, and reliable solution for modern hostel management.

SYSTEM ARCHITECTURE

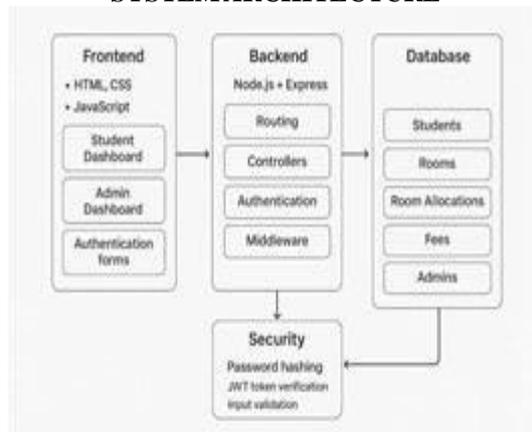


Fig:1 Hostel management systems METHODOLOGY DESCRIPTION

Front End: Hostel Management System has the front-end files such as student dashboard and Admin dashboard. Students and admins can interact with this application through the front end.

Back End: Hostel management system has the backend to communicate with the frontend and database; Backend is the combination of the Node.js and express.

Data Base: All the student data and admin data

will be stored in the MongoDB database and room allocation details and room details are also available in the database

RESULTS AND DISCUSSION

Home Page: It is the Home page for the Hostel Management system. It contains the login boxes for both students and admins.

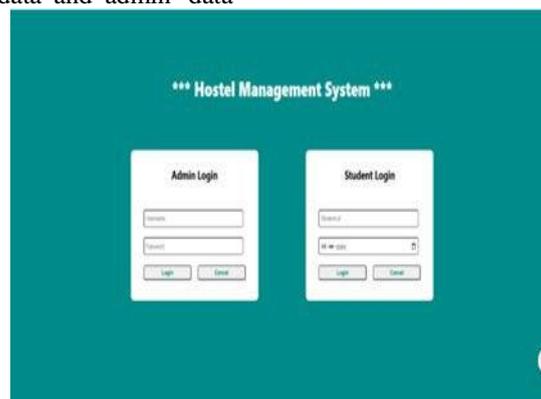


Fig :2 Home Page for Hostel Management System

Student Dashboard: It is the student dashboard which includes the functionalities like student details, room details, fee details and allocated

room details.



Fig :3 Student Dashboard for the Hostel Management System

Admin Dashboard: It is the admin dashboard which includes the functionalities like room allocation and room deallocation, student

registration etc .



Fig 4: Admin Dashboard for the Hostel Management System

CONCLUSION

The proposed Hostel Management System efficiently automates the core hostel operations, including student registration, room allocation, and fee management. It minimizes manual work, reduces human errors, and ensures data accuracy through digital record management. With its secure authentication and user-friendly interface, both students and administrators benefit from improved accessibility and transparency. The use of Node.js and MongoDB ensures scalability and reliability in data handling. Overall, the system provides a cost-effective and efficient solution for modern hostel administration.

FUTURE SCOPE

In the future, the system can be enhanced by integrating online payment gateways for direct fee transactions. Mobile application support can be added for convenient access on smartphones. AI-based room allocation and occupancy prediction can further optimize hostel space utilization. Cloud integration could improve data backup and remote accessibility. Additional modules like maintenance tracking and attendance management can make the system more comprehensive.

REFERENCE

1. Kumar, R., & Singh, A. (2019). Web- Based Hostel Management System for Educational Institutions. *International Journal of Computer Science and Engineering*, 7(5), 210–214.
2. Sharma, P., & Verma, S. (2021). Automation of Hostel Administration using Web Technologies. *International Journal of Innovative Research in Computer and Communication Engineering*, 9(3), 1450–1457.
3. Das, M., & Roy, K. (2020). A Database-Driven Hostel Management Solution for Universities. *Journal of Emerging Technologies and Innovative Research (JETIR)*, 7(9), 625–631.
4. Reddy, S., & Rao, V. (2021). Digital Transformation of Hostel Management Using Modern Web Frameworks. *International Journal of Engineering Research & Technology (IJERT)*, 10(6), 1120–1125.
5. Choudhary, A., & Gupta, R. (2020). Secure Authentication in Web Applications Using JWT and Node.js. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 5(8), 305–310.
6. Singh, P., & Kaur, N. (2018). Enhancing Institutional Efficiency Through Web- Based Information Systems. *International Journal of Computer Applications*, 182(42), 10–14.
7. Bansal, D., & Tiwari, R. (2020). Development of Automated Hostel Management Using Node.js and MongoDB. *International Journal of Engineering Trends and Technology (IJETT)*, 68(4), 120–125.
8. Hussain, M., & Khan, S. (2021). Web- Based Room Allocation and Fee Management System for Hostels. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, 10(9), 550–556.
9. Agarwal, P., & Deshmukh, A. (2019). Online Hostel Management and Allocation System Using JavaScript and MongoDB. *International Journal of Research in Computer Applications and Information Technology*, 7(3), 78–83.
11. Naidu, C., & Iqbal, M. (2022). Implementation of Secure Hostel Room Allocation Using Web Technologies. *Journal of Information Technology and Engineering Studies*, 5(2), 215–

220.

12. Banerjee, S., & Mukherjee, T. (2020). Database-Oriented Web Systems for Institutional Hostel Management. *Journal of Applied Computing and Information Technology*, 18(1), 88–94.
13. Gupta, A., & Rani, P. (2019). Automation of Hostel Processes Using Node.js and RESTful APIs. *International Journal of Scientific & Engineering Research (IJSER)*, 10(11), 942–948.
14. Thomas, J., & Sebastian, L. (2021). A Web-Based Hostel Fee and Room Management System. *International Journal of Computer Science Trends and Technology (IJCSST)*, 9(3), 300– 305.
15. Devi, K., & Raj, M. (2023). Design and Development of a Secure Hostel.Management Portal Using JavaScript and MongoDB. *International Journal of Emerging Research in Computer and Communication Engineering (IJERCCE)*, 11(1), 112–118.