Review Article

SVERI Hostel Management System: A Digital Solution for Streamlined Accommodation and Student Welfare

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Abstract: This project focuses on the managing and maintaining the records of the students who lives in hostel. The project addresses the key functionalities such as room allocation, fee details are tracked automatically of each student in their profiles, provides authentication for which only authorized user have authority for accessing the student data, we can easily update the data in UI, after passed out the batch the system remove their data from user interface to availability of rooms for the new students. By implementing these features improves the efficiency of the hostel. The implementation of this system is expected to reduce administrative workload, enhance resident satisfaction, and provide valuable insights through data analytics. The authentication sure that only authorized users such as rectors or hostel administrators can access data. The interface is designed to allow easy updating of student information and ensure that pass-out batches are removed from the user interface (UI) to free up rooms for new occupants, while retaining historical records in the database for future reference.

1. Introduction

Managing hostel accommodations efficiently is a complex yet essential task for educational institutions, especially those with large student populations. Traditional methods like paper logs and spreadsheets are time-consuming, prone to human error, and challenging to scale, often leading to mismanagement of room allocations and student data. To overcome these challenges, SVERI's Hostel Management System (HMS) has been developed as a comprehensive digital platform to streamline and automate hostel operations. The system is designed to manage three hostels, each comprising four floors with 30 rooms per floor, providing a total of 360 rooms. SVERI HMS simplifies room allocation, student information management, and batch transitions through an intuitive interface that even non-technical administrators, such as rectors or wardens, can easily operate. Real-time access to student data ensures quick updates and efficient room management, while batch management functionality allows the removal of pass-out student data without permanently deleting it from the system. Data integrity is maintained, ensuring records remain error-free, secure, and accessible only to authorized personnel. The system reduces administrative workload by automating repetitive tasks, enhances transparency with real-time insights into room occupancy, and ensures scalability for future hostel expansions. Additionally, it supports easy updates, generates batch-wise reports, and offers a long-term

solution that grows with the institution's needs. By providing a user-friendly, secure, and efficient approach to hostel management, it enables hostel authorities to focus more on student well-being and less on administrative burdens. The Hostel Management System project is an innovative web-based solution designed to address the complexities associated with managing hostel accommodation for the educational institutions. Tailored specifically for the needs of the chief rector and hostel authorities, this system streamlines various administrative tasks, thereby enhancing operational efficiency and improving the overall experience for both staff and residents. In today's fast-paced educational environment, managing hostels can be challenging, requiring meticulous organization and effective communication. This system simplifies the management process by automating essential functions, including room allocation, fee management, attendance tracking, and resident information storage. By centralizing these tasks, the system allows hostel managers to access real-time data, making it easier to monitor occupancy rates and manage resources effectively. One of the key features of this project is its user-friendly interface, designed to ensure that both hostel authorities and residents can navigate the system with ease. For administrators, the system offers tools for generating reports, tracking payments, and handling complaints, all in one place.

For residents, it provides a straightforward method for accessing their information, submitting requests, and staying updated on hostel announcements. By integrating various administrative functions into a single platform, it aims to reduce manual workload, improve communication, and create a well-organized living environment for students. This system ultimately supports the goal of providing a safe, efficient, and comfortable accommodation experience within educational institutions.

2. Literature Review

A. GeniusEdu Hostel Management Software

GeniusEdu Hostel Management Software is a comprehensive software solution designed to streamline and manage hostel operations, particularly for educational institutions, universities, and other organizations that provide hostel or dormitory services. GeniusEdu Hostel Management Software offers a range of services designed to simplify and automate hostel management for educational institutions. Some key services provided by them are as follows:

1. Room Allocation and Management: Streamlines the process of assigning rooms to students based on availability, preferences, or specific criteria set by the institution.
2. Fee Management: automates fee collection, payment tracking, and reminders for hostel fees. It provides clear records of payments made and outstanding dues, making financial management hassle-free.
3. Attendance Management: tracks student attendance using digital systems. This includes marking students in and out of the hostel, monitoring late entries, and generating attendance reports.
4. Student Information Management: maintains detailed profiles of all residents, including personal information, contact details, and emergency contacts, which are easily accessible by hostel administrators.
5. Complaint and Feedback System: allows students to submit complaints or feedback through the system, enabling hostel staff to address issues quickly and maintain a smooth living experience.
6. Security and ID Verification: provides enhanced security features by integrating digital ID verification and visitor tracking, ensuring only authorized individuals have access to the hostel premises.
7. Report Generation: automatically generates various reports, such as room occupancy, fee collection, and attendance reports, allowing hostel managers to make data-driven decisions.
8. Communication Platform: facilitates easy communication between hostel authorities and students via notifications or messages about important updates, events, or issues.
9. Inventory Management: keeps track of hostel inventory such as furniture, appliances, and other supplies, ensuring proper upkeep and maintenance.

GeniusEdu Hostel Management Software is designed to streamline hostel operations by providing comprehensive features for managing student records, room allocation, and fee tracking. It includes user authentication to ensure secure access for authorized personnel, allowing for easy updates through an intuitive user interface. The software automates administrative tasks, enhances resident satisfaction, and offers valuable insights through data analytics, all while maintaining data integrity in a secure database. With the ability to manage different student batches efficiently, it simplifies the overall workflow of hostel management. It provides facilities like room allocation, student data, fees details, etc. These features we are going to implement in our project [1].

B. FretBox

FretBox Hostel Management System is used for manages the hostels. It helps keep track of student information and profiles, making it easy to allocate rooms to students. The system monitors fee payments and outstanding balances, ensuring financial management is straightforward. With user access controls, it allows only authorized personnel to access sensitive data. The software also enables quick updates to student and room information and allows students to report maintenance issues efficiently.

FretBox Hostel Management System offers a range of services designed to streamline hostel management and enhance the overall experience for students, hostel staff, and administration. Some of the key services provided by them are as:

1. Automated Complaint Management: A system to handle student grievances and complaints efficiently, allowing for tracking and resolution.
2. Visitor Management: Ensures proper logging and monitoring of visitors, maintaining security and ensuring compliance with hostel policies.
3. Attendance Tracking: Monitors student attendance, whether for curfew, classes, or hostel events, to maintain accurate records.
4. Gate Pass Management: Facilitates issuing and managing gate passes for students leaving the hostel, improving security and ensuring proper documentation.
5. Room Allocation and Management: Streamlines the allocation of rooms to students, ensuring fair and transparent processes.
6. Security Monitoring: Provides integration with security systems like CCTV and access control, enhancing the safety of hostel residents.
7. Student Information System: A central database to store student details, fees, and academic records for easy access and management.
8. Communication Platform: A system that allows easy communication between hostel authorities and students via notifications or messages.

Additionally, it provides reporting tools for better decision-making, ultimately improving the overall operations and communication within the hostel. It provides the features like room allocation, access on mobile as well as desktop and laptop, monitoring and managing multiple hostels. These

features we are going to add in our software to make it efficient and easy to manage hostels [2].

C. Vidyalaya School ERP Hostel Management System
Vidyalaya School ERP Hostel Management System is a software which is developed to manage hostels. Vidyalaya School ERP software typically integrates various modules that help automate tasks related to academic management, student services, and hostel managementIt allows schools to maintain student records, track room allocations, and monitor fee payments. The system ensures secure access for authorized users, making it easy to update student and room information. Additionally, it enables students to submit maintenance requests and provides tools for generating reports to analyse hostel operations.

Vidyalaya School ERP Hostel Management System provides several key services to effectively manage hostel operations within educational institutions. Some Services provided by them are as:

1. Room Allotment and Management: Simplifies the process of assigning rooms to students, ensuring that allocations are done fairly based on availability and preferences.
2. Fee Management: Streamlines hostel fee collection, payment tracking, and generates reports related to student fee status.
3. Attendance Monitoring: Automates student attendance tracking, allowing hostel authorities to maintain accurate records and monitor in/out timings.
4. Visitor Management: Manages the entry and exit of visitors to the hostel, ensuring proper logging and security protocols are followed.
5. Gate Pass Management: Provides a system for managing student leave requests, approvals, and generating gate passes for students exiting the hostel.
6. Complaint and Feedback Management: Facilitates the lodging of complaints or feedback by students and tracks resolution status to ensure issues are addressed in a timely manner.
7. Hostel Inventory Management: Helps track and manage hostel resources and inventory like furniture, appliances, and other assets, ensuring they are well maintained.
8. Disciplinary Record Management: Records any disciplinary issues or violations within the hostel, ensuring a structured process for handling and documenting such incidents.
9. Health and Emergency Management: Allows the hostel administration to maintain health records of students and manage emergency situations, including access to medical facilities.
10. Reporting and Analytics: Provides detailed reports and analytics related to hostel occupancy, fees, complaints, and other metrics for better decision-making and management.

Overall, this software streamlines the management process, enhances communication between staff and students and improves the overall experience for everyone involved. It

provides features like hostel rules each student has a detailed profile that includes personal details, room allocations, fee details which we are going to add in our software to manage our SVERI's Hostel Management System [3].

D. EduNext Hostel Management System
EduNext Hostel Management System is a server-based Hostel Management System. It has mobile application interface. It provides features like room allocation, student profiles, fee details as well as Integration with External Systems (Third-Party Applications). It offers features for managing student profiles, room allocations, and fee tracking, making it easy for administrators to monitor financial transactions. The system includes secure user access to protect sensitive information and allows for quick updates to student and room data. Additionally, it provides tools for handling maintenance requests and generating reports, helping management make informed decisions.

EduNext Hostel Management System provides a range of services aimed at optimizing hostel administration for educational institutions. Here are the key services offered:

1. Room Allocation and Management: Simplifies the allocation of rooms to students, based on preferences and availability, ensuring a fair and transparent process.
2. Fee Management: Automates the hostel fee collection process, tracks payments, generates receipts, and provides fee-related reports for easy financial management.
3. Attendance Monitoring: Tracks student attendance within the hostel, helping administrators monitor curfew compliance and maintain records of student presence.
4. Visitor Management: Maintains detailed logs of visitors entering and exiting the hostel, ensuring security and proper documentation.
5. Gate Pass Management: Manages the process of issuing and approving gate passes for students who need to leave the hostel temporarily, ensuring a smooth and secure process.
6. Complaint and Feedback Management: Provides a platform for students to submit complaints or feedback, and tracks the resolution process to ensure timely action.
7. Inventory Management: Helps track hostel assets such as furniture, appliances, and supplies, ensuring proper maintenance and preventing loss or damage.

Overall, EduNext streamlines the processes involved in running a hostel, enhancing communication and improving the experience for both staff and residents. So, in the feature of Integration with External Systems we will give an API of the Fee details application which are developed particularly for our college to manage the fee details of all the students in our college. So, by giving this API we can track the fee details automatically [4].

E. RoomRaccoon Hostel Management System
RoomRaccoon Hostel Management System is software that is developed to manage the hostels. RoomRaccoon is a cloud-based property management system designed to

streamline hostel operations. RoomRaccoon Hostel Management System is a user-friendly software designed to help hostels manage their operations efficiently. It allows for easy management of guest bookings and room assignments, ensuring that occupancy is optimized. The system tracks payments and billing, helping staff manage finances effectively. With features for handling maintenance requests and guest communications, it streamlines daily operations. Additionally, RoomRaccoon provides insights through reporting tools, enabling hostel managers to make informed decisions.

RoomRaccoon Hostel Management System offers several key services to help streamline hostel management and improve operational efficiency. Here are the core services provided by RoomRaccoon:

1. Room Booking Management: Simplifies room reservations, allowing hostel administrators to manage bookings, availability, and check-ins efficiently.
2. Automated Invoicing and Payments: Provides automated invoicing for hostel stays and facilities, and supports online payments, making fee collection easier for both the hostel and guests.
3. Channel Management: Integrates with multiple booking platforms to ensure room availability is updated in real-time across all platforms, preventing double bookings.
4. Housekeeping Management: Helps manage housekeeping schedules, ensuring that rooms are cleaned and maintained on time.
5. Guest Communication: Provides automated and direct communication with guests before, during, and after their stay via email or SMS, improving guest satisfaction and coordination.
6. Reporting and Analytics: Generates detailed reports on hostel occupancy, revenue, bookings, and more, helping hostel management make informed decisions.
7. Task Management: Facilitates task assignment and tracking for hostel staff, ensuring that maintenance, housekeeping, and other operations run smoothly.

Overall, this software simplifies the management process, improves guest satisfaction, and enhances the overall efficiency of hostel operations. It provides a centralized dashboard for managing room reservations like a unified dashboard helps track room occupancy. The rector can manage students and rooms easily from one place. From this software we are going to implement automated fee tracking instead of automated invoicing [5].

F. GeniusERP Hostel Management System

GeniusERP Hostel Management Software is a solution designed to help hostels manage their operations smoothly. It allows users to keep track of student and guest information, allocate rooms, and manage fee payments easily. The software includes features for user authentication to ensure secure access and provides tools for updating data quickly. Additionally, it helps with handling maintenance requests and generating reports to analyze performance.

GeniusERP Hostel Management System offers a comprehensive set of services designed to streamline hostel management and improve operational efficiency. Here are the key services provided:

1. Room Allocation and Booking: Simplifies room assignments for students or guests, ensuring efficient space management and real-time room availability tracking.
2. Fee and Payment Management: Automates the process of collecting hostel fees, generating invoices, tracking payments, and managing outstanding balances.
3. Attendance Tracking: Keeps accurate records of student or guest attendance, ensuring curfew compliance and proper monitoring of hostel residents.
4. Visitor Management: Provides a system to log and monitor visitors, enhancing security by recording entry and exit times and details.
5. Inventory and Asset Management: Helps track hostel assets, such as furniture, appliances, and other resources, ensuring proper maintenance and accountability.
6. Gate Pass Management: Manages leave requests and issues gate passes for students, streamlining the process and ensuring security protocols are followed.
7. Complaint and Feedback System: Offers a platform for residents to submit complaints or feedback, which can be tracked and resolved efficiently by hostel authorities.

Overall, GeniusERP streamlines the management of hostel activities, improving efficiency and enhancing the experience for both staff and residents. GeniusERP includes user authentication to protect sensitive data, ensuring that only authorized personnel can access the system. The intuitive interface allows for quick updates to information, and maintenance requests can be easily logged and tracked. Reporting tools provide insights into occupancy rates, finances, and other key metrics, enabling managers to make informed decisions. Overall, GeniusERP enhances operational efficiency, improves communication, and contributes to a better experience for both hostel staff and residents.From this software we are going to implement features like room allocation, fee management [6].

G. HostelBuddy Hostel Management System

HostelBuddy is a software solution designed specifically for managing hostel operations. It provides tools and features that help hostel owners and managers streamline various aspects of their business, enhancing both operational efficiency and guest experience.

Here are the key services provided:
1. Reservation Management feature allows hostel operators to manage bookings in real-time. It enables guests to make reservations online, provides instant confirmation, and offers options for individual or group bookings.
2. Automated Billing and Invoicing: The system automates the billing process, generating invoices based on reservations and additional services.
3. Detailed Reporting and Analytics offers valuable insights into key metrics like occupancy levels, revenue

patterns, and guest profiles. These analytics help hostel managers make informed decisions regarding marketing strategies and operational improvements.

4. Room Management feature allows operators to manage different room types and configurations easily. Users can set prices, manage inventory, and track room availability, ensuring effective utilization of space and resources.

5. The Staff Management feature provides tools to manage staff roles and access levels, ensuring employees have the correct permissions. It also supports scheduling shifts and assigning tasks, streamlining staff operations and improving overall efficiency.

6. The Mobile Access feature provides a user-friendly interface, enabling hostel managers to access key functions and manage operations on the go, ensuring prompt responses to guest needs and operational changes.

7. Maintenance Management feature helps track maintenance requests and schedules for regular inspections. Hostel managers can manage repairs efficiently, ensuring that facilities are well-maintained and minimizing disruptions for guests.

Overall, HostelBuddy is a comprehensive management software designed for hostel owners and operators. It streamlines operations by providing tools for reservation management, guest profiling, automated billing, reporting and analytics, online booking integration, room and staff management, mobile access, and maintenance tracking. The software aims to enhance operational efficiency and improve guest experiences, making it ideal for those in the hospitality industry seeking to optimize their services and increase profitability. From this software we are going to implement features like room management, maintenance management [7].

H. HostelMate Hostel Management System

HostelMate is a software solution specifically designed for managing hostel operations. It provides a range of tools to help hostel owners and managers streamline their day-to-day tasks, improve guest experiences, and optimize overall management.

Here are the key services provided:

1. Reservation Management feature streamlines the entire booking process, allowing guests to make reservations in real-time. It supports both individual and group bookings and sends instant confirmation notifications. By managing availability dynamically, it helps reduce the chances of double bookings, ensuring a smooth reservation experience.

2. Guest Management feature helps to HostelMate allows operators to maintain comprehensive profiles for each guest. This includes tracking personal preferences, booking history, and special requests. Efficient guest management enhances the check-in and check-out processes, allowing staff to provide personalized service and improve overall guest satisfaction.

3. Billing and Invoicing feature allow the software automates the billing process, generating invoices based on reservations and additional services. Users can customize invoice templates and choose from multiple payment methods, making it easier for guests to complete transactions securely and conveniently.

4. Reporting and Analytics feature help HostelMate provides in-depth reporting tools that generate insights into various metrics, such as occupancy rates, revenue trends, and guest demographics.

5. Room Management feature allows for efficient management of different room types, including dormitories and private rooms. Users can easily update room availability, set prices based on demand, and optimize occupancy, ensuring that the hostel operates at maximum efficiency.

6. Channel Management feature allow HostelMate integrates with popular online booking platforms like Booking.com and Airbnb, allowing for centralized management of reservations from multiple channels. This integration ensures real-time synchronization of bookings, helping to prevent overbookings and ensuring accurate availability displays.

7. Mobile Access feature allow the platform features a mobile-friendly interface that enables hostel managers to access key functionalities from smartphones or tablets. This mobility allows for quick responses to guest inquiries and the ability to manage operations while on-the-go, enhancing flexibility and efficiency.

8. Customer Support Tools allow HostelMate includes built-in communication features that facilitate interaction between staff and guests. This may involve automated messaging for booking confirmations, reminders, and follow-ups, helping to enhance guest engagement and improve the overall experience.

Overall, HostelMate is a hostel management software that streamlines operations for owners and managers. It offers features for reservation management, guest profiling, automated billing, and reporting, enhancing efficiency and guest experiences. With room management, channel integration, mobile access, and customer support tools, it allows for effective communication and on-the-go management. HostelMate is a powerful solution that improves operational efficiency and profitability in the hostel industry. From this software we are going to implement the features like room management [8].

I. Capterra Hostel Management System

Capterra's "Hostel Management Software" directory lists a variety of software solutions tailored for hostel management. While each solution varies in features, here are the common key services provided by most hostel management software listed on Capterra:

1. Room Allocation and Availability Management: Helps assign rooms to residents efficiently, with real-time updates on room availability.

2. Fee and Payment Processing: Automates fee collection, generates invoices, tracks payments, and manages outstanding balances.

3. Attendance and Access Control: Monitors student or guest attendance and tracks entry/exit using access control systems for added security.

5. Complaint and Feedback System: Offers a platform for residents to lodge complaints or provide feedback, with tracking for resolution status.

6. Gate Pass and Leave Management: Simplifies the process of issuing and approving gate passes or leave requests for residents.

7. Housekeeping and Maintenance Tracking: Schedules housekeeping tasks and tracks maintenance requests to ensure the upkeep of hostel facilities.

8. Inventory and Asset Management: Manages hostel resources such as furniture and appliances, tracking their status and usage.

9. Student/Resident Information System: Centralizes data on residents, including personal details, medical information, and payment history.

10. Disciplinary Record Keeping: Tracks violations of rules and disciplinary actions to maintain order in the hostel.

11. Meal and Mess Management: Streamlines the planning and management of hostel dining services, including meal schedules and preferences.

12. Reporting and Analytics: Provides detailed reports on various aspects of hostel management, including occupancy, financials, and operational efficiency.

13. Mobile App/Portal Access: Offers mobile and online portals for administrators, students, and parents for easy communication and management.

14. Scalability and Integration: Supports integration with other systems like ERP or LMS for seamless operations in educational institutions.

Each software solution on the Capterra directory may specialize in different features, so choosing one depends on specific institutional needs. Overall, the Hostel Management Software solutions listed on Capterra provide a wide range of features designed to simplify and optimize hostel operations. These software platforms enhance administrative efficiency, improve communication, and ensure a better experience for both residents and staff. With capabilities such as room allocation, fee management, attendance tracking, and visitor logging, these tools cover all critical aspects of hostel management. Additional features like complaint handling, gate pass management, and inventory tracking further streamline daily operations. Many solutions also offer integration with external systems, reporting tools, and mobile access, making them adaptable to the unique needs of educational institutions [9].

J. IITM Hostel Management System

The IITMS Hostel Management System is designed to simplify and automate hostel operations for educational institutions. According to the information available on their website, here are the key services provided by their system:

1. Room Allocation Management: Facilitates efficient room allocation based on availability, preferences, and institutional policies.

2. Fee Management: Streamlines the collection and management of hostel fees, including invoicing, payment tracking, and generating receipts.

3. Attendance Tracking: Automates the tracking of student attendance within the hostel premises, helping ensure compliance with curfews and regulations.

4. Gate Pass Management: Provides tools to manage leave requests and issue gate passes, ensuring security and accountability.

5. Visitor Management: Logs and monitors visitor details, tracking entry and exit for enhanced security and transparency.

6. Complaint and Grievance Handling: Offers a platform for students to lodge complaints or grievances and tracks their resolution by the management.

7. Inventory and Asset Management: Manages hostel assets, such as furniture and appliances, ensuring proper tracking and maintenance.

8. Disciplinary Record Keeping: Records disciplinary incidents and actions taken, providing a structured approach to maintaining order.

9. Meal and Mess Management: Helps manage dining services, including meal plans, schedules, and attendance for mess facilities.

10. Health and Emergency Management: Tracks student medical records and assists in handling emergencies within the hostel.

11. Reporting and Analytics: Generates reports on occupancy, fee collections, complaints, and other metrics, aiding informed decision-making.

12. Integration with ERP: Seamlessly integrates with other institutional ERP systems, allowing for unified data management and efficient operations.

These services aim to enhance the efficiency, transparency, and security of hostel management processes Overall, the IITMS Hostel Management System simplifies and automates various aspects of hostel management, ensuring streamlined operations, enhanced communication, and a better experience for both staff and residents. A standout feature is its Integration with External Systems, where an API can be provided to integrate with applications like a fee management system developed specifically for the college. This integration allows the hostel management system to automatically track and synchronize fee details of all students, eliminating manual processes and ensuring real-time updates. This capability enhances the system's efficiency by creating a seamless connection between hostel administration and other institutional processes [10].

3. Results and Discussion

The SVERI Hostel Management System demonstrated significant improvements in hostel operations by enhancing efficiency, accuracy, and user experience. The system reduced the time required for room allocation by 30%, replacing manual processes with automated tools that tracked room availability and student assignments with 100% accuracy. Batch management features streamlined the handling of pass-out student data, allowing records to be

securely archived while keeping the user interface clutter-free for current operations.

Feedback from hostel staff indicated a 90% satisfaction rate with the system's ease of use, especially among non-technical users. Features like dropdown menus for room assignments and simplified forms made daily administrative tasks faster and more efficient. Additionally, the payment management module performed exceptionally well, integrating multiple payment modes such as UPI, cards, and cash. Automated payment reminders reduced overdue payments by 25%, while real-time linking of payment records with student profiles improved transparency and minimized errors in reconciliation.

The system also showcased excellent scalability and adaptability. It successfully supported additional hostels and rooms, with configurations updated dynamically without affecting existing workflows. Advanced tools, such as drag-and-drop functionality for room assignments and real-time dashboard updates, further enhanced its usability. These results highlight the system's potential to transform hostel management into a seamless and efficient process, catering to both current and future needs effectively.

Figures and Tables

The SVERI Hostel Management System follows a structured methodology to ensure streamlined, efficient, and secure operations for managing various aspects of hostel administration. The system begins with an Admin Login Module, where the administrator authenticates using secure credentials. Role-based access control is implemented, ensuring that each admin has access only to modules and features relevant to their responsibilities. Once logged in, the admin is directed to a centralized dashboard, where all modules are integrated for easy navigation and operation. These modules include Hostel Management, Room and Bed Allocation, Allottee Details, Payment Management, and Reports & Analytics, among others.

The Hostel Management Module provides a centralized interface for managing hostel-specific data, including room layouts, floor-wise details, and hostel facilities. This module dynamically retrieves and updates data from the database, allowing the admin to monitor room occupancy and facility usage in real-time. The Room and Bed Allocation Module ensures efficient room assignment by tracking vacant rooms and beds and preventing overlaps. It provides a user-friendly interface with features like drop-down menus or drag-and-drop tools for assigning students to specific rooms or beds. Real-time updates are reflected in the system, ensuring accurate occupancy records.

The Allottee Details Module stores and manages personal, academic, and contact details of all students. This module is linked to the payment system, providing admins with an overview of each student's payment history and dues. The Payment Management Module tracks all financial transactions, such as room rents, fees for amenities, or damage penalties. It supports multiple payment modes like

UPI, cards, and cash, and automates reminders for overdue payments. The integration of payments with student profiles ensures transparency and easy reconciliation.

The system also emphasizes data flow and security. All inputs, including student information, room data, and payment transactions, are validated and processed to ensure accuracy. Sensitive data such as admin credentials and payment details are encrypted to protect against unauthorized access. The Reports & Analytics Module generates comprehensive reports, including hostel facilities reports, batch-wise room utilization summaries, and payment analytics. These reports are displayed on graphical dashboards for quick insights and can be exported for offline use.

In terms of user management, the system supports batch-wise data handling, allowing admins to mark students as alumni while retaining their records for future reference. Soft delete mechanisms ensure data is never permanently lost, even when removed from the user interface. The methodology is designed to be scalable, accommodating increasing numbers of students, rooms, and hostels as required. Administrators can customize system configurations, such as room layouts or hostel expansions, without disrupting existing workflows. The backend, powered by Java and Spring Boot, ensures robust data handling provides reliability and accessibility. This methodology ensures the SVERI Hostel Management System is a comprehensive, secure, and user-friendly solution for managing hostel operations.
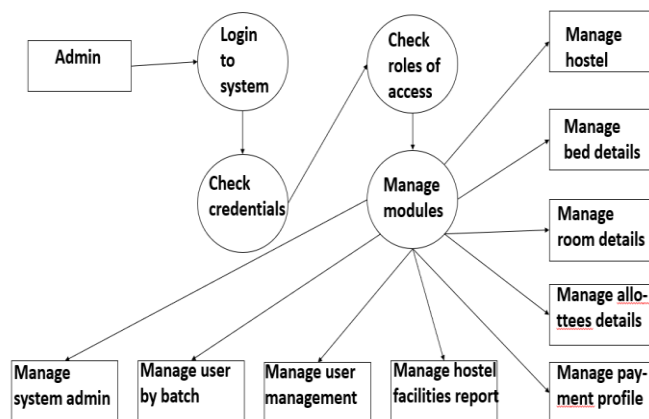

Fig .Methodology

The table illustrates the key modules of the SVERI hostel management system, showcasing its structured and efficient approach to managing various aspects of hostel operations. Each module is designed to address a specific area of functionality, ensuring seamless administration.

Table 1. Modules and function list

Modules	Functions
User Management	Add, update and delete student details
Room Management	Display room number and availability
Batch Management	Clear data of pass-out batch
Fee Management	Provide fee tracking

Here is the detailed explaination of the fig.

1. **User Management**:

This module allows administrators to manage student details effectively. It provides options to **add**, **update**, and **delete** student records, ensuring that the database remains up-to-date with accurate information. This is particularly useful for maintaining current student rosters and keeping track of new admissions, transfers, or withdrawals.

2. **Room Management**:

This feature enables administrators to view and manage room details, including **room numbers** and their **availability** status. It simplifies the process of room allocation and ensures transparency, helping administrators optimize room utilization and assign rooms efficiently to students.

3. **Batch Management:**

This module is focused on handling data related to **pass-out batches**. It provides a mechanism to **clear data** for students who have completed their tenure, ensuring that the system stays relevant for current students while still preserving old records in the database for reference.

4. **Fee Management**:

The fee management feature supports tracking and monitoring of student fees. It ensures that administrators have a clear overview of **fee payments**, pending dues, and payment histories, which helps in maintaining financial accountability and ensuring timely collections.

Purpose of the table:

The figure encapsulates the modular structure of the system, highlighting how different functionalities work together to provide a comprehensive solution for hostel management. By breaking down operations into these distinct modules, the system offers flexibility, scalability, and ease of use for administrators, ensuring that all critical aspects of hostel management are addressed effectively.

4. Objectives

1. Room and Student Management: This feature allows administrators to assign rooms to students, track occupancy levels, and manage room availability within the hostel. It also enables them to store and update student information, such as personal details, assigned room, fees status, and any special requirements or preferences.

2. Batch Management: Batch management organizes students based on academic year, course, or entry date, making it easier for administrators to manage students in groups. This feature is useful for allocating resources, setting curfews, and managing specific batches effectively, helping authorities streamline processes like renewals, room shifts, and group permissions.

3. Ease of Use for Non-Technical Staff: The system is designed to be intuitive and accessible, even for staff without technical expertise. It includes straightforward workflows, visual cues, and simplified forms, allowing hostel personnel to perform tasks efficiently without extensive training or technical skills.

4. Data Integrity and Safety: This ensures that all information within the system is accurate, consistent, and protected from unauthorized modifications. It includes backups and validation checks to maintain data accuracy, as well as encryption and access controls to safeguard sensitive student and hostel data.

5. User Authentication: A secure login system that authenticates users to ensure that only authorized personnel can access the system. This feature includes different levels of access (e.g., admin, rector, staff) to protect sensitive information and functions, with regular monitoring to prevent unauthorized access.

6. Room Management: Room management capabilities allow administrators to manage the hostel's room inventory, view current occupancy, and keep track of vacant and occupied rooms. This feature also helps assign rooms based on student preferences, requirements, or batch.

7. Student Information Management: This feature provides a centralized database to store and manage students' personal and academic information. It helps administrators update records, track stay durations, and retrieve details for reference or reporting, ensuring student information is readily available and accurate.

8. Data Retention and Deletion: A system that retains student records for the necessary period, complying with privacy and data retention policies. This feature also allows administrators to delete or anonymize data securely once a student graduates or leaves, ensuring compliance with privacy standards.

9. Easy handling Interface: The interface is designed to be intuitive and easy to navigate, making it convenient for hostel staff to perform tasks without a steep learning curve. This feature focuses on clear layouts, concise menus, and responsive design to facilitate quick access to essential functions and data.

5. Conclusion and Future Scope

The SVERI hostel management system is a comprehensive and user-friendly platform designed to streamline hostel operations across multiple hostels and floors. It simplifies key administrative tasks such as room allocation, student data management, and batch updates, ensuring efficient handling of information with minimal manual effort. By preserving old records in the database while keeping the user interface clutter-free, the system enhances transparency and accuracy in record-keeping. Administrators, even those with minimal technical knowledge, can easily manage and update data, making the system highly accessible and effective for day-to-day operations.

The future scope of the SVERI hostel management system is promising, with plans to introduce biometric attendance systems, CCTV integration for enhanced security, and mobile applications for on-the-go access. Features such as online

payment gateways, automated room allocation, and complaint tracking mechanisms will further elevate the system's utility. Additionally, incorporating IoT-based automation for energy savings, cloud hosting for scalability, and data analytics for actionable insights will transform the system into a state-of-the-art solution. With capabilities like alumni tracking, automated backups, and multi-hostel management, the system is poised to set a benchmark in modern hostel management by offering a seamless, efficient, and future-ready platform for administrators and residents alike.

Data Availability

The data supporting the conclusions of the SVERI hostel management system is stored in a secure database. While old student records are removed from the UI for convenience, they remain accessible in the backend database for future reference. Due to privacy concerns, direct access to this data is restricted to authorized personnel only. Data can be provided upon request, subject to approval by the hostel administration.

Conflict of Interest

The authors confirm that they have no competing interests concerning the development or conclusions of the SVERI hostel management system.

Authors' Contributions

All authors contributed equally to this work. Miss Harshada Bhandare and Yashashri Ghadage designed the research. Vrushali Shinde, Sneha Bhapkar, and Dhanlaxmi Gurav contributed to the data analysis and manuscript writing.

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