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Venue Vista: A Smart Hall Booking Management System

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Abstract: *Managing seminar halls and event venues within educational institutions is often handled through manual processes, which leads to scheduling conflicts, inefficient resource utilization, and delays in approval workflows. This paper presents **Venue Vista**, a web-based smart hall booking management system designed to automate and streamline the process of reserving institutional venues. The system allows faculty members to check hall availability, submit booking requests, and track approval status through a centralized digital platform. The booking request passes through a structured approval workflow involving the Head of Department (HOD), Principal, and Public Relations Officer (PRO).*

The proposed system uses modern web technologies including React for frontend development, Supabase for backend services, and PostgreSQL for database management. The system incorporates role-based dashboards, automated conflict detection, real-time notifications, and analytical reporting features. Administrative users such as the Principal, Chairman, and PRO can view statistics including the most frequently used halls, department booking patterns, and upcoming events through calendar visualization. Reports can also be exported in Excel format for institutional records.

Experimental testing and simulation demonstrate that the system significantly reduces scheduling conflicts and improves transparency in venue allocation. The Venue Vista system provides an efficient and scalable solution for managing institutional venue bookings and administrative workflows.

Key Words: *Hall Booking System, Resource Management System, Web Application, Workflow Automation, Seminar Hall Scheduling, Cloud Database, Institutional Resource Management.*

I.INTRODUCTION

Educational institutions frequently organize seminars, workshops, conferences, and academic meetings that require access to seminar halls or event venues. Traditionally, booking such venues is managed through manual methods such as written registers, phone calls, or direct communication with administrative staff. These methods often result in double bookings, delays in approvals, lack of transparency, and inefficient resource utilization.

With the growth of digital infrastructure, many institutions are shifting towards automated management systems that streamline administrative operations. A digital hall booking system enables users to check venue availability, submit booking requests, and receive approvals through a centralized platform.

The Venue Vista system is developed to address the limitations of manual booking systems. It provides a web-based platform where faculty members can submit booking requests and track approval status in real time. The system implements a multi-level approval process involving the Head of Department (HOD), Principal, and Public Relations Officer (PRO). This ensures that all bookings are properly authorized and coordinated. Additionally, the system provides administrative dashboards that allow higher authorities to monitor venue usage patterns, view upcoming events through calendar interfaces, and generate reports for institutional planning. By automating the hall booking process, Venue Vista enhances operational efficiency and improves transparency in institutional resource management.

II. LITERATURE SURVEY

Resource scheduling and booking management systems have been widely studied in the domain of information systems. Several digital solutions have been developed to automate scheduling processes and reduce manual administrative tasks.

Smith et al. (2020) proposed a web-based conference room booking system that allows users to reserve rooms through a centralized interface. The study demonstrated that digital booking platforms significantly reduce scheduling

conflicts and improve resource utilization. Kumar and Singh (2021) developed a cloud-based facility management system for educational institutions. Their system included role-based authentication and automated notification features to improve communication between users and administrators. Another study by Zhang et al. (2019) presented a smart scheduling system that integrates real-time availability checking with automated booking confirmations. The research highlighted the importance of real-time databases and conflict detection algorithms in scheduling systems.

Although these systems provide basic booking functionality, many lack structured approval workflows and advanced analytics for administrative monitoring. The Venue Vista system extends these capabilities by integrating multi-level approval processes, role-based dashboards, analytics features, and automated reporting tools.

III. METHODOLOGY

The development of Venue Vista follows a systematic approach based on software engineering principles. The methodology includes requirement analysis, system design, database design, module implementation, workflow definition, and testing.

A. Requirement Analysis

Requirement analysis is performed to identify system functionalities and define operational constraints.

Functional Requirements:

- User registration and login
- Hall Availability Check
- Booking Submission
- Approval Workflow
- Notifications
- Admin Management

Non-Functional Requirements:

- User-friendly interface
- Data security
- Scalability
- Usability

B. System Design

The system architecture follows a three-tier design.

Presentation Layer- Handles user interface interactions and is developed using React.
Application Layer-Processes business logic and communicates with backend services using APIs.
Data Layer- Stores application data using PostgreSQL database and Supabase services.

User Interface
↓
Application Logic
↓
Database System

C. Database Design

The database uses a relational structure with multiple tables linked through foreign keys.

Table	Description
Users	Stores authentication details
Profiles	Stores user roles and departments
Halls	Contains hall details and capacity
Bookings	Stores booking requests
Approvals	Stores approval decisions
Notifications	Stores user alerts

Relationships between tables maintain data integrity and consistency.

D. Module Implementation

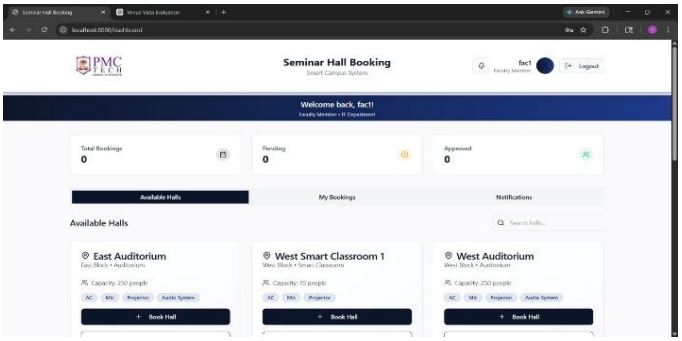
The system is divided into the following modules:

1. User Authentication Module

- Handles login, registration, and role-based authentication.

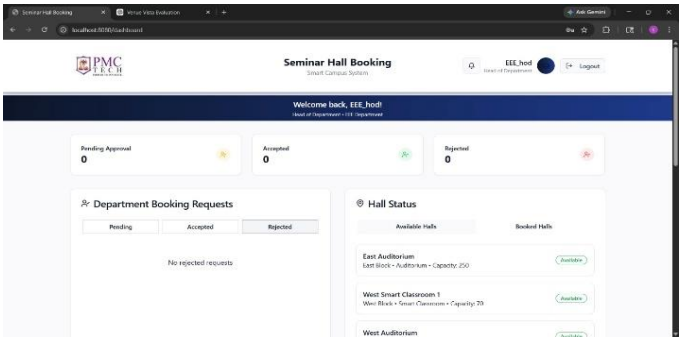
2. Hall Management Module

- Stores hall information including capacity, location, and amenities.



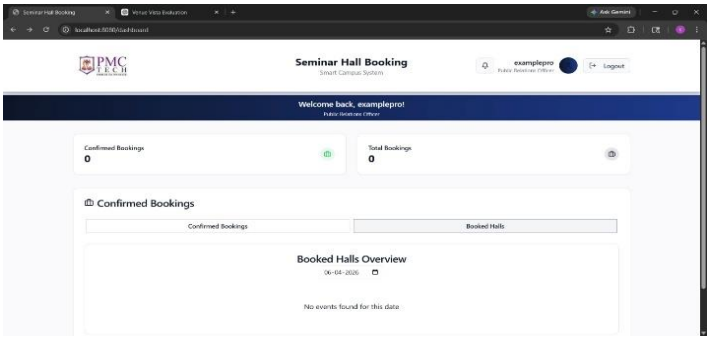
3. Booking Management Module

- Allows faculty to submit booking requests.



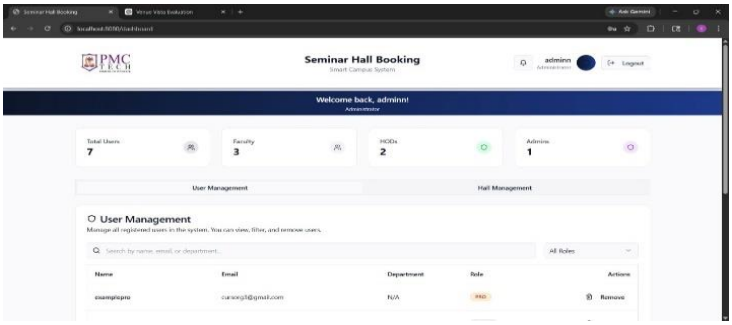
4. Approval Management Module

- Handles booking approvals by HOD and Principal.



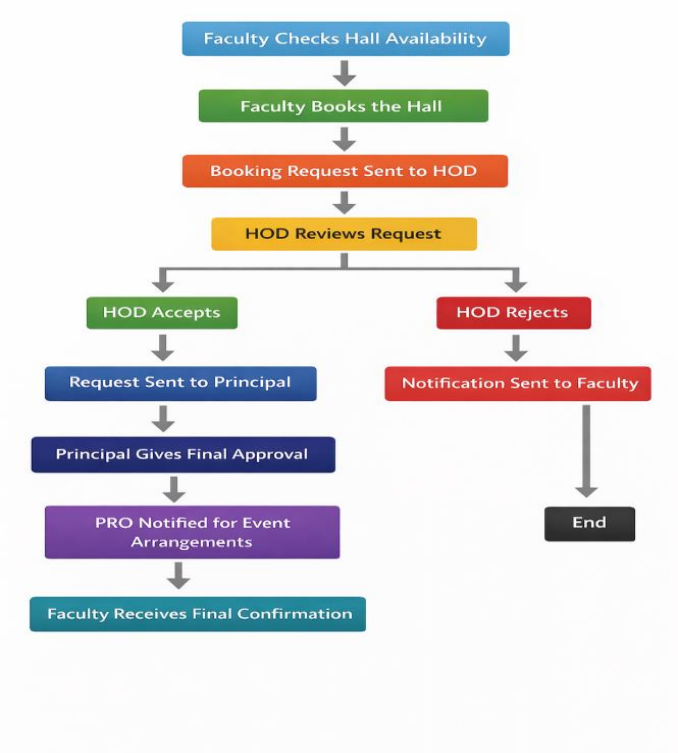
5.Admin Module

- Allows administrators to manage users, halls, and system data.



E. Workflow of the System

The booking process follows a structured workflow.



Administrative users such as the Principal, Chairman, and PRO can view hall usage statistics, department booking trends, and upcoming events through calendar views.

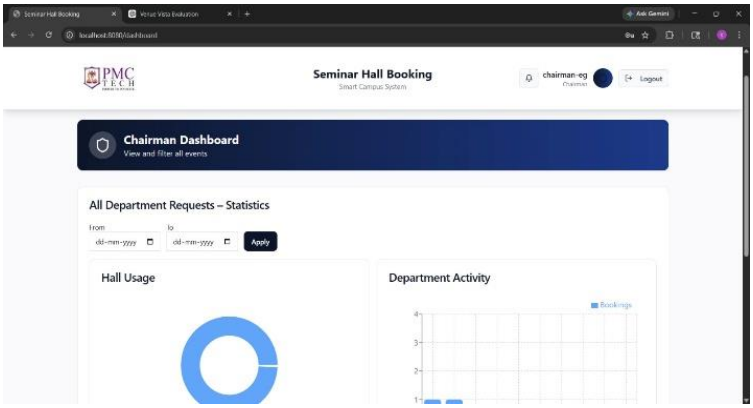
Reports can also be downloaded in Excel format.

F. Implementation Steps

The system was implemented through the following steps:

1. Requirement collection and analysis
2. System architecture design
3. Database schema development
4. Frontend development using React
5. Backend integration using Supabase
6. Implementation of booking and approval workflows
7. Testing and debugging
8. Deployment on cloud platform

G. User Interface Design
The interface is designed to be simple and responsive:



H. Testing and Validation
Various testing methods were used to validate the system.
=>Functional Testing
Ensures all system features operate correctly.
=>Integration Testing
Verifies communication between modules.
=>Load Testing
Simulates multiple booking requests simultaneously.
=>Security Testing
Ensures secure authentication and data protection.
Testing confirmed that the system operates efficiently and prevents booking conflicts.

IV. PROPOSED SYSTEM

The proposed system introduces an automated platform for managing institutional venue bookings. Unlike traditional manual systems, Venue Vista allows users to submit booking requests digitally while ensuring proper approval procedures.

Key features include:

- Online hall booking system
- Automated conflict detection
- Multi-level approval workflow
- Real-time notifications
- Administrative analytics dashboards
- Excel-based report generation

The system significantly improves operational efficiency and reduces manual administrative workload.

V. TABLE OF ANALYSIS

Feature	Existing System	Proposed System
Booking Method	Manual register	Online booking
Approval Process	Manual approval	Automated workflow
Conflict Detection	Not available	Automatic detection
Notifications	Not available	Real-time alerts
Reporting	Manual records	Digital reports

VI. RESULTS AND DISCUSSION

The implementation of Venue Vista demonstrated significant improvements in hall booking management. The automated system eliminated double booking issues by implementing conflict detection algorithms. The structured approval workflow ensured that all bookings were properly authorized before confirmation.

Administrative dashboards provided valuable insights into venue utilization patterns. The system also allowed administrators to track departmental usage and identify the most frequently used halls.

Simulation testing confirmed that the system could handle multiple booking requests without performance degradation. The integration of automated notifications further improved communication between users and administrators.

VII.SCOPE OF RESEARCH

The Future improvements to the system may include:

- Mobile application integration
- AI-based scheduling optimization
- Integration with institutional event calendars
- Automated reminders for upcoming events
- Advanced analytics dashboards

These enhancements would further improve the efficiency and usability of the system.

VIII.CONCLUSION

The Venue Vista system provides an effective solution for managing seminar hall bookings in educational institutions. By replacing manual booking processes with an automated web-based platform, the system improves scheduling efficiency, transparency, and resource utilization.

The integration of role-based approval workflows, real-time notifications, and administrative analytics ensures that the booking process is organized and efficient. Experimental testing confirms that the system successfully prevents scheduling conflicts and simplifies administrative operations.

Venue Vista demonstrates how modern web technologies and cloud-based infrastructure can be used to transform traditional administrative processes into efficient digital systems.

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