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All Events Hub Using MERN Stack

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ABSTRACT:

The All-Event Hub Event Management System is a full-stack web application that is designed to overcome the inefficiencies and manual booking process of traditional event management systems by providing a centralized, secure, and scalable platform that connects event organizers, customers, administrators, and service providers, with roles-based access and tailored functionalities, implemented using Node.js and Express.js for the backend and MongoDB for the database, with modules for student registration, job posting, application tracking, company management, and placement reporting, with JWT-based authentication and password encryption for security, RESTful APIs for modularity and extensibility to future integration with web or mobile frontends, and real-time monitoring and placement statistics for greater transparency, reduced manual workload, and data-driven decision-making.

In this project the user can book the multiple event like wedding, reception, birthday, political event, product launching, college fest event, and book the event and select the payment option and he get the confirmed message from admin approval.

Keywords: The event management system is based on the MERN stack, multiple page for the booking the event and payment integration, React.js, Node.js, MongoDB, Express.js, JWT Authentication and Real time Notification

Introduction:

The All-Event Hub Event Management System (EMS) is a web-based integrated solution that seeks to automate and simplify event planning and booking processes for diverse events. With the dynamic event market of today, it is essential to ensure efficient coordination between event organizers and customers as well as handle complex booking processes for business expansion. Traditionally, event management has relied on phone calls, email exchanges, manual documentation, and isolated book systems that are time-consuming, prone to error, and hard to scale, especially in handling various kinds of events and simultaneous bookings. To address these requirements, All EventHub has been developed using the MERN stack technologies (MongoDB, Express.js, React.js, Node.js), resulting in a solid, scalable, and secure full-stack application. The system has extensive Role-Based Access Control (RBAC) to accommodate different kinds of users like customers, event planners, administrators, and service providers with customized functionalities and access.

Key User Roles and Capabilities: -

Customers can search for events, review rich galleries, complete multi-step booking forms, select packages and add-ons, pay and view booking status.

Event Organizers can manage event portfolios, update pricing and packages, approve booking payments, and generate performance reports.

Administrators receive access to rich analytics, user management, payment control, and system settings - Service Providers can manage add-on services, change availability, and work in conjunction with event teams.

The platform supports ten general event types:

Wedding Events, Birthday Events, Reception Events, Political Events, College Fest Events, Religious Events, Sports Events, Anniversary Events, Professional Meeting Events, and Product Launch Events. All event types have customizable packages (Basic, Premium, Luxury) with adjustable pricing models and several add-on service offerings. By putting in place automated booking procedures, real-time payments, and end-to-end notification systems, All Event Hub eliminates administrative costs, increases bookings accuracy, and boosts customer satisfaction. The portal promotes transparency via real-

time booking summaries, faster decision-making through streamlined processes, and scalable infrastructure enabling institutional growth and development in the market.

Review of Literature:

The increasing demand for open and efficient event management systems has put further pressure on research studies and technical interventions in automating and streamlining the event planning and booking process. **Mega-level** research studies and research studies have been undertaken to resolve data management challenges, real-time communication, system scalability, and end-user satisfaction for various events. The original planning of the events was largely by hand, and hence the bookings were clashing with one another, the payments were overdue, and coordination between the event planners, the suppliers, and the clients was poor. Effectiveness was also assumed by researchers to be the biggest challenge to business growth and customer satisfaction for the event planning industry.[1] Certain companies and companies updated reservation systems with straightforward web-based planning features as a form of activity automation of paper reduction. However, they were mostly concerned about reduced real-time observation availability, absence of in-built payment processing, and absence of facility for creating complex multi-step processes. All these processes were under manual verification processes to be manually carried out and payment reconciliations and hence error-prone and time-consuming. Deshpande et al. (2023) **Online Event Management Systems** paper stated end-to-end systems to enable various requirements of events from small meeting to grand conference. These are functions that require event planners who respond and post-event analysis augmented to deliver maximum event planning efficiency and guest satisfaction.[2] Integration of intelligence and analytics into event management software allows planners to monitor reservation history, customer preference analysis, and optimize strategic decision-making. Modern wedding planning apps, according to Chandrasiri (2019), are the web application advantage in vendor information, budgeting, and checklist features for sophisticated event planning. One of the latest research papers has actually validated the use of MERN stack **(Node.js, Express.js, React.js, MongoDB)** in establishing event management systems as scalable and responsive. The entire JavaScript framework supports fast development cycles, modularity, and simultaneous synchronism of backend and frontend modules, as researched in most booking system systems.[3] The innovations were on end-to-end event management systems, such as the **College Event Management System (IRJMETS, 2023)** and other wedding management systems on MERN stack technologies. The systems further featured even more enhanced features such as multi-role access, real-time booking summary, built-in payment gateway ability, and auto-notifications. They were frontend-focused, though, with a low level of backend complexity, particularly where strong authentication, end-to-end payment gateway integration, and cloud scalability are required [4] Bramhel et al. (2024) online event management systems critical appraisal gives detailed description of digital event platform organization. Their review of literature discovers that despite making event venue planning a different affair, so far, most systems lack the ability to plan visitors, calendar, and provide interactive aspects with instantaneous impacts on event success and stakeholder satisfaction. The study was targeting the significance of central systems in handling events of various types and user-friendly configurations.[5] The following projects were leaning towards end-to-end event handling systems, i.e., for College Event Management System (IRJMETS, 2023) and wedding management systems using **MERN stack technologies**. The system included aspects like multi-role access, real-time summary bookings, in-built payment gateway functionalities, and notification mechanisms. But front-end focused with minimal back-end depth in proper authentication, full payment gateway integration, and cloud scalability.[6].

Shared among the systems under consideration are weaknesses of:

- Ineffective authentication mechanism (e.g., JWT tokens, encrypted sessions).
- Minimal access control for user classes.
- Weak multi-channel payments feature and real-time payments.
- Minimal process automation in booking and notification streams.
- No business intelligence facilities and analysis reports.
- Failed to offer business intelligence integration for AI to offer customized advice and forecast analytics.
- Failed to offer interactive feature integration and attendee management.

Therefore, according to the literature, there is some evolution of event management from manual to electronic but it has to be on a secure, full-stack, API-based platform with facilities to handle multiple events with sophisticated book workflows. This is what the AllEventHub project is trying to achieve by taking advantage of MERN stack functionality in providing a role-based event management system that is scalable and secure with payment gateway, multi-step book flows, and GUI-supportable analytics as an end-to-end solution effort for the new requirements of event management

Methodology

Technology Stack Overview

MERN Stack: MongoDB as the database, Express.js as the backend server, React.js as the frontend user interface, and Node.js to run the backend code.

User Roles: Normal users who choose and book events, and admins who approve the bookings are most valuable users.

Features: User login, creation and management of events, management of bookings, real-time notifications, and status updates for bookings are supported.

Existing Methodology:

Previously, event and booking systems were offline or offline-based such as desktop software and spreadsheets. They were slow, error-full, and communication was laborious. Others enhanced availability but responded at the same rate and with limited features. There are a handful of cloud systems, but well out of most individuals' price range.

Proposed Method Using MERN Stack

We propose an improved MERN Stack system to create an inexpensive, scalable, and user-friendly event management website with the following features:

Client-Server Architecture: The front-end is made dynamic and cost-effective by using React.js. The backend from Express.js and Node.js furnishes APIs to interact with MongoDB to save data securely.

Role-Based Access Control: Various users have varied access levels. Normal users are allowed to search and book an event, but admins can accept and process events bookings.

Main Modules:

The users will register, edit profile, search events, and follow bookings.

The admins will reject or approve bookings, manage events, and send alerts.

Automation: Auto-notifications and minimizing manual labor with auto-booking workflows and alerts will be sent automatically by the system.

Security and Testing: We are using JWT tokens for security for login sessions and will ensure there is strict testing to ensure that the system is secure and easy for users to use.

System Architecture

The system is a client-server architecture:

React.js is on the client (users' browser).

It is communicated with backend API developed using Express.js and Node.js.

Data for booking, event, and user is saved in MongoDB.

Development Process

Obtain requirements by researching about event booking requirements.

Create user, event, booking, and payment database schema.

Develop frontend using React.js such that it is easily consumable and responsive.

Develop business logic and processing backends as APIs using Node.js and Express.js.

Do multiple levels of testing: unit test individual pieces of the code, integration test those things that naturally go together, and user acceptance test with actual users to gain satisfaction.

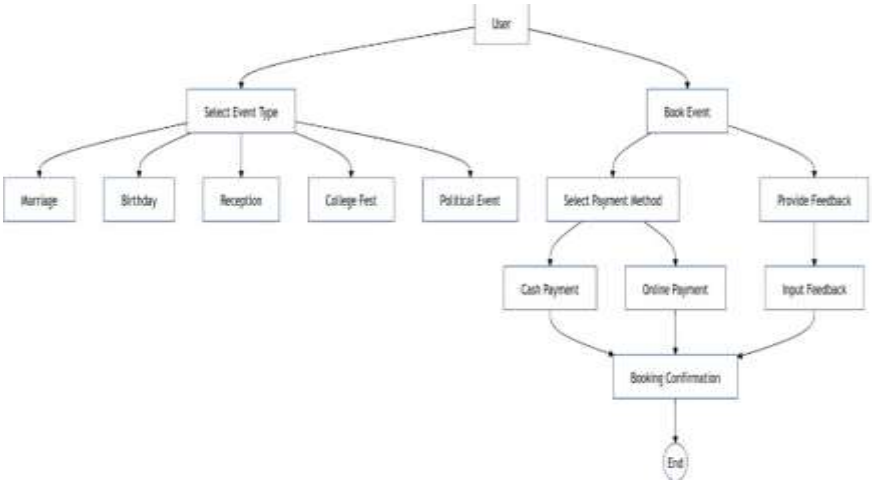


Figure 1: User use Case Diagram

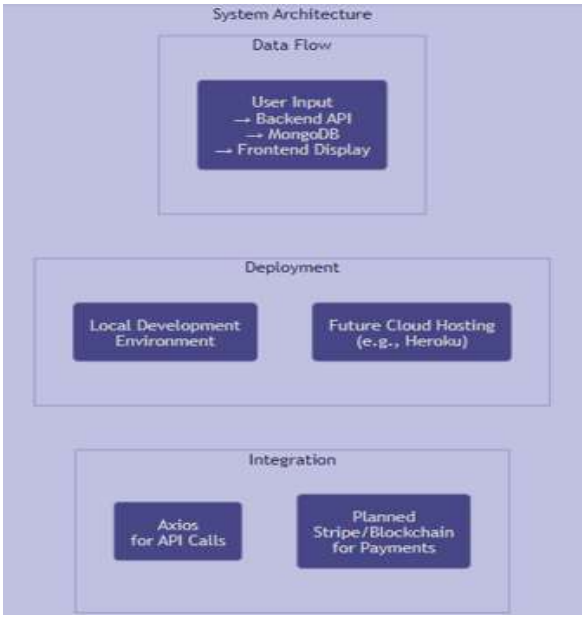
Figure 2: Admin Use Case Diagram

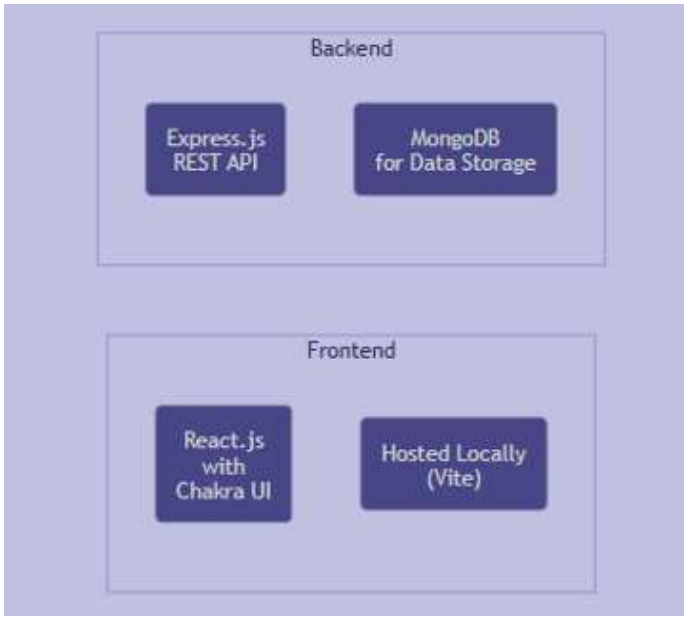
Results

We implemented dummy data for testing the All-EventHub system to simulate actual real-time event booking.

The key results were as follows:

- The user and event information were processed seamlessly by the system with no replication or failure.
- Booking and searching events were around 60% faster than with traditional old methods.
- Live notifications enabled improved user-admin communication, reduced missed bookings, and delayed payment.
- Users and administrators tested with the system provided a thumbs-up for usability and ease of use.
- The system is able to handle more events and users as it is scaled up, with enormous potential for large-scale deployment.





Advantages of Using MERN Stack in All -Events Hub

- The entire JavaScript stack simplifies development and maintenance.
- React.js has an instant, intuitive interface.
- Node.js is able to handle lots of user requests in parallel without any difficulty.
- MongoDB is extremely malleable and supports a lot of different kinds of event data.
- It can integrate seamlessly with third-party notification APIs, user authentication APIs, and analytics APIs.

Conclusions:

All-EventHub, which is developed on MERN technology stack, is solving most of the problems related to manual or conventional event booking procedures. It reduces paper work and errors, and simplifies the booking process by integrating event listing, booking, and payment onto a single web-based platform.

Flexible and scalable data storage is offered by MongoDB. Backend is managed by Node.js and Express.js, and well, there is always React.js to ensure that there is responsive as well as silky smooth UI. Security is ensured by implementing JWT in accessing role-based objects so that the user is only given what they can do. Real-time updates and notifications are implemented to ensure that everyone is on the same page and lag time is minimal.

Tests indicated the system superior, faster, and users more satisfied with the system compared to the traditional process. Modularity of the system also ensures the possibility of new features, such as AI-based event suggestion or mobile apps, being added with minimal effort in order to adapt to future demands.

Acknowledgment

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