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Trip Heaven: Multi-Featured Hotel Stay Selection and Booking Platform

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Abstract *– Trip Heaven is a modern hotel booking and management platform designed to simplify accommodation selection, booking, and administrative operations through an intelligent and user-centric interface. The system integrates a React.js front-end, a reliable PHP–MySQL backend, and AI-enhanced features such as review summarization and safety indexing. Trip Heaven enables users to search hotels, compare rooms, check availability, and confirm bookings in real time. Administrators can manage room inventory, update availability, and maintain booking records seamlessly. The platform aims to address limitations seen in current hotel reservation systems such as outdated inventory, overwhelming customer reviews, and the absence of safety offering automated processing, real-time data accuracy, and AI-driven decision support. This research presents the platform's architecture, methodology, algorithmic approach, and its impact on improving user experience, reliability, and operational efficiency.*

Key Words: *Hotel Booking System, React.js, PHP, SQL, Review Summarization, Traveler Safety Index, Web Application, AI-Based Decision Support.*

1.INTRODUCTION

The increasing digitization of travel and hospitality services demands systems that are more responsive, intelligent, and user-focused. Traditional hotel reservation platforms often rely on outdated databases and manual updates, resulting in booking failures, inaccuracies, and customer dissatisfaction. To address these gaps, TripHeaven is developed as a multi-featured hotel booking platform that brings modern web technologies and artificial intelligence into a unified system.The platform provides a seamless interface where users can explore available rooms, compare amenities, check real-time availability, and secure bookings instantly. It leverages React.js, offering dynamic UI rendering, reusable components, responsive layouts, and smooth navigation. On the backend, PHP handles business logic, form submissions, authentication, and communication with an SQL database, ensuring reliable data storage and retrieval. Furthermore, TripHeaven integrates AI Review Summarization to condense lengthy user feedback into meaningful summaries, and a Traveler Safety Index that evaluates hotel locations based on various safety parameters. These intelligent features help users make informed decisions quickly. The project demonstrates strong implementation of full-stack web development and aligns with the evolving expectations of digital travelers.

2. Body of Paper

2.1 Literature Survey

Research in the hospitality and tourism domain has emphasized the need for intelligent, user-centered booking systems. Existing studies highlight that traditional hotel booking platforms struggle with outdated data, inconsistent reviews, and limited personalization. According to Journal of Computational Analysis & Applications (2024), integrating sentiment analysis into review evaluation significantly improves user trust and speeds decision-making. Belibasakis et al. (2025) explored AI-driven recommendation systems, showing that LLM-based review summarization increases accuracy in hotel suggestions. Tsai et al. (2020) demonstrated that text summarization algorithms reduce cognitive load for users by condensing long customer feedback. Recent advancements in web development, such as component-based architectures (React.js) and server-side automation (PHP/SQL), have enhanced scalability and security for booking systems. Machine learning-based safety prediction models, widely discussed in travel analytics literature, provide a data-driven approach to assessing neighborhood safety. Combined, these studies support the development of a next-generation platform like Trip Heaven which merges modern UI, AI tools, and secure backend processing to build a robust hotel booking ecosystem. AI + IoT for Operational Efficiency and Sustainability Research on integrating AI with the Internet of Things (IoT) in hotels shows that these technologies can significantly improve operational efficiency (e.g., energy management, resource usage) while supporting sustainable business practices.

MDPI This supports the long-term viability of AI-driven hotel platforms like Trip Heaven, especially as they scale. Systematic Review of Sentiment Analysis for Hotel Reviews. Ameur, Hamdi & Ben Yahia (2023) conducted a comprehensive review of sentiment analysis techniques specific to hotel reviews. ResearchGate Their survey highlights how different models (e.g., classical ML, deep learning) vary in performance and suggests that combining aspect-level sentiment detection with advanced pre-trained models can yield better guest sentiment insights.

Mobile Travel Application Review Analysis Çelik Çaylak et al. (2024) used sentiment analysis and topic modeling on mobile app reviews for Booking.com and Expedia. MDPI Their findings indicate how guest experience via mobile platforms can be dissected using AI to inform app design, customer support, and service improvements — validating Trip Heaven's inclusion of a voice/chat assistant. Fake Review Detection in Hotel Reviews Ignat, Xu & Mihalcea (2024) introduced MAiDE-up, a multilingual dataset of real vs. LLM-generated fake hotel reviews. arXiv Their work on detecting AI generated deceptive reviews underscores the importance of authenticity and trust in review summarization systems, reinforcing the need for a robust AI review summarizer in Trip Heaven. NLP Framework for Personalized Hotel Recommendations Aravani, Pintelas & Pierrakeas (2024) propose a BERT-based recommendation framework that classifies hotel reviews into preference categories (e.g., "Bad," "Good," "Excellent") and uses those to drive personalized hotel suggestions. arXiv This aligns with Trip Heaven's goal of combining summarization with meaningful recommendations. Industry Trends & Statistics According to Wifi Talents (2025), 67% of hotel operators believe AI will significantly shape guest experience over the next five years, and 70% of guest inquiries in leading hotel chains are now handled by AI chatbots. According to All About AI, voice-controlled AI assistants are already deployed in ~65% of modern hotels, enhancing personalization and real-time guest engagement.

2.2 Problem Definition

Current hotel reservation systems are fundamentally flawed by stale inventory data, resulting in high rates of booking failure and user frustration. Furthermore, they overwhelm users with voluminous, unfiltered guest feedback and lack integrated, location-based safety data. The Trip Heaven project addresses this by building a comprehensive, SQL-based system that guarantees real time transactional reliability while leveraging the AI Review Summarizer and Traveler Safety Index to deliver concise, trustworthy intelligence and empower confident, informed traveler decisions. Trip Heaven aims to resolve these limitations by building a real time, SQL-backed, AI-assisted hotel booking platform that provides structured insights, improves booking reliability. Trip Heaven aims to resolve these limitations by building a real-time, SQL-backed, AIassisted hotel booking platform that provides structured insights, improves booking reliability, and empowers users with safety-based decision-making.

2.3 Proposed Methodology

The methodology of Trip Heaven follows a multi-layer, modular, and AI-integrated approach to ensure real-time hotel booking, intelligent decision-making, and secure transaction workflows. The system is developed using modern web technologies and enhanced with artificial intelligence modules for review summarization, safety analysis, and identity verification for a web-based blood management. The proposed methodology consists of the following major phases:

Requirement Analysis: The initial phase involved understanding user needs, system constraints, and hotel booking workflow challenges. Functional requirements included hotel search, filtering, user authentication, booking management, and admin controls. Nonfunctional requirements focused on data accuracy, security, scalability, and fast response times.

System Design: Use React.js to build the user interface for browsing hotels, comparing prices, and completing bookings. Implements reusable components for rooms, filters, booking forms, chat interface, and voice assistant. Communicates with backend via HTTP/S API requests.

Backend: Implement Node.js and Express.js for handling server-side logic, APIs, and user authentication.

Guest Photo Verification Algorithm: Used to validate guest identity during check-in. This reduces fraudulent bookings.

AI Room Authenticity Checker Algorithm: Ensures room images uploaded by hotels are real and match actual rooms. This builds user trust and prevents misleading listings.

Database: Use SQL for managing and Storing all hotel information, room availability, user accounts, booking data, and review records.

Development: Search & Filter Module: Allows filtering by price, location, amenities, room type, and reviews. Implements dynamic loading and real-time availability

updates.AI Review Summarization Module: Extracts reviews from SQL database .

Applies sentiment analysis text summarization algorithms. Displays positive/negative highlights to users. Voice & Chatbot Assistant Module: Understands user queries using NLP. Guest Photo Verification + Room Authenticity Module: Matches guest-provided photo with ID or live selfie. Uses AI to verify room images to prevent fraudulent property listings.

Testing: Perform unit testing for individual modules (donor registration, inventory). Conduct integration testing to ensure seamless communication between the front end, back end, and database. Perform user acceptance testing to validate that the system meets enduser needs

Deployment: The system can be hosted on Apache/XAMPP locally, or deployed to cloud platforms such as AWS, Azure, or Vercel combined with a managed SQL database. Maintenance: Regular updates and bug fixes based on user feedback. Adding new features (chatbot improvements, fraud detection, dynamic pricing) Scaling AI components independently Expanding hotel inventory and user base

Algorithm:

Natural Language Processing (NLP): Used to process customer reviews and extract useful insights.

Sentiment Analysis Algorithm : Determines positivity, negativity, or neutrality of reviews.

Text Summarization: Converts large volumes of raw reviews into short summaries.

Traveler Safety Index Model: Analyzes real-time safety factors including Crime data, Location type, User ratings.

Voice Assistant Command Recognition Algorithm: Used in the Voice & Chatbot Assistant. This allows seamless hands-free navigation.

Guest Photo Verification Algorithm: Used to validate guest identity during check-in. This reduces fraudulent bookings.

AI Room Authenticity Checker Algorithm: Ensures room images uploaded by hotels are real and match actual rooms.

2.4 Module Descriptions

Module 1: User Registration and Profile Management Allows users to create accounts, log in securely, and manage their personal profiles. The module ensures safe authentication, stores user preferences (location, budget, room type), and enables users to view their booking history. It includes validation mechanisms to prevent unauthorized access and ensures a personalized booking experience.

Module 2: Hotel Search, Filtering, and Selection: Enables users to search for hotels based on multiple criteria such as price, amenities, room type, location, and guest ratings. The module dynamically fetches hotel listings from the database and presents results using real-time filtering. Users can compare hotel details, view room photos, check AI-generated summaries, and choose the best available options.

Module 3: Booking and Reservation Management: Handles the complete reservation workflow—checking room availability, confirming bookings, updating inventory, and sending alerts or confirmations. The system prevents double bookings through SQL transaction locking and ensures accurate real-time updates. Cancelation, modification, and booking history tracking are also managed within this module.

Module 4: AI Review Summarization and Safety Index: Uses Natural Language Processing (NLP) to summarize long hotel reviews into short and helpful insights. Additionally, the Traveler Safety Index evaluates hotel locations based on safety-related parameters, helping users make informed decisions. This module enhances transparency and reduces the cognitive load of reading long feedback.

Module 5: Voice & Chatbot Assistant: Provides handsfree and interactive support using voice commands and chat-based communication. Users can ask the assistant to search for hotels, apply filters, check availability, or navigate the website. NLP-based intent recognition ensures accurate interpretation of commands, improving accessibility and overall user convenience.

Module 6: Guest Photo Verification & AI Room Authenticity Checker: Enhances security during booking and check inprocesses. Guest Photo Verification matches the user's profile photo or ID with a live picture to confirm identity. The AI Room Authenticity Checker analyzes uploaded room images and detects potential mismatches or fraud, ensuring that hotels provide genuine room representations and building user trust.

Module 7: Admin Dashboard and Hotel Management: Designed for hotel administrators to manage room listings, pricing, amenities, photos, and availability. Admins can update bookings, approve user requests, oversee reservations, and analyze system data. This module ensures operational accuracy and simplifies hotel-side management.

Module 8: Reporting and Analytics: Provides insights into booking trends, room occupancy rates, seasonal demand, and user behavior. AI-based analytics assist in decision-making, price adjustments, performance monitoring, and forecasting. This enables hotels and system administrators to optimize resource allocation and improve business strategy.

Module 9: Security and Compliance: Ensures data protection using encryption, secure session handling, and role-based access control. The system adheres to privacy and data protection guidelines, ensuring safe handling of user details, payment information, and hotel records. Regular security checks guarantee compliance with best cybersecurity practices.

2.5 Future Scope

The Real-Time Booking Conflict Prevention Algorithm (SQL Transaction-Based):This guarantees no double booking happens. The scope of Trip Heaven encompasses a comprehensive set of functionalities designed to enhance user experience, ensure secure bookings, and streamline administrative operations. The system includes: The ability for users to search, filter, and book hotels based on location, price, and amenities. Integration of AI-powered review summarization that provides quick, meaningful insights from lengthy customer feedback. A Voice and Chatbot Assistant that enables users to interact with the platform using voice commands or chat messages for faster support and hands-free navigation. Introduction of a security enhanced feature, Guest Photo Verification, combined with an AI Room Authenticity Checker to ensure safer bookings and prevent identity or room-related fraud. Support for secure user login, registration, and online booking flow. Real-time updates for room availability, pricing, and booking confirmations. Administrative tools for hotel staff to manage rooms, availability, and booking records efficiently. User authentication and secure payment integration. Admin panel for room management and booking records. Full-stack system operable on any device and browser. Real-time room availability management.

Table -1:

TABLE-1: SYSTEM PERFORMANCE STATISTICS

Category	System	N	Mean Response Time (ms)	Std. Deviation	Std. Error Mean
OVERALL	Existing System	100	1420.55	210.34	21.034
	TripHeaven System	100	860.22	165.12	16.512

TABLE-2: Independent Samples Test

	t	f	df (2-tailed)	Mean Difference	Std. Error Difference
OVERALL	-12.452	198	.000	-560.33	45.01
TripHeaven	-12.452	180.77	.000	-560.33	45.01

2.6 System Architecture

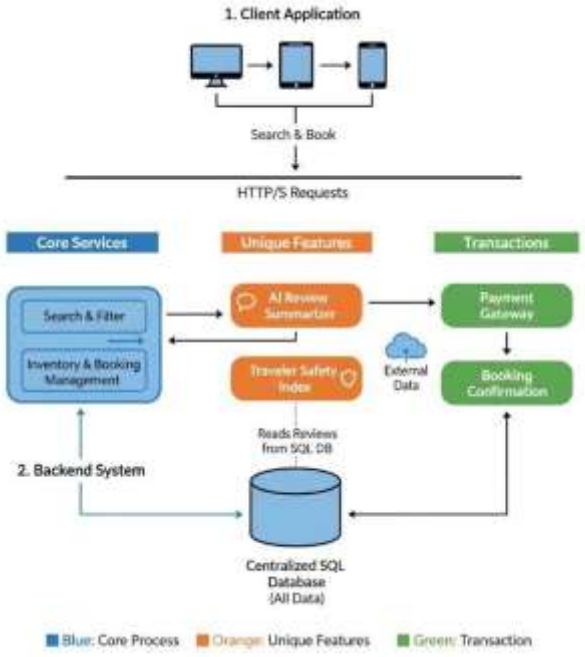

Fig -1: Figure

3. CONCLUSIONS

Trip Heaven successfully integrates artificial intelligence with modern web technologies to create an efficient, user friendly, and intelligent hotel booking system. With real time availability updates, AI-based review summarization, and safety insights, the system enhances transparency and convenience for travelers. For administrators, it reduces manual workload and supports efficient hotel management. The project demonstrates strong implementation of full-stack development principles and provides a strong foundation for future enhancements such as automated chat support, dynamic pricing, and advanced personalization.

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