



Smart Hotel Management System (AI-Integrated)

Redefining hospitality through intelligence and automation.



Project Overview






The Smart Hotel Management System is a web application designed to modernize the way hotels manage guests, rooms, and services.

It blends traditional management systems with AI-driven insights to deliver a more personalized and efficient experience for both guests and administrators.

The goal was to build a system that doesn't just record data — but learns from it, predicts guest preferences, and helps hotels make smarter decisions.



What It Does

-  AI-Powered Guest Prediction: Predicts guest preferences based on booking history and behavior.
-  Smart Room Allocation: Automatically assigns rooms based on availability, type, and previous guest choices.
-  Personalized Recommendations: Suggests food, activities, or services guests might like.
-  Blockchain-Inspired Ledger: Keeps a secure, tamper-proof record of all transactions for transparency.
-  Analytics Dashboard: Displays revenue, occupancy trends, and satisfaction scores in real time.



How I Built It

The project combines Django and React to achieve a balance between performance and smooth user experience.

- Backend: Django (Python) for handling bookings, data analytics, and AI modules.

- Frontend: React.js for creating an interactive and responsive admin dashboard.
- Database: SQLite for structured storage of guest and transaction data.
- AI Models: Python libraries (scikit-learn, Pandas) for predictive analysis.
- Security Layer: A blockchain-style ledger to ensure data integrity.

The biggest challenge was integrating AI predictions into the live dashboard without affecting performance — which I solved using async data fetching and modular AI services.

Why I Built This

Hotels generate massive amounts of guest data but often fail to use it effectively. I wanted to explore how AI could make hotel operations smarter, improving both guest satisfaction and business efficiency.

This project reflects my passion for combining data science, backend systems, and user experience design in one complete solution.

How It Works

- Guests are registered and bookings are logged.
- The AI model analyzes historical and current data to predict preferences.
- The dashboard updates in real time with insights — like which guests are likely to extend their stay or request upgrades.
- The blockchain-style ledger securely records every transaction.
- Admins can view detailed reports or recommendations through an intuitive UI.

Highlights

- Fully functional admin dashboard with AI analytics.
- Modular backend for scalability.
- Secure data integrity using blockchain logic.
- Designed to demonstrate real-world hotel workflow automation.



Tech Stack

- Frontend: React.js, Tailwind CSS
- Backend: Django (Python)
- Database: PostgreSQL
- AI Tools: scikit-learn, Pandas
- Security: Blockchain-style ledger



Future Plans

- Add chatbot assistant for guest communication.
- Integrate voice-based booking using speech recognition.
- Expand AI model for dynamic pricing.
- Develop a mobile-friendly version with PWA support.



Results

This system automates over 60% of routine hotel management tasks, reducing manual effort while increasing personalization.

It shows how technology can bridge operational efficiency with customer delight.



Project Links



Source Code: github.com/gayathirivenkatesh/smart-hotel-ai-system



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