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Automated and Efficient Hotel Management System

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ABSTRACT: The hotel administrator and receptionist can manage all hotel operations online using the desktop-based application known as the hotel management system. Being a very busy individual, the hotel administrator or receptionist does not have time to sit down and oversee all actions manually on paper. He now has the ability and freedom to control the complete system from a single web platform thanks to this programme. It oversees and keeps up the hotel's records of guests, accommodations, staff, and drivers. The project aims to keep the daily state of customer admission/vacation, employee list, room data, etc. The primary goal of this project is to offer hotels a way to handle most of their operations using computerized processes. This software will assist the administrator in managing client information, room assignment information, payment information, driver information, reserving rooms of two distinct types, etc. With the aid of the NetBeans IDE, it is constructed in the Java programming language. Java is used for its frontend and MySQL for its backend.

1. INTRODUCTION

The smooth operation of hotels is facilitated by a software program known as the 'Hotel Management System.' This comprehensive software system computerizes the entire hotel operation. Given the multitude of tasks involved in hotel management, it becomes challenging for hotel administrators and receptionists to effectively handle them manually. Manual systems are beset with issues related to storage limitations and processing speed. Additionally, the use of physical files and registers results in excessive paper consumption during activities such as record addition, deletion, or retrieval. To address these limitations, the Hotel Management Information System (HMIS) was developed as a solution to replace manual systems. The HMIS efficiently manages a range of tasks, including customer and employee information, driver details, room reservations for various room types, pickup services, room status tracking, payment processing, complaint management, and checkout procedures. This desktop-based application offers two distinct logins: one for administrators and another for receptionists. The primary objective of this hotel management system is to simplify the responsibilities of managers and front desk personnel. Notably, this management approach stands out for its simplicity and effectiveness.

2. LITERATURE REVIEW

This research delves into the field of hotel management, which is an integral part of the hospitality industry. The utilization of the internet, computers, and various electronic devices has significantly simplified numerous tasks and management-related challenges in the modern era. This project centers around the development and implementation of an efficient computerized hotel

administration system. The system is designed to provide centralized and well-organized data management and transaction handling. Additionally, it offers a user-friendly interface that ensures easy interaction, even for individuals with limited computer proficiency (Yang, 2013).

The hotel employs a Hotel Management Information System (HMIS) to monitor guests and facilitate various tasks such as reservations, registrations, invoice generation, and room rate management. Traditional manual methods suffer from limitations like restricted data storage capacity and sluggish processing speeds. Updating and deleting records in paper registers can be cumbersome and inefficient, and searching for specific information within manual records is time-consuming.

To address these challenges, the Hotel Management Information System (HMIS) was developed. This system utilizes Hypertext Markup Language (HTML) as the front-end tool and an Oracle database as the backend. HMIS software plays a pivotal role in automating hotel-related functions, providing comprehensive information about services, including room bookings, staff management, client details, and fee tracking (Wei & Lou, 2019).

The aim of this research, conducted with the Satellite Motel in Ilorin, Nigeria, as a case study, is to explore the implementation of a computerized hotel management system. The primary objective is to examine how computer technology can address common challenges faced by hotel management when performing manual tasks. Finding accommodations upon arrival at a destination can be a time-consuming and expensive process. This highlights the significance of online hotel reservation systems. A notable advancement in the realm of the internet is the capability to make hotel reservations from any location globally, tailored to individual preferences and requirements (Ogirima et al., 2014).

An automated hotel management system efficiently oversees all aspects of the hotel's information and reservation system. In the twenty-first century, the advent of computers and electronic devices has not only made various tasks feasible but also remarkably straightforward. This project focuses on the conception and framework of an electronic hotel management system, which is designed to provide well-structured, centralized data and transaction management. Additionally, it features a user-friendly software interface that ensures users can swiftly and easily grasp and utilize the application (Hu & Gu, 2013).

The system's objective is to efficiently oversee and administer hotels located worldwide. The main aim of this system development project is to establish a hotel management system designed to streamline the management of hotel guest rooms, ensuring speed and simplicity for office employees. It facilitates the management of booking clients and agents, offering comprehensive information about various available hotels and their occupancy status. Visitors are promptly notified when their requested units become available. User registration on the website is facilitated by providing the required information as per the system's requirements (Gonzalez et al., 2019).

To enhance the hotel administration process through automation, standardization, and the ultimate aim of improving the efficiency of hotel guest room management, this document outlines the objectives. The overarching aim of system development for the hotel management system is to facilitate swift and straightforward management of hotel guest rooms by office employees. This involves conducting a comprehensive analysis of the functional requirements of the hotel management system, alongside the system design objectives, the system's use case diagram, and various other aspects (Akazue, 2016).

The primary objective of an automated hotel management system is to oversee the comprehensive information and reservation system within a hotel. This application strives to encompass all operations conducted in residential hotels, spanning from employee management to booking, floor management, office management, room type management, and various other aspects. The Automated Hotel Management System project aims to illustrate the data and information processing mechanisms employed within hotels. To provide an overview of hotel management, the project is segmented into different components. Customers are offered a range of services, including check-in, check-out, reservation editing, and making advance payments (Madhura et al., 2023).

As people's quality of life continues to improve, their leisure time has become more vibrant than ever. The emergence of hotels, catering to individuals seeking leisure and travel, has coincided with the growing number of people on the move or engaged in work-related travel. In the fiercely competitive hotel industry, effective management through information technology is undoubtedly a prudent choice. Implementing a system for managing hotel rooms through data collection, transmission, and processing enhances the level of automation, standardization, and overall efficiency, contributing to the humanization of hotel management. This system was developed using the MyEclipse development tool and connects seamlessly to the MySQL database using Java Swing technology, tailored to the specific requirements of hotel room management. The system offers a range of features, including checkout, settlement, and reservation capabilities. This solution simplifies and expedites hotel room management, significantly enhancing processing efficiency and

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modernizing the overall management process (Wei, 2022).

This article delves into the evaluation of the progress of an external chain hotel management system's development. It entails compiling project requirements and presenting an overview of the core business operations within the business sector. Ultimately, it encompasses the comprehensive design of an intelligent hotel management system for an integrated business hotel chain. While this approach holds significance for the administration of hotel chains, it also underscores the need for further research to address some of its limitations (Mi, 2013).

The system framework design, as detailed in this paper, utilizes a three-tier architectural approach, which is further analysed and explained. The introduction section covers the primary aspects of table construction and storage procedures as part of the database design. The core focus of the hotel management system is on the automation, computerization, and integration of various internal hotel management processes through the use of information technology. This aims to enhance the productivity of all departments and employees within the hotel, ultimately providing high-quality services to consumers (Weerasinghe et al., 2022).

This essay presents an analysis and design of a hotel management system that leverages cutting-edge computer technology. The viability of the system and various requirements are analysed to establish a theoretical foundation for its implementation. The system is modularized, with a detailed analysis and clear explanation of each module's function. Additionally, the essay discusses the logical organization of the management system's database design. By addressing challenges associated with modern operating systems, such as heavy workloads, delayed data transmission, error-prone management statistics, and other factors, this management system contributes to enhancing the competitiveness of the hotel industry (Guo & Qingdao, 2011).

With the extensive development of hotel management systems, research in this field has reached its zenith. Both public and private software solutions are available for purchase and are currently in use. However, despite these advancements, many hotel management software solutions fall short of being ideal. They often face challenges related to accommodating multiple reservations and check-in/check-out interruptions to cater to the diverse needs of users. Such limitations can affect users who may wish to check in at one time and check out later or return to the same hotel and check in again. Furthermore, the majority of hotel management software systems still do not support multiple reservations, as indicated by an analysis of major internet hotels. To address these shortcomings, this research study proposes a fresh and updated design for a hotel management system. The objective is to enhance existing hotel management systems by enabling flexibility in check-in and check-out times within predefined windows (Wang & Zhang, 2021).

The aim of this study for the College of Charleston is to design and develop an online hotel reservation and management system. The Lyceum of the Philippines University's Batangas campus offers courses in international tourism and hospitality management. The system is designed to be user-friendly and serves the purpose of acquainting CITHM (College of International Tourism and Hospitality Management) students with an online hotel reservation system. It involves evaluating the system's functionality and highlighting the benefits it can bring to the college and its staff. Furthermore, the system is intended to facilitate supplementary operations at the front desk and provide operational training. The researchers utilized the System Development Life Cycle in conjunction with Microsoft Web Developer 2008 as the programming platform. CITHM students utilized the developed software to familiarize themselves with the usage of an online hotel reservation system. This software effectively enabled instructors to educate their students on the fundamentals of hotel reservation systems while ensuring online security to safeguard customers' financial information and privacy (Delizo & Esguerra, 2013).

In this study, we have designed and developed a hotel management system tailored to the specific needs of the hotel industry. We employed QT and C++ as our programming languages of choice. To enhance system flexibility and reusability while connecting it with the database, we have adopted the B/S model. The functional modules of this system primarily cater to hotel customer reservations, check-in and check-out processes, as well as the management of internal hotel staff and other related functions. These functional modules encompass customer service, front-end processing, back-end management, data storage, and various other components. One of the notable advantages of this system is its cost-effectiveness in terms of development and its user-friendly operation. This cost-efficiency not only reduces staff training expenses but also enhances overall hotel management effectiveness. Furthermore, it simplifies maintenance and management, making it a valuable asset for the future (Chen & Chen, 2023)

The Hotel Management Information System (HMIS) serves as a comprehensive solution for hotel visitor booking, registration, and record-keeping. It enables functions such as invoice posting and room rate entry. Manual systems have been limited by challenges related to storage capacity and labour-intensive operations. Tasks like adding and deleting records make physical files or

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registers paper-intensive, disorganized, and time-consuming to manage. Searching for records manually is also a tedious process. To address these limitations, the Hotel Management Information System (HMIS) was developed. HMIS software utilizes Visual Basic for data integration, with Visual Basic serving as the front-end tool and Oracle as the back-end database. The resulting software (HMIS) significantly streamlines and automates high-level clerical tasks. It provides comprehensive information about facilities and services, including room details, employee records, client information, and fee structures. In terms of security, user authentication measures have been implemented to ensure that only authorized personnel can access the software. This enhances system security. HMIS software holds potential for managing hotel operations effectively within the hotel industry (Zhou & Liu, 2022).

In the pursuit of creating a hotel information management system capable of achieving intelligent management across in-store, entertainment, sleep, and out-of-store modes, this study leverages artificial intelligence technology, specifically employing CNN (Convolutional Neural Network) and LSTM (Long Short-Term Memory) approaches. The objective is to not only enhance hotel managers' productivity but also cater to the specific preferences of each guest. Overall, the CNN and LSTM algorithms demonstrate a high level of accuracy in predicting the four modes within the hotel information management system. The largest prediction error occurs in the hotel information system's forecast of guests' sleep patterns, accounting for only 2.81% of the maximum prediction error. The average inaccuracies for forecasting in-store and out-of-store trends within the hotel management system are merely 1.34% and 1.97%, respectively. This highlights the high credibility of CNN and LSTM methods in achieving intelligent hotel management. Furthermore, in the prediction of the entertainment and sleep modes within the hotel management system, the error distribution in forecasting the operation of indoor equipment remains relatively consistent, with most errors falling within a 2% margin (Dzikria & Solihin, 2023).

The objectives of this paper were as follows: 1) To assess customer satisfaction levels regarding the flexible online hotel reservation model. 2) To gauge the impact of flexible multiple reservation bookings on enhancing customer satisfaction. To enhance existing hotel management systems and introduce flexibility in check-in and check-out times within predefined windows, this research study presents a novel and modified architecture for a hotel management system. The study demonstrates the system's capability to effectively handle numerous check-ins and checkouts. Additionally, the introduction of this module has shown an increase in client satisfaction. These findings provide a foundation for further research, encouraging the online community to address the existing design issues of the current model to enhance the system (Gulmez et al., 2014).

The increasing number of individuals traveling abroad, coupled with economic growth, has led to the proliferation of hotel businesses in China. Nevertheless, without a dedicated focus on cost reduction, these hotel enterprises may struggle to compete effectively in the market and sustain long-term growth. This essay aims to elucidate the pivotal role of cost control in hotel financial management, underscore its importance in hotel operations, identify current challenges in hotel cost control, and actively explore strategies for enhancing cost control.

Hotels encounter various challenges when striving to leverage technology for service enhancement, particularly when they recognize the significance of their staff's roles and technological infrastructure. In response, a hotel management system has been developed to align with the tasks performed by employees in service delivery. This research seeks to investigate the impact of task-technology fit on users' intentions to adopt and use the newly developed hotel management system. Moreover, the study statistically assesses how task-technology fit affects the alignment between users' task requirements and technology, their perceptions of the technology, and how these perceptions influence their intentions and behaviour regarding technology adoption and utilization. The study's findings indicate a substantial influence of task-technology fit on the ease of system use. These findings contribute to academia by applying task-technology fit theory to the context of hotel reservation management systems.

Staying abreast of the latest technological developments in the IT industry is crucial for success. However, the adoption of new technology in the highly competitive hotel industry is often challenging. This divide is particularly evident when it comes to cloud technology, with hotels split between those who view it as a passing trend to be disregarded and those who see it as a facilitator of daily operations. This research aims to assess the extent and effectiveness of cloud technology adoption in hotels, with a focus on the hotel Property Management System (PMS). It involves a comparison between the features of new web-based PMS programs and older desktop versions. To accomplish this, a qualitative study was conducted, involving semi-structured interviews with hotel managers who use either of these programs. The study elucidates the benefits and motivations behind the adoption of each version.

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3. METHODOLOGY

The methodology of project is following:

1. Start.
2. Create the main class named as Hotel Management System that extends JFrame implements Action Listener and add buttons login.
3. Create a database in Mysql name projecthms. Clear instructions to install and create database and tables.
4. Create a Login class that extends JFrame, add text label and password label to the JFrame and two-button Login.
5. Enter the user name “admin” and password “password” to click the login button to confirm access.
6. Create a class connection add declare a variable connect with data type Connection creates a connection by using “com.mysql.jdbc.Driver" now Connection the code with database using Driver Manger using the following string "jdbc:mysql:// localhost/projecthms","root","password";
7. Create a class main menu that extends JFrame, Add the following buttons to the JFrame that has buttons HotelMangement and admin and logout, where hotel management button calls reception class and admin button calls administration class.
8. Now create an administration class that has Add Employee and Add Room and back buttons. Add Employee button calls addEmployee class and Add Room button calls addRoom class.
9. Now create Add Employee Class that contains input fields where the employee data can be given as an input and then using a button submit stores the data of the employee in the MySQL database in table called “employee” using JDBC connect. Same thing for the Add Room, the input details of the room will be stored in the MySQL database in the table “room” using JDBC connect, inside the Action Performed block.
10. the valid details entered the button submit stores the details in the database Once and returns to the previous class Frame. Or by clicking the Back will return to the previous class file.
11. Now in the Hotel Management in the main menu, the action performed by this button will lead to hotel reception where, New customer form, room, all employee info, customer info, manager info, checkout, update check status, update room status and main menu buttons exist. using these buttons will lead to respective class file.
12. Now New Customer Form button will lead to Customer form class where the details of a new customer can be added and then step 12 will be performed.
13. Now Room button will lead to room class file that will display all the rooms in the form of a table and the button Load data will refresh if any changes are updated in the database. And the button Back will take back to the reception screen.
14. Now all employee info button will lead to employee info class file that will display all the employees in the form of a table and the button Load data will refresh if any changes are updated in the database. And the button Back will take back to the reception screen.
15. Now Customer info button will lead to employee info class file that will display all the customers in the form of a table and the button Load data will refresh if any changes are updated in the database. And the button Back will take back to the reception screen.
16. Now manager info button will lead to employee info class file that will display all the managers in the form of a table and the button Load data will refresh if any changes are updated in the database. And the button Back will take back to the reception screen.
17. The 'Check Out' button will direct users to the check-out class, where a selection box displays all the checked-in customer IDs. After making a selection, an image button will populate the corresponding room number in the text field below. Upon clicking the 'Check Out' button, the selected customer's details will be removed from the checked-in table, making the room available for other customers. The reception class will become visible again. Alternatively, users can use the 'Back' button to return to the reception frame.
18. The 'Update Check Status' button will navigate to the check-in class, which features a dropdown menu displaying all the checked-in customer IDs. After selecting an ID, a 'Check' button will display the corresponding customer details in the text fields below. Users can view and modify the paid amount and pending amount here. Upon completing the necessary adjustments, clicking the 'Update' button will update the details in the database and return to the reception frame. Alternatively, users can use the 'Back' button to return to the reception frame.
19. The 'Update Room Status' button will navigate to the room class, which includes a dropdown menu displaying all the checked-in customer IDs. Upon selecting an ID, a 'Check' button will reveal the

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corresponding customer details in the text fields below. Users can view and modify the room cleaning status and availability here. After completing the necessary adjustments, clicking the 'Update' button will update the details in the database and return to the reception frame. Alternatively, users can use the 'Back' button to return to the reception frame.

20. Finally, there exists a button Main Menu, the action performed by this will take back to the main menu frame.

4. NOVELTY

User Friendly GUI:- All GUIs used in this project are very user friendly and very easy to access. They all gives very complete information about functions.

Advantage of MySQL Database:- Use of MySQL database helps to show the complete information about hotel customers and workers which helps to hotel administrator and receptionist.

Complete Hotel Management System:- This system has all facilities like customer login, search rooms, search drivers to pick up, check room status, find employee information and manager information, pay bills of rooms online etc. So overall it is a complete hotel management system.

5. RESULTS

The system's primary goal is to enhance overall efficiency and guest satisfaction by automating manual tasks, reducing errors, optimizing resource allocation, and improving communication between various hotel departments. In essence, a hotel management system's primary objective is to elevate operational efficiency, customer service quality, and profitability by efficiently managing hotel-related functions and processes as shown in Figures 1-8.

Figure 1: *Start Screen.*

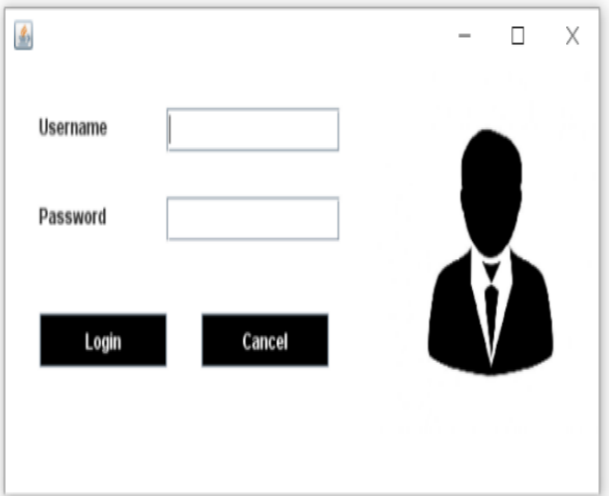

Figure 2: *Login Page.*

Figure 3: *Add Employee.*

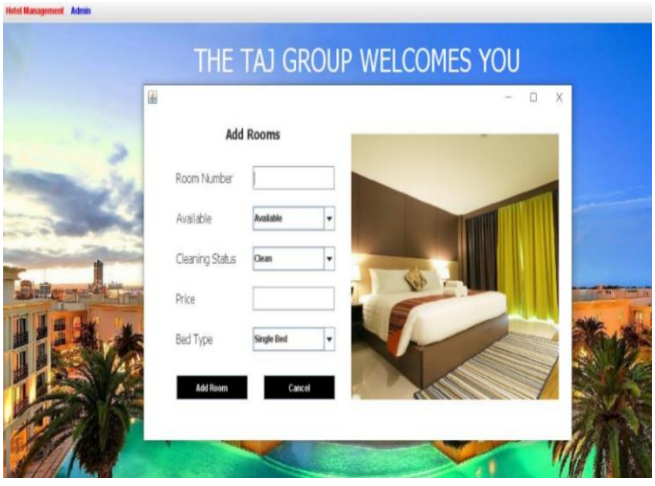

Figure 4: *Add Rooms.*

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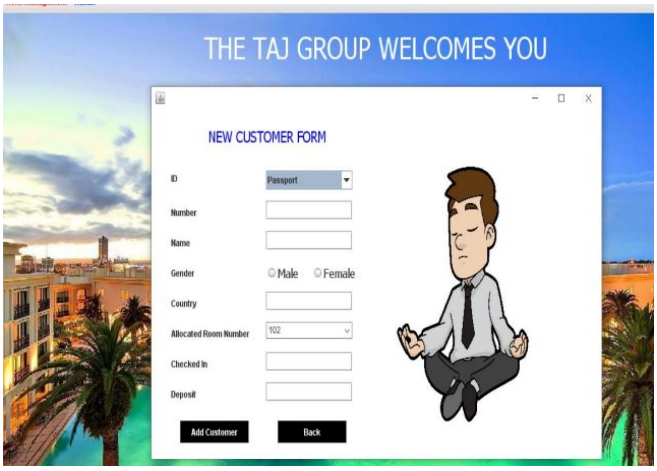

Figure 5: *Add New Customer.*

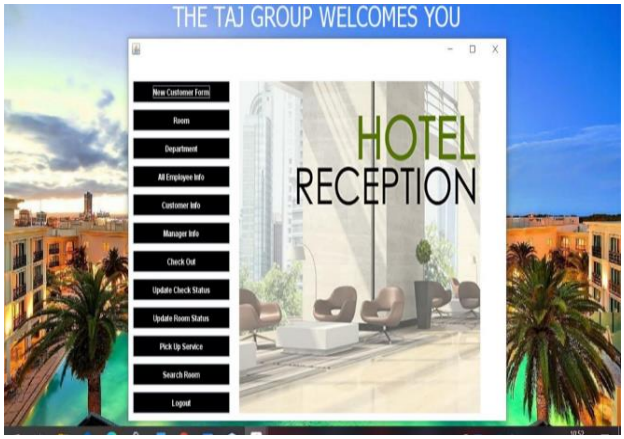

Figure 6: *Reception Window.*

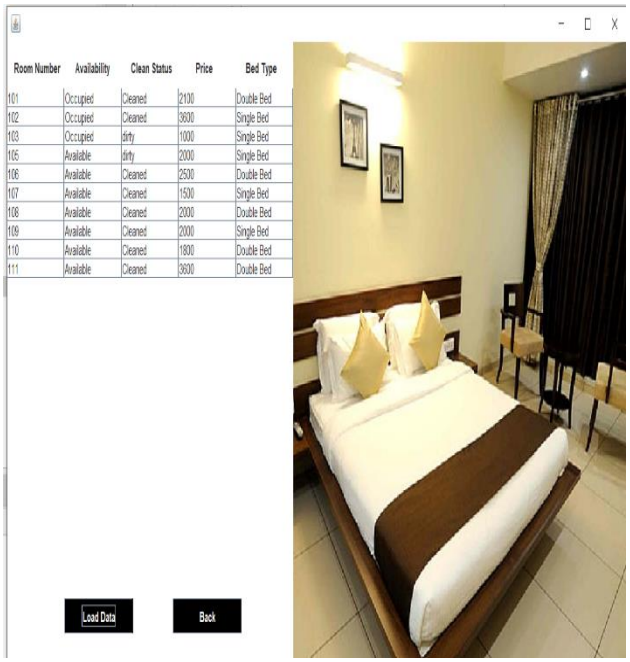

Figure 7: *Room Details.*

Figure 8: *Employee Details.*

6. FUTURE SCOPE

The future of hotel management systems is centered around mobile and cloud-based solutions, integration with emerging technologies, elevating guest experiences, advanced analytics and reporting, seamless integration with external platforms and services, and incorporating sustainability and energy management features. These innovations are geared towards enhancing operational efficiency, guest satisfaction, and maintaining competitiveness in the dynamic hospitality industry.

7. CONCLUSION

In conclusion, the Hotel Management System project serves as a valuable tool for hotel administrators and receptionists to optimize productivity, enhance customer experiences, and streamline operations. The system achieves this by automating various tasks, including the management of employee and customer information, room details, billing processes, and reporting, thereby reducing errors and improving efficiency. The project provides an intuitive user interface that enables hotel staff to perform tasks such as customer check-in/check-out, employee management, room availability tracking, billing and invoice generation, as well as performance analysis reporting. It also includes features like driver management, efficient room allocation, billing and payment processing, complaint tracking, and analytics. Hotels can effectively manage resources, increase room occupancy, and boost revenue generation through the utilization of this hotel management system. This technology aids in maintaining accurate data, delivering personalized service to customers, and facilitating seamless communication across different hotel departments.

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