Hotel Management System : A DBMS Solution

Kriti Satpute* Vivek Ghuge†,
Divija Godse‡, Mitrajeet Golsangi§, Pravin Harne¶, *dept. of Computer Science*
Vishwakarma Institute of Technology
Pune, India
Email : *kriti.satpute@vit.edu, †vivekghuge2002@gmail.com, ‡divijagodse@gmail.com,
§mitrajeetgolsangi@gmail.com, ¶sunnyharne008@gmail.com,

***Abstract*—The twenty-first century is an open digital book. The internet, computers, and other electronic gadgets have made it relatively easy to handle many professions and areas of administration in the twenty-first century. Everything is gaining a morbid touch. In this race, the hotel business did not fall behind. Hotel Management System keeps track of accommodation visitors and provides tools for booking, registering, producing invoices, and inputting room hotel prices, among other things. Manual methods have constraints, such as limited storage capacity and a slow operating speed. Tasks such as updating and removing records make registers paper-intensive and messy. The manual register's search for a person's data is extremely sluggish. As a result, the Hotel Management system was created to address the shortcomings of the manual system. The focus of this research is to start a conversation and do research to commercialize the proposed systems.**

***Index Terms*—DBMS, Django, SQL, Web Development**

I. Introduction

The key purpose and attitude of hotel management in order to prevail in the harsh rivalry of the hotel service business is how to give consumers high-quality and humanized services. To compete with the international e-marketplace, much emphasis should be placed on optimizing user needs in order to provide recommended hotel options. In general, hotel management is the process of sustaining the many operations of a hotel via the use of a number of staff members. Let us first take a look at a typical motel. To book a room at this sort of hotel, the client must first meet with the receptionist to learn about the hotel's amenities. Following that, he must complete the pro forma issued by the hotel authorities, pay the specified amount of money, and be given a room key for his/her leased room. He/she then completes the formalities at the reception area by passing through customs. However, clients continually desire more privacy and dependable security. The goal of this project is to create an integrated Hotel Management System that can be used by both administrators and customers. Customers will be informed about the availability of rooms at various hotels by the admin, and customers will confirm the availability of rooms in the preferred hotel. Customers should be able to determine whether a room in a certain hotel is available. To make their stay more comfortable, they should be able to book available rooms in advance based on their demands. The Admin receives the reservation information from the customers. Users must register for the system and log in. The same is true for the administrator. The administrator will be aware of the reservation information as well as the regular income. A database stores seat availability and booking information. This project protects admin and user data. The administrator may be in charge of the hotel's several departments. The customer's check-in and check-out details are updated.

II. Literature Survey

The hotel administration system is just too complicated, and we discovered various studies on the subject. Researchers employed various strategies to find the best answer to this problem. While working on this project, we found their research to be really beneficial. The work of other academics and researchers who have addressed this particular issue is taken into consideration and examined in the literature study (Hotel Management System)

Priyadharshini.S and Catherine Joy. R created a website that would assist hotel management in providing effective service to consumers. They used HTML, CSS, and Javascript to create the front-end. They also employ the Bootstrap framework, which assists them in developing a nice user interface. They utilized the Java Spring framework for the backend. Additionally, they used the MySQL database for data storage. There is information accessible about every one of the hotel staff members. Additionally, buyers can reserve the rooms they need for a specific day or time. There are also provided the specifics of the check-ins and check-outs. [1]

The following researcher launched a web page for the system mentioned on the browser. They gave the admin and user separate logins. They have used the Oracle19 database to keep track of every action they take, from room allocation to room availability. The author of the above-mentioned papers made an effort to address all the characteristics of a competent hotel management system. This technology has advanced greatly, handling everything from booking a hotel to paying the employees and maintaining a record of every employee and customer. [2]

Jingda Yang uses UML diagrams, particularly use case diagrams, to define the structure and behavior of the hotel management system. In this work, they also discuss the software development life cycle (SDLC). Understanding the functionality of the front end and backend is made easier by the author's UML diagram. The author uses SQL Server 2008 for the backend and data management, along with HTML and CSS for the implementation portion. [3]

Instead of utilizing drag and drop, Rajavardhan wrote all of the codings for an interactive web application he designed using HTML. The system will be in charge of all transactions. The backend, where customer records and transactions are stored, is mysql. It functions as a database To handle a photo, dialogue box, and text box, utilise links. The project effort will guarantee that hotel rooms are reserved, cancelled, and available. The admin can easily change all of the room's information since they have access to the data server where it is stored. An effective and integrated hotel management system is created to handle all these tasks from the hotel's perspective as well as that of the customers. [4]

A hotel management system was proposed by Sumanth Deeti, Sravani Manne, and Veerendra Vundavalli. The whole front end of their proposed system was dominated by HTML standards used in conjunction with the dynamic of JAVA server pages. Servlets and JSPs were used in the design of the communicating client. High attention was taken to ensure that the system handles the date consistency with appropriate business validations at all appropriate levels. The authorisation and authorization were cross-checked at every stage when the database link was planned utilising the Java Data Base Connectivity. Accessibility at the user level has been limited to two areas: the administrative and the typical user areas. [5]

III. Methodology

Hotel management systems are a robust and vast topic. The system can be and is implemented in various ways. The paper implements the system using a web application interface. The proposed system uses the Python Django Web Framework [6] for backend development, the PostgreSQL database [7] and tailwindCSS [8] as a frontend styling library. The proposed system has chosen web as a suitable platform since there is absolutely no restriction on the device on which the systems' users can interact with it. This ensures maximum reach and eliminates the need for multiple code bases. [9]

A. Frontend Development

Since the proposed system is a web application the main frontending of the application is done using the Hyper Text Markup Language (HTML5) [10] and Cascading Style Sheets (CSS). The proposed system uses TailwindCSS a utility first CSS framework.

B. Backend Development

The backend of the proposed system is developed using the Python Django web development framework. Django is a full stack high level web development framework [6]. It follows the Model-View-Template MVT architecture. [11] The proposed system is working with django since in comparison with other similar frameworks like RubyOnRails and PHP Django is comparatively easy to use and is based on python. [11] Since, the Django framework is based on Python it supports really heavy computing and machine learning models, which is important for recommendation of hotels, restaurants, etc. Fig.1 displays the workflow of the entire system

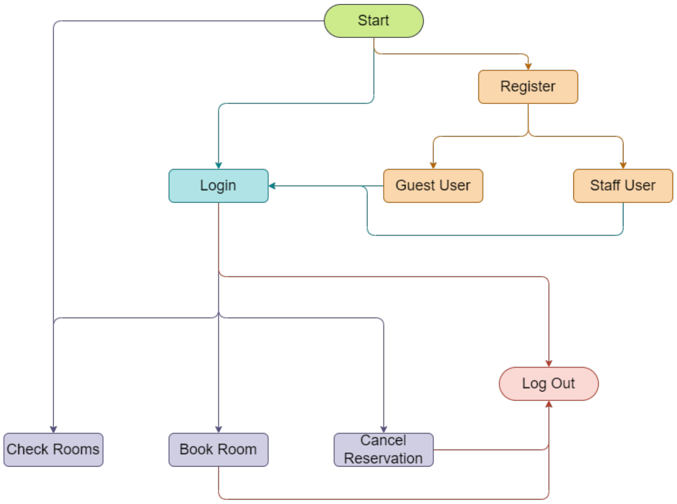


Fig. 1. System Workflow

C. Database Integration

The system uses PostgreSQL as a database. The system implements the relational model for the database. [12] This means that the main data is stored in relational tables. In order to better visualize the proposed system an Extended Entity Relationship (EER) model has been created shown in Fig.2

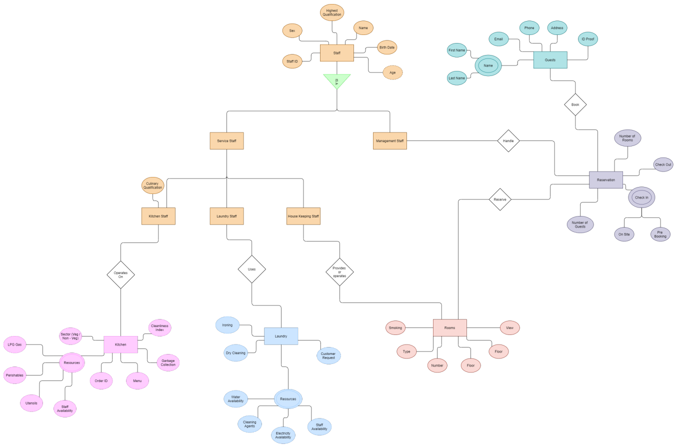


Fig. 2. Extended Entity Relationship Model

Furthermore this EER model has been converted into the relational model, storing the data into respective tables. The main tables consisting inside the proposed system are

1) Users Table
   a) Guest Users
   b) Staff Users
2) Rooms Table
3) Reservation Table

D. Deployment

The proposed system has been hosted on Heroku, a Salesforce solution. [13] Heroku is a Platform as a Service (PaaS) model which provides certain containers (dynos) for hosting of various web based applications. These dynos run on remote unix based servers and provide a global World Wide Web (www) domain for the hosted application. This ensures that any person on the planet connected to the internet can access that application.

IV. System Architecture

As the system is based on Django it uses the Model View Template (MVT) Architecture [11]. Basically, it has 3 major components, each of which perform some tasks described below

1) Models: Models are the part of the system which are a local representation of the global database. Here, models are classes since Django is based on Python which is a Object Oriented Programming Language. These models, are mapped with the database and any data model changes that happen in the application are routed to the database via these models. In short, models act as a mediator between the application and the database.

2) Views: Theses are the components of the system which contain all the business logic. These are responsible for making the application function and show respective templates. This template rendering is mapped to the respective view via url patterns, which define which views to call depnding on the url slug in the browser.

3) Templates: These act as the frontend of the application. Templates in Django are HTML pages which can render dynamic server data using the Jinja syntax. [11] Django has several template rendering techniques which help in improving the performance of the system. These provide a two way communication bridge between the views and the user.

Fig.3 Explains the system architecture in detail.

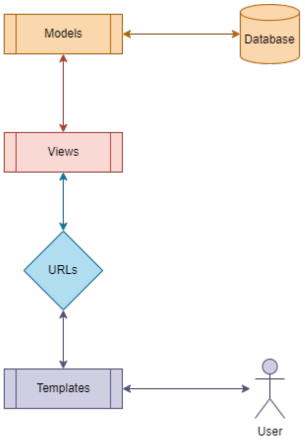


Fig. 3. System Architecture

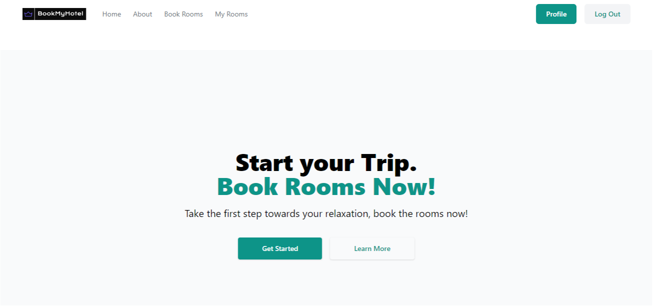
V. Conclusion

The shortcomings of the manual hotel management system can be overcomed using the web based Room booking systems. This allows the user to view the available rooms and check if they are suitable for the users needs. The staff can have an overview of the booking schedule and can make modifications depending on the incoming guest reservations. The staff can also cancel the room reservations at any time giving the system a flexibility for accommodating all hte runtime changes. This overall makes the entire process easier

The system is a simple implementation of Checking out and booking rooms, which can be further extended upon. The system has a great potential in also managing the internal affairs of the hotel, example the kitchen schedule, cleaning schedule, etc. The system may also integrate online payment gateways for actually booking the rooms and paying for them.

VI. Results and Discussion

The system has been tested for various test cases before the deployment for addressing the security and logical concerns. The system majorly solves the problem of checking and booking hotel rooms for vacations. Since the system has various options for the preferences of selecting the rooms, it offers a transparent way for choosing rooms tailored to the needs of the specific user. These are some of the implementation screen shots of the system Fig.4 displays the view shown in the home screen of the application. The home screen, or initial page, of the website, is seen in the above graphic. Here, users may view the rooms that are available and book one that suits their needs if they are registered users.

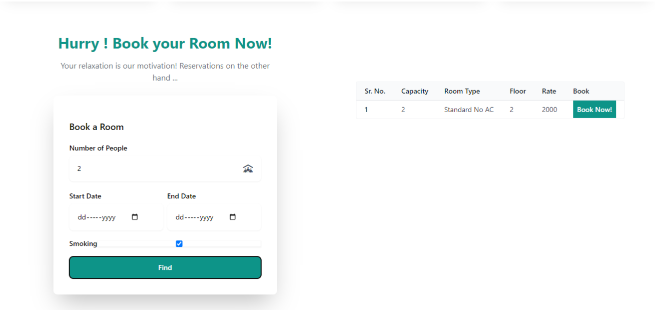


Start your Trip.
Book Rooms Now!

Take the first step towards your relaxation, book the rooms now!

Fig. 4. Home Screen

Fig.5 displays teh view for booking the respective rooms. Here the customer can be led to the room booking page from the home page. Here, the customer may choose the number of people for whom the accommodation is being reserved as well as the check-in and check-out dates. If the system meets the customer's needs, it will present many options. The user must choose a decision based on their preferences. Both smoking and nonsmoking accommodations are available. Fig.6



Hurry ! Book your Room Now!

Your relaxation is our motivation! Reservations on the other hand ...

Book a Room

Number of People: 2

Start Date: dd-----yyyy

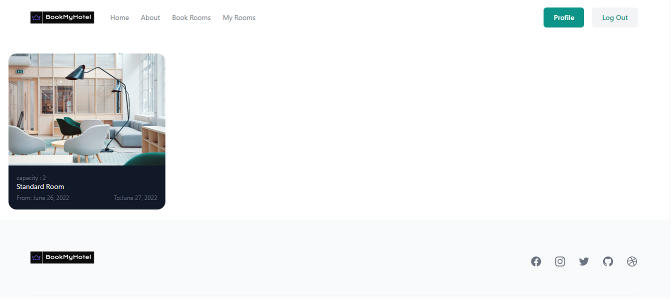
End Date: dd-----yyyy

Smoking ☑

Sr. No.	Capacity	Room Type	Floor	Rate	Book
1	2	Standard No AC	2	2000	Book Now!

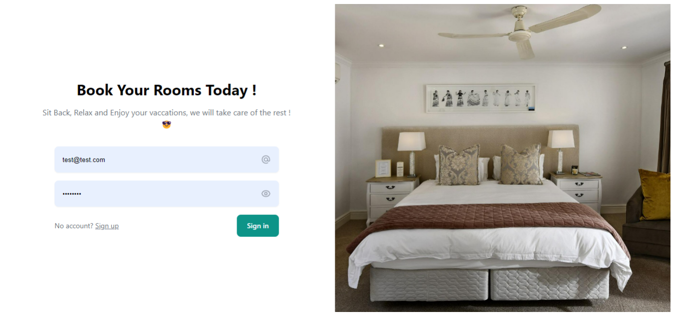
Fig. 5. Room Booking

displays the customers booked rooms. Customers may view the reserved room and all the information they filled out on the ”book room” area. Additionally, the entire cost of the accommodation may be determined and shown to the buyer.



capacity : 2
Standard Room
From: June 26, 2022
To:June 27, 2022

Fig. 6. My Rooms



Book Your Rooms Today !

Sit Back, Relax and Enjoy your vaccations, we will take care of the rest !

test@test.com

••••••••

No account? Sign up

Fig. 7. Login Screen

The reader can also experience the complete website on https://hotel-management-system-dbms.herokuapp.com

References

[1] Priyadharshini.S and C. Joy.R, “Design and implementation of an automated hotel management system,” vol. 10, June 2021.

[2] M. Nandiraju, S. Rachana, S. Chandini, S. Srilath, G.Sabitha, and S. Nazneen, “Hotel management system,” *International Research Journal of Modernization in Engineering Technology and Science*, vol. 2, March 2020.

[3] J. Yang, “Research and design of hotel management system model,” in *2013 the International Conference on Education Technology and Information System (ICETIS 2013)*. Atlantis Press, 2013, pp. 1141–1145.

[4] Rajvardhan, “Hotel management system,” *IJESC*, 2020.

[5] S. Deeti, S. Manne, and V. Vundavalli, “Hotel management system,” 2016.

[6] J. Forcier, P. Bissex, and W. J. Chun, *Python web development with Django*. Addison-Wesley Professional, 2008.

[7] B. PostgreSQL, “Postgresql,” *Web resource: http://www. PostgreSQL. org/about*, 1996.

[8] J. Pyhäjärvi, “Tailwindcss: n integrointi gutenberg-kehitykseen,” 2019.

[9] B.-K. Gao, X.-F. Wang, J.-G. Jiang, and Z.-Q. Sun, “Development of the mobile web service distribution system platform-independence,” in *Proceedings of 2004 International Conference on Machine Learning and Cybernetics (IEEE Cat. No. 04EX826)*, vol. 1. IEEE, 2004, pp. 7–9.

[10] B. Lawson and R. Sharp, *Introducing html5*. New Riders, 2011.

[11] J. Plekhanova, “Evaluating web development frameworks: Django, ruby on rails and cakephp,” *Institute for Business and Information Technology*, vol. 20, p. 2009, 2009.

[12] D. Maier, “Minimum covers in relational database model,” *Journal of the ACM (JACM)*, vol. 27, no. 4, pp. 664–674, 1980.

[13] C. Kemp and B. Gyger, *Professional Heroku Programming*. John Wiley & Sons, 2013.