

A New Approach to Hotel Management System

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Abstract- With India's rapid economic and tourism development, competition in the hotel industry has intensified. Only to improve their management methods and practices and to improve the quality of their work on a regular basis, they can also get enough healthy growth. Therefore, the operation of the hotel computer management has become a very important task. These articles give a brief introduction of a hotel management system, based on software engineering methods to perform performance analysis, needs analysis and design. The whole system is divided into separate modules and introduces the function, while providing a set of conditions and logical structure of data management database. These analyses and guidelines basically meet the structure hotel management requirements based on information technology, to improve the quality of service and efficiency of hotel managers.

Keywords:- Hotel management, database, logical structure, software architecture, cloud computing, business analysis, data security, data redundancy.

I. INTRODUCTION

With the mass gain in the development of economic and tourism, marketing in the hotel industries is at a great pace. Competition in these areas are becomes wider. They are continuously trying to meet the customer's expectations and building their systems to attract interest of most of the customers. Keeping in mind about the type of service with low cost and full satisfaction is their first motive.

Let us take a view to an ordinary hotel management system which is manually operated, the customer should present at the reception the make an entry of his/her personal information then a room is allotted to the person. The receptionist offers a key to the allotted room but here customer thinks about the privacy of information which he/she gave to the receptionist. The world's best hotels have always been on the lookout for them to evaluate, implement and improve hotel management information.

which hires the rooms with the facilities such as food and beverage which is run well to get the benefits.

Sulastiyono (2007:3) says that hotel is an accomodation that gives the facilities like rooms, food and beverage and other supporting facilities such as sport area, and laundry.

According to **Tarmoezi and Manurung (2007:1)** hotel is a building that provides the rooms with the supporting facilities such as the food and beverage. Base on the definition, hotel is not only sells the room but hotel is one of accommodation that sell the other facilities.

Steadmon (2003:8) in Fadmawati also states that a hotel may be defined as an establishment whose primary business is providing lodging facilities for the general public and which furnishes one or more of the following services.

Yoeti (1995:111) explains hotel must have 4 elements or main requirements. They are Physic infrastructure and facilities, quality of product and service, employees' attitude, and competitive price.

II. LITERATURE REVIEW AND RELATED WORKS

Rumekso (2002:2) states that hotel is a building

According to **Manullang (1999:69)** management is controlling an organization for reaching certain purpose that has been decided before with general rule. Management is culture and planning science, organizing, arranging, coordinating, and controlling human resource for reaching a certain purpose which has been previously decided.

According to **Amstrong in Ester (2008)**, marketing is human activity that aims to satisfy the needs and desires through exchange process. The main point to remind by sales team in promoting their product is communication.

According to **Kotler and Amstrong in Fadmawati (2011)** marketing strategy is a marketing logic which the company hopes to create customer value and achieve profitable relationships. Opportunities that occur today are not necessarily going to remain a chance in the future could have an opportunity to be a threat and the threat can become an opportunity, Changes in external factors can cause changes in internal factors so that strengths and weaknesses is also changing.

Reid and Bojanic in Fadmawati (2011) states there are four concepts in formulating marketing strategy in conjunction with the management of existing and new products in new markets.

According to **Wilson et al (2015)** there are some strategies to increase occupancy. Free wireless internet access. For business travelers, the internet is essential to doing business. Hotel Manager.net says, "Today, quite literally almost everything is done through the Web, so being able to access those important facilities in the comfort of your hotel room is essential for most travelers. While some hotels offer WiFi on a pay-per-day system or free in common areas only, going the extra step by offering (and promoting) free in-room WiFi will bring a lot of people knocking on your door".

According to **Roberts** in Demand Media Owning and operating a hotel is often rewarding and fulfilling, but it's not easy. In the hotel business, occupancy is essential, as the rate of a hotel's occupancy determines the success of the business. Increasing occupancy starts with implementing a creative marketing plan that attracts new and repeat guests. Hoteliers can use various ideas to create a successful marketing campaign.

Based on Wilson et al (2015) came up with some easy ways for increasing hotel occupancy. Use an internet booking engine. beginning an in-depth discussion of how internet booking engines (IBE) can help you gain more customers and attention. IBEs can be customized to your site and allow you to create your own brand.

The Managing a hotel is not an easy job. It requires a direct contact with customers, their purchases for the hotel and the room reserved for them. The manual hotel manages by defining specific tasks. These tasks should complete in very effective way and should be punctual with time to achieve the objective.

III. PROBLEM STATEMENT

In the current generation, the hotel industries are using computer-based or web-based application to manage the hotel system. It is far better way to manage the hotel system rather than the paper records maintained by the receptionist which was a very old process.

In the current system, hotel industries provide online web-based booking facility to the customers to book their rooms via third-party e-commerce sites. The same data which was entered at the time of booking will be sent to the respective hotel or maintain their records, which creates duplicity of data. Afterall, current system doesn't provide online check-in or check-out facility to customers, which will save the quality time. There is only possible way to order their snacks or laundry services by a phone call.

IV. MATERIALS AND METHOD

In the above given figure 1, the whole architectural diagram is shown for better understanding the model of web application of hotel management system.

1. Frontend Management:

1.1 Frontend Ui: Frontend Ui for the hotel management system will be consisting of a web-based application. It is a single platform in which the customers and admin will sign up together for their own purposes. This web application will provide all facilities to the admin as well as customers. Facilities from web check-in/check-out to laundry, food ordering will be done online

for the customers. All types of invoices will be calculated at the billing section even for very small order.

1.2 Backend Ui: Backend Ui or backstage management for this system is none other than but a type of frontend Ui for the admin. For the Admin, managing the staff, security, finance etc. will be available on their own dashboard.

1.3 Services: In this section, facilities like ordering snacks, food, laundry and essential needs will be provided to the customers. These all services will be done through online by using web application.

1.4 Check-in/Check-out: Check-in/Check-out will be done through online mode by using the same application. It is not like older methods in which the customers had to present at the receptionist and after full verification, customers can check-in/check-out respectively. This facility will save the customer's and admin's precious time as well.

1.5 Database: All the data about customer, admin, staff from signup to check-out will be stored in a cloud-based database i.e., Google Firestore. This is a single database attached to the application which helps in removing data duplicity.

1.6 Payment Provider: Payment provider plays a very important role in minimizing the cash related problems. If a company is working on cash payments than it is hard to track their expands and income. Also, there may be cases of losing records of payments done earlier.

data to be accessed or retrieved securely because if there are any loop hole left during the database connection, it may cause leakage of data.

2.2 System Maintenance: System management is maintaining the whole system to work on that. It may include the webserver maintenance, data security, bug fixing etc.

2.3 Staff Management: In this application, there is also a section in which a dashboard is provided for managing the staff members. This will keep track about staff's day to day joining and off-duty timings. It will also keep track about their salaries, time tables, day or night shifts.

2.4 Analytics Team: It is the most important part of this application. Analysis of data in industries helps in growing business high, calculating revenue, cost and other business properties. This analysis will be done through Google Firebase app which is a cloud computing database.

2.5 Database Technology: According to the database specialist, if a database is having best architectural connection then it will be minimizing the data loss or data leakage. In this application, Google Firestore is used to store the data. Google Firestore, also known as Cloud Firestore, is part of the Google Firebase app development platform.

Basically, a cloud-based NoSQL database for storing and synchronizing data. Firestore can be directly accessed by mobile and web applications via native SDKs. It enables users to access Unity, Java, C++, Go, and Node.js SDKs options, and provides support for REST and RPC APIs. The Firestore website makes automatic measurement, improved performance, ease of use, and offers a high level of reliability.

Firestore helps sync data across all customer applications using real-time audiences. It uses Cloud ID, and Accessibility features from Google through the authentication process. Firestore performs data storage in the form of documents, documents stored in clusters. Documents support a variety of data types, such as aggregates, numbers, and strings. Firestore is pleased to integrate with Google Cloud Platform and Google Firebase. Businesses prefer Firestore because of the level of security and reliability it offers.

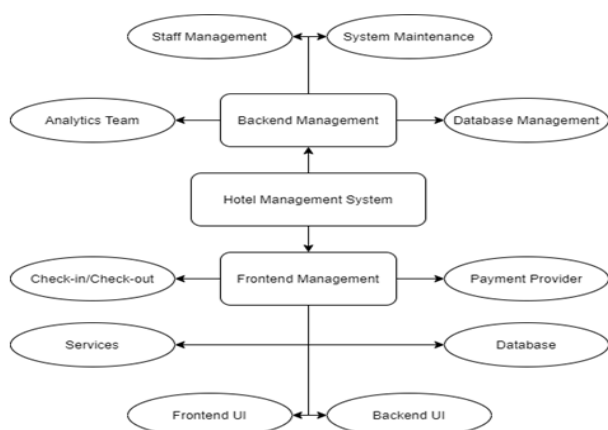


Fig 1. Architectural Model.

2. Backend Management:

2.1 Database Management: The database will be managed by backend team running in the background. This team will be responsible for the

V. THE PROPOSED MODEL

In this application, customers and admins both have to work on a single platform. There are no third-party e-commerce sites are included to book their rooms. No commission for these websites will be made. For the customers, they first sign up on this website with valid information which will directly store in the cloud database. Second, they need to search for their respective hotel, their rooms by checking their prices, accommodations etc. When they find their expected room, they can directly make payments via inbuilt payment provider in which they can use debit card, credit card, UPI, net banking, wallets etc.

After the successful completion of payment, the booking will be verified by the admin and the invoice will be attached to their billing section into their dashboard. Customers can do web check-in through this application. Also, they can order their snacks before they reach there. When they approach to the hotel, they will come into process of security check. After all, they will receive keys from the reception by showing their invoice.

Now, they are welcomed to their room. If they want to order other services like laundry, they can do it on this application, invoices for all the service will be tracked online and attached to the billing section. When they want to leave, they will have to pay their dues and can check-out online. After the successful security check, they will be allowed to leave.

For the first time of hotel, Admin are required to manage the hotel frontend basics like how many rooms are in the hotel, hotel picture to be uploaded so that it will be available to customers while searching this hotel. Admins have to set prices, accommodation provided in their hotel. Admins can track all over activities happening from customers to their staff members. Admin will have the record of their staff members whether they are on-duty or off-duty.

1. Method and Tools for Data Analysis:

Google Analytics helps you understand how people use your web, iOS, or Android app. The SDK automatically captures several events and user properties and allows you to define your own custom events to measure the things that uniquely matter to your business. Once the data is captured, it's

available in a dashboard through the Firebase console. This dashboard provides detailed insights about your data — from summary data such as active users and demographics, to more detailed data such as identifying your most purchased items.

VI. EXPERIMENT AND RESULTS

The table shown below in Figure 2 is taken from the database, which tells us about the Room_Id which are unique for every room. There are two types of room available "Twin" and "Luxury" and their prices are Rs. 4300 and Rs. 5700 respectively. In the last column, status of room is given below whether it is occupied or vacant.

Table 1. Room Status.

ID	Room_Id	Room_Type	Price	Status
1	1001	Twin	4300	occupied
2	1002	Luxury	5700	vacant
3	1003	Luxury	5700	vacant
4	1004	Twin	4300	occupied
5	1005	Twin	4300	occupied

The table shown below in Figure 3 is taken from the database, which tells us about the Customer's booking details. Here is the CustId which is automatically generated while sign up on the application. When the customer successfully made the payment then room is allotted to him/her. Their booking details will be saved to the database like you can see the AmtPaid, Arrival, Departure and RoomAllotted.

Table 2. Room Booking Record

CustId	FirstName	LastName	RoomAllotted	Arrival	Departure	AmtPaid
102	Fiona	Blake	1001	10-01-2021	12-01-2021	4300
104	Anne	Chapman	1002	15-01-2020	18-01-2021	5700
105	Hannah	Brown	1003	12-01-2021	18-01-2021	5700
108	Dec	Butler	1004	05-01-2021	07-01-2021	4300
109	Carol	Cameron	1005	09-01-2021	12-01-2021	4300

The table shown below in Figure 4 is taken from the database, which tells us about the customer's information. This is the information which is saved to the database while successful sign up at the website. In the sign-up form, this will ask you about the FirstName, LastName, Phone, Gender and Address. The CustId is automatically generated while sign-up, which is uniquely given to all the customers.

Table 3. Customer Record.

CustId	FirstName	LastName	Phone	Gender	Address
101	Andrea	Black	202-555-0130	Female	30 Memorial Drive, Avon MA 2322
102	Fiona	Blake	202-555-0119	Male	66-4 Parkhurst Rd, Chelmsford MA 1824
103	Gabrielle	Carr	202-555-0118	Male	591 Memorial Dr, Chicopee MA 1020
104	Anne	Chapman	202-555-0159	Female	42 Fairhaven Commons Way, Fairhaven MA 2719
105	Hannah	Brown	202-555-0124	Male	30 Catskill, Catskill NY 12414
106	Ava	Buckland	202-555-0139	Male	3949 Route 31, Clay NY 13041
107	Bella	Burgess	201-555-0652	Female	677 Timpany Blvd, Gardner MA 1440
108	Dec	Butler	201-555-1214	Male	311 RT 9W, Glenmont NY 12077
109	Carol	Cameron	201-555-2587	Male	555 East Main St, Orange MA 1364
110	Jasmine	Campbell	201-555-3659	Male	67 Newton Rd, Danbury CT 6810

Now, we are going through the analysis process. Here, we will learn about the analysis and their successful use in growing business.

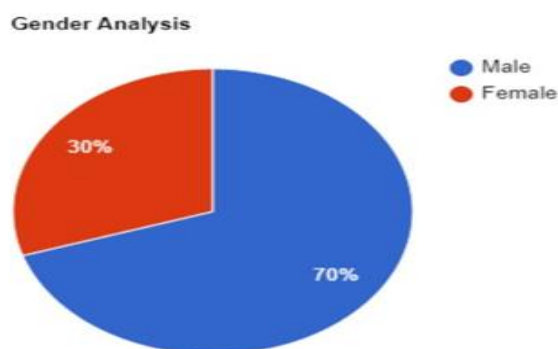


Fig 2. Gender Analysis.

Figure gives you the information about the Gender Analysis. In which we can see that 30% are females and 70% are males. From this we can analyse that the majority of males are higher in booking their hotel. The number of male customers is high because of business purposes.

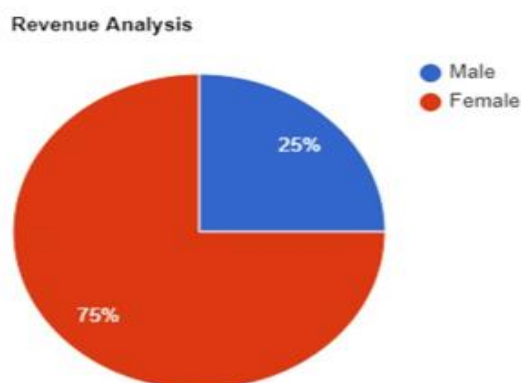


Fig 3. Revenue Analysis.

Now, coming to the next figure. It is the analysis of booking luxury rooms. So, we can see that 75% luxury bookings made from the females and only

25% luxury bookings are made from males. It defines that females use luxurious rooms mostly. This may be because of best accommodations. Now, we can analyze that even the quantity of female booking is less than male but they book luxurious rooms. If we give this data to higher authority, they will always keep in mind about focusing their advertisement to attract more female customers. So, that their revenue will increase.

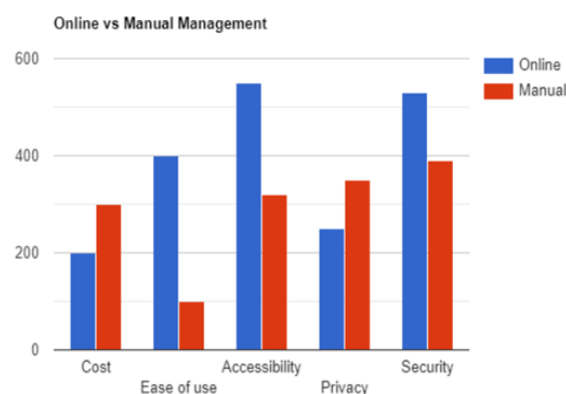


Fig 4. Online vs Manual Management.

The above given Figure 7, shows up the statistical analysis from the past observation of Online vs Manual hotel management system. It shows the data of five key factors: cost, ease of use, accessibility, privacy and security.

First, we talk about the cost of online system, then it is one time investment for the industries to setup its application and manage it. For the manual, they use paper records, cash payments which are hard to track. Ui of this application is very easy to use. It is made with the user experience, so that anyone can use it without any problem but in manual, there are no such things.

If we talk about the accessibility in online than this application is very easy to use in online as in our current generation, we all surrounded with network so we can do it online without physical present at the hotel. But in manual we have to present ourself at the hotel's reception for any type of booking. Privacy in online mode may be challenging sometimes. This is due to higher security issues from the hackers. But in manual, it is not possible because data kept in paper records which are safe.

Security in online and manual, both plays a very important role, because it is the basic need of any customers. Then also online system is far better than

manual because it keeps tracks of every activity happening with the customer. But there is no such type of facility in manual system.

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VII. CONCLUSION AND FUTURE SCOPE

The hotel management system in this paper analyses and designs based on the current advances in computer technology. By analyzing system performance, as well as analyzing various needs, optimizing the system, analyzing, and providing a simple introduction to the performance of each module, and then providing a logical structure of the management plan data provides a theoretical basis for system implementation.

This management system overcomes the short comings of today's operating system that computer calculations are not robust and systematic, such as heavy load, timely data transfer, error management statistics and more; improves hotel competition. Information management technology is forced into the timeline by global waves of information, so the information management system is becoming a major public concern.

With the advancement of science and technology, computer science becomes new; they play a cold role in all areas of society. People can give a lot of tedious work to computer programs to process them, thus improving the efficiency of the work.

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