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HOTEL REVENUE MANAGEMENT AND BOOKING CHANNEL PERFORMANCE DASHBOARD WITH SEASONAL PRICING INTELLIGENCE

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Abstract

In the modern hospitality industry, effective revenue management is crucial for maximizing profitability and maintaining competitiveness. Hotels operate across multiple booking channels, including direct websites and online travel agencies, making it challenging to track performance and optimize pricing strategies. The Hotel Revenue Management and Booking Channel Performance Dashboard with Seasonal Pricing Intelligence project addresses these challenges by providing a data-driven analytical solution for hotel management.

The system integrates data from various sources such as booking platforms and property management systems into a centralized dashboard. It leverages Microsoft Power BI to transform raw data into meaningful visual insights. Key performance indicators (KPIs) such as occupancy rate, Average Daily Rate (ADR), and Revenue per Available Room (RevPAR) are analyzed to evaluate hotel performance. Additionally, the system assesses booking channel effectiveness by measuring revenue contribution and operational efficiency of each channel.

A significant feature of the system is seasonal pricing intelligence, which utilizes historical data and demand trends to dynamically adjust room pricing. This approach enables hotels to maximize revenue during peak seasons and improve occupancy during low-demand periods. The dashboard provides real-time visualizations, trend analysis, and predictive insights to support quick and informed decision-making.

I. Introduction

In the modern hospitality industry, effective revenue management plays a crucial role in maximizing profitability and maintaining a competitive edge. Hotels operate in a dynamic environment where demand fluctuates due to factors such as seasonality, customer preferences, and market trends. Managing room pricing, occupancy levels, and booking channels efficiently has become increasingly complex, especially with the rise of online booking platforms and global travel networks.

Hotels receive bookings from multiple channels, including direct websites, travel agents, and online travel agencies. Each channel contributes differently to revenue and profitability, making it essential to monitor their performance. Traditional methods of tracking bookings and revenue often rely on manual reporting and

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fragmented systems, which limit the ability to gain real-time insights and make informed decisions.

The Hotel Revenue Management and Booking Channel Performance Dashboard with Seasonal Pricing Intelligence project aims to address these challenges by providing a centralized and data-driven solution. Using Microsoft Power BI, the system integrates data from various sources and presents it through interactive dashboards and visualizations. This enables hotel managers to track key performance indicators such as occupancy rate, Average Daily Rate (ADR), and Revenue per Available Room (RevPAR).

A key feature of this project is the implementation of seasonal pricing intelligence, which analyzes historical data and demand patterns to adjust room pricing dynamically. This helps hotels maximize revenue during peak seasons and maintain occupancy during off-peak periods. Additionally, the dashboard provides insights into booking channel performance, allowing better resource allocation and strategic planning.

II. Literature Survey

Hotel Revenue Management has emerged as a critical strategy in the hospitality industry for maximizing revenue by optimizing room pricing and occupancy levels. Earlier systems primarily relied on manual processes and fixed pricing strategies, which were ineffective in adapting to changing market conditions and demand fluctuations. With advancements in technology, modern approaches incorporate data analytics and dynamic pricing models that adjust room rates based on demand, seasonality, customer behavior, and market trends.

Research highlights the importance of demand forecasting in revenue management, where techniques such as time-series analysis and machine learning are used to predict booking patterns and occupancy levels. Accurate forecasting enables hotels to plan pricing strategies and resource allocation more effectively. In addition, booking channel performance analysis has gained significant attention, as hotels operate through multiple channels such as direct bookings, travel agents, and online travel agencies. Each channel has different commission structures and profitability levels, making it essential to analyze their performance to identify the most efficient and revenue-generating sources.

Recent studies emphasize the use of business intelligence and visualization tools such as Microsoft Power BI for developing interactive dashboards. These dashboards provide real-time insights into key performance indicators (KPIs) such as occupancy rate, Average Daily Rate (ADR), and Revenue per Available Room (RevPAR). Visualization techniques help simplify complex data, allowing hotel managers to make faster and more informed decisions.

Another important concept discussed in the literature is seasonal pricing intelligence, where room prices are dynamically adjusted based on factors such as holidays, special

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events, and demand variations. This approach helps maximize revenue during peak seasons while maintaining occupancy during off-peak periods.

Despite these advancements, existing systems often face limitations such as lack of integration between different data sources, limited real-time analytics, and insufficient automation. Many systems analyze revenue, booking channels, and pricing strategies separately rather than in a unified framework. Therefore, there is a need for an integrated solution that combines revenue management, booking channel performance analysis, and seasonal pricing intelligence into a single dashboard. This project addresses these gaps by providing a comprehensive and data-driven system to improve efficiency, decision-making, and profitability in the hospitality industry.

II. System Analysis

The hospitality industry operates in a highly dynamic environment where demand, pricing, and customer behavior continuously change. Hotels must manage room inventory, pricing strategies, and booking channels efficiently to maximize revenue. Traditional systems are not capable of handling large volumes of data or providing real-time insights. There is a need for a centralized system that integrates booking data, pricing information, and performance metrics. Key indicators such as occupancy rate, ADR, and RevPAR must be monitored continuously. Booking channel analysis is important to identify profitable sources. Seasonal demand variations require flexible pricing strategies. Data analytics helps in identifying trends and forecasting demand. Visualization tools simplify complex data into actionable insights. The system should support real-time monitoring and decision-making. It must be scalable and user-friendly. This project addresses these requirements using modern analytics tools.

Existing System

In the existing system, hotel revenue management is often handled using manual methods or basic software tools. Data is stored in separate systems such as booking platforms and property management systems. There is limited integration between these systems. Pricing is usually fixed or adjusted manually, without considering real-time demand. Reports are generated periodically and lack real-time updates. Booking channel performance is not analyzed effectively. Visualization tools are either absent or limited. Decision-making is based on historical data rather than predictive insights. There is no proper mechanism to track seasonal trends. Data analysis is time-consuming and prone to errors. Communication between departments is inefficient. Overall, the existing system lacks efficiency and transparency.

Disadvantages of Existing System

- Lack of data integration across systems
- No real-time monitoring of hotel performance
- Fixed or manually adjusted pricing strategies
- Poor analysis of booking channel performance
- Limited visualization and reporting capabilities

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- Time-consuming manual processes
- Higher chances of errors
- No predictive or trend analysis
- Inefficient resource utilization
- Slow decision-making
- Lack of scalability
- Reduced revenue optimization

Proposed System

The proposed system is a data-driven dashboard developed using Microsoft Power BI for hotel revenue management. It integrates data from booking platforms and property management systems into a centralized platform. The system analyzes key metrics such as occupancy rate, ADR, and RevPAR. It evaluates booking channel performance based on revenue contribution and efficiency. Seasonal pricing intelligence is implemented to adjust room rates dynamically based on demand. The dashboard provides real-time insights and interactive visualizations. Users can explore data using filters and drill-down features. Predictive analysis helps in forecasting demand trends. The system supports better decision-making. It is user-friendly and scalable. It improves transparency across operations. Overall, it enhances revenue optimization and efficiency.

Advantages of Proposed System

- Centralized data integration
- Real-time monitoring and analysis
- Dynamic pricing based on demand
- Improved booking channel evaluation
- Interactive dashboards and visualization
- Better decision-making support
- Reduced manual effort and errors
- Efficient resource utilization
- Predictive insights for planning
- Scalable and flexible system
- Increased revenue and profitability
- Enhanced operational efficiency

IV. Methodology

The project begins with collecting data from booking platforms and hotel management systems. The data is cleaned and preprocessed to remove inconsistencies. Data transformation is performed to structure it properly. The processed data is loaded into Power BI. Data modeling is carried out to establish relationships between datasets. Key performance indicators such as occupancy rate, ADR, and RevPAR are defined. Booking channel performance metrics are calculated. Seasonal pricing patterns are analyzed using historical data. Interactive dashboards are created using charts and graphs. Filters and slicers are added for dynamic exploration. The system is

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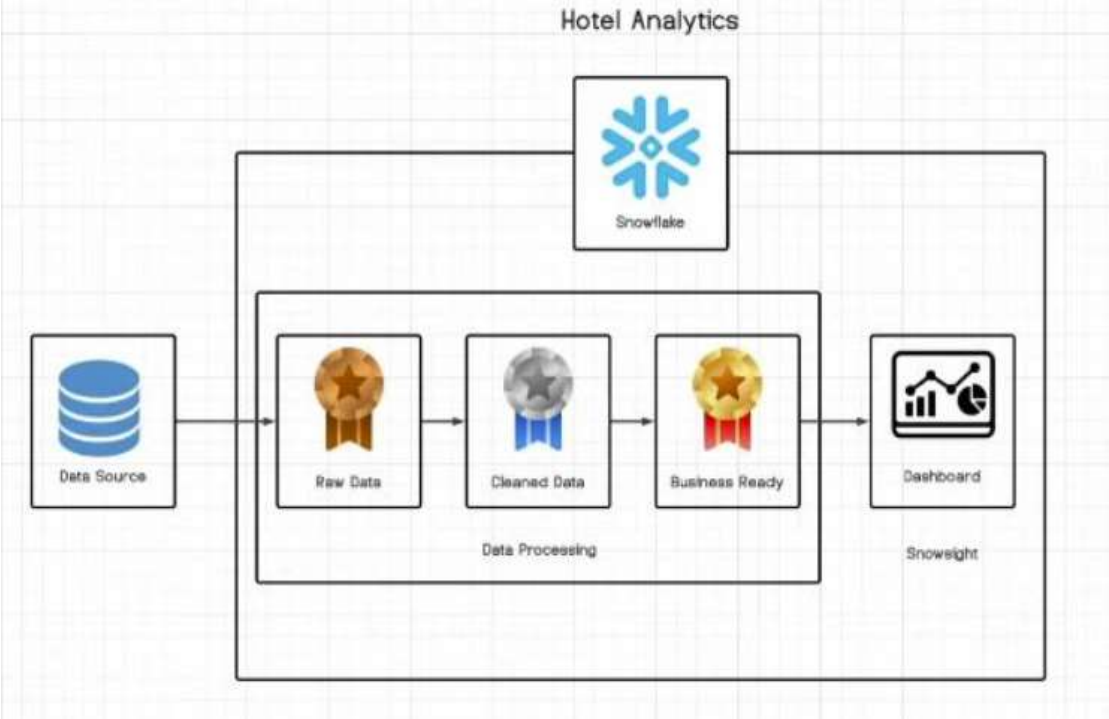
tested for accuracy and performance. Finally, the dashboard is deployed for use by hotel managers.

System Architecture

The system architecture consists of multiple layers for efficient data processing and analysis. The first layer is the Data Source Layer, which includes booking systems and property management systems. The second layer is the Data Preprocessing Layer, where data cleaning and transformation are performed. The third layer is the Data Integration Layer, combining data from multiple sources. The fourth layer is the Data Storage Layer, where processed data is stored. The fifth layer is the Data Analysis Layer, where KPIs and pricing models are calculated. The sixth layer is the Visualization Layer, implemented using Power BI dashboards. The seventh layer is the User Interaction Layer, where users access insights. The system supports real-time updates. It ensures data accuracy and consistency. The architecture is scalable and flexible. Overall, it provides a complete solution for hotel revenue management.



V. Result and Output

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VI. Conclusion

The Hotel Revenue Management and Booking Channel Performance Dashboard with Seasonal Pricing Intelligence provides an effective and data-driven solution for improving hotel operations and maximizing revenue. By integrating data from multiple booking channels into a centralized platform, the system offers real-time insights that support faster and more accurate decision-making. Using interactive dashboards developed with Microsoft Power BI, hotel managers can easily monitor key performance indicators such as occupancy rate, Average Daily Rate (ADR), and Revenue per Available Room (RevPAR).

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The system also enables detailed analysis of booking channel performance, helping identify the most profitable and efficient sources of revenue. One of the major strengths of this project is the implementation of seasonal pricing intelligence, which dynamically adjusts room rates based on demand patterns, seasonal trends, and customer behavior. This approach helps maximize revenue during peak periods while maintaining occupancy during low-demand seasons.

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