Infosys Springboard Virtual Internship 6.0 Completion Report

Team Details:

Batch: A

Start Date: 10-Oct-25

Names:

S.No.	Name
1	Aditya Gadilkar
2	Diya Lodha
3	Patnaikuni Sai Likhita
4	Sahithi Akula
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6	Neha Maram

Internship Duration: 10 Weeks

1. Project Title

HotelRevAI AI-Driven Revenue Analysis for Hotels

2. Project Objective

The primary objective of the **HotelRevAI – AI-Driven Revenue Analysis for Hotels** project is to design and implement an intelligent analytics system that enables hotels to monitor, analyze, and optimize their revenue and occupancy performance using data-driven insights.

The specific objectives of the project are as follows:

- To collect, integrate, and structure hotel booking, customer, and room-level data into a well-defined analytical data model suitable for reporting and analysis.
- To calculate and analyze key hospitality performance indicators such as **Occupancy Rate, Average Daily Rate (ADR), and Revenue per Available Room (RevPAR)** across different time periods.
- To study guest behavior patterns by analyzing booking sources, guest types, nationality, length of stay, and spending behavior.
- To identify customer segments such as first-time guests, repeat customers, and high-value guests using clustering techniques.
- To analyze booking trends, cancellation behavior, lead time patterns, and no-show rates to support operational planning.
- To forecast future occupancy trends and demand patterns to assist hotel management in proactive decision-making.
- To develop an interactive, role-based dashboard that provides actionable revenue strategy insights for General Managers (GMs) and Revenue Managers (RMs).

3. Project Description in Detail

HotelRevAI is an AI-driven revenue analytics solution designed to help hotels make informed strategic decisions by transforming raw booking and customer data into meaningful business insights. The system integrates multiple datasets including booking details, customer information, room attributes, and hotel branch data to build a unified analytical foundation.

The project begins with data ingestion and modeling, where raw data is cleaned, transformed, and organized into a **star schema** consisting of fact tables and dimension tables such as Date, Room, Customer, and Hotel Branch. Derived metrics such as booking duration, stay type, and room category are calculated to enrich the dataset.

Using this structured data, the system computes essential hotel performance metrics including **Occupancy Percentage, ADR, and RevPAR**, enabling analysis of daily, weekly, monthly, and seasonal performance. Comparative analysis between **direct bookings and Online Travel Agency (OTA) bookings** helps assess distribution channel effectiveness.

The Guest Analysis module focuses on understanding customer behavior by analyzing guest demographics, booking patterns, nationality distribution, and stay duration. Customers are further segmented into meaningful clusters such as business travellers, family guests, loyal customers, and high spenders to support targeted marketing and personalization strategies.

The Forecasting and Cancellation module analyzes historical trends to predict future occupancy levels, identify high-risk cancellation periods, and study lead time distributions. Visual insights into no-show trends and refund patterns help hotels reduce revenue leakage and improve forecasting accuracy.

Finally, the **Revenue Strategy Dashboard** consolidates all insights into an interactive Power BI dashboard designed for hotel decision-makers. The dashboard highlights upselling opportunities, seasonal pricing recommendations, and room-type-based revenue strategies, enabling hotel management to improve profitability and operational efficiency.

4.Timeline Overview

Week	Activities Planned	Activities Completed
Week 1	Project kickoff, understanding hotel revenue management concepts, and identifying data requirements.	Conducted project initiation, finalized project scope, identified key KPIs such as Occupancy %, ADR, and RevPAR, and reviewed hotel datasets.
Week 2	Data collection and initial data modeling for booking, customer, and room datasets.	Collected booking, customer, room, and hotel branch data; performed initial data cleaning and validation.
Week 3	Designing analytical data model and building star schema.	Designed and implemented a star schema with Fact Bookings and Dimension tables (Date, Room, Customer, Hotel Branch).
Week 4	KPI calculation and occupancy & revenue analysis.	Calculated Occupancy %, ADR, and RevPAR; developed daily, weekly, and seasonal performance visuals.

Week 5	Guest analysis and demographic segmentation planning.	Analyzed guest types (business, family, solo), nationality distribution, booking sources, and stay duration patterns.
Week 6	Customer segmentation and behavioral analysis.	Clustered customers into first-time guests, loyal customers, and high spenders; validated segmentation insights.
Week 7	Forecasting and cancellation trend analysis.	Analyzed booking trends, cancellation rates, lead time distribution, and no-show patterns; created trend-based forecasts.
Week 8	Advanced forecasting and trend visualization.	Refined occupancy trend analysis and integrated cancellation and refund visuals into the dashboard.
Week 9	Revenue strategy identification and dashboard integration.	Identified upselling opportunities, seasonal pricing strategies, and room-type-based revenue insights.
Week 10	Final dashboard completion, documentation, and submission.	Completed end-to-end interactive Power BI dashboard and finalized project documentation and presentation.

5a. Key Milestones

Milestone	Description	Date Achieved
Project Kickoff	Initial project briefing, finalization of objectives, understanding hotel revenue analytics concepts, and identification of datasets and KPIs.	**Week 1**
Data Model Completion	Completion of data cleaning, transformation, and implementation of star schema with fact and dimension tables.	**Week 3**
KPI Dashboard Prototype	Development of core occupancy and revenue metrics including Occupancy %, ADR, and RevPAR with time- based analysis.	**Week 4**
Guest Analysis Module Review	Completion of guest demographic analysis, booking source insights, and customer segmentation into meaningful clusters.	**Week 6**
Forecasting & Trend Analysis Completion	Implementation of booking trend analysis, cancellation behavior, lead time distribution, and occupancy forecasting visuals.	**Week 8**
Final Submission & Presentation	Full integration of all modules into a single interactive dashboard along with finalized documentation and presentation.	**Week 10**

5b. Project Execution Details

The execution of the **HotelRevAI** project followed a modular and structured approach. Initial phases focused on data understanding, cleaning, and transformation using analytical best practices. The data model was designed to ensure scalability and efficient reporting.

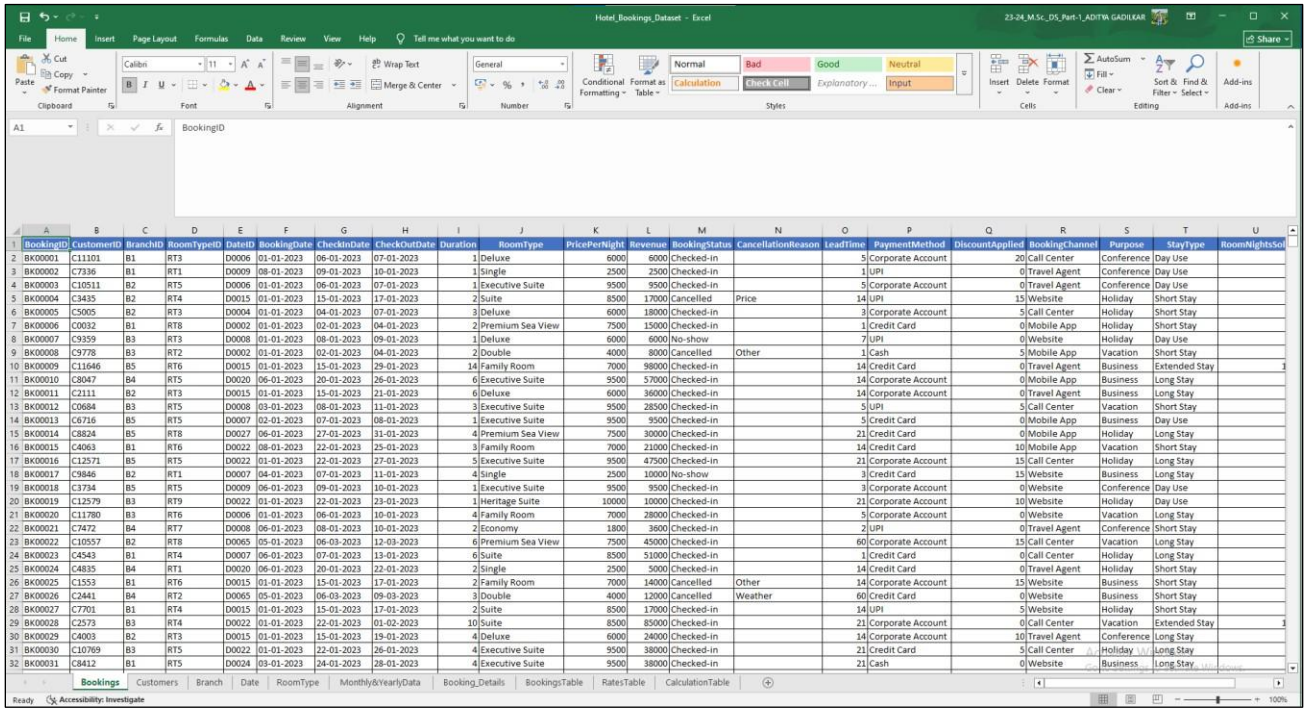
Key performance metrics were calculated using business logic aligned with hospitality industry standards. Visual analytics were created using interactive charts, slicers, and drill-down features to allow dynamic exploration of data. Forecasting trends were derived using historical patterns and trend lines to support future planning.

The final dashboard integrates operational, analytical, and strategic views, enabling hotel stakeholders to monitor performance, identify revenue opportunities, and optimize pricing and distribution strategies effectively.

6. Snapshots / Screenshots

Module 1 - Data Modeling and Ingestion

1. Dataset



BookingID	CustomerID	BranchID	RoomTypeID	DateID	BookingDate	CheckInDate	CheckOutDate	Duration	RoomType	PricePerNight	Revenue	BookingStatus	CancellationReason	LeadTime	PaymentMethod	DiscountApplied	BookingChannel	Purpose	StayType	RoomNightsSol
BK00001	C11101	B1	RT3	D0006	01-01-2023	06-01-2023	07-01-2023	1	Deluxe	6000	6000	Checked-in		5	Corporate Account	20	Call Center	Conference	Day Use	
BK00002	C7336	B1	RT1	D0009	08-01-2023	09-01-2023	10-01-2023	1	Single	2500	2500	Checked-in		1	UPI	0	Travel Agent	Conference	Day Use	
BK00003	C10511	B2	RT5	D0006	01-01-2023	06-01-2023	07-01-2023	1	Executive Suite	9500	9500	Checked-in		5	Corporate Account	0	Travel Agent	Conference	Day Use	
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BK00005	C5005	B2	RT3	D0004	01-01-2023	04-01-2023	07-01-2023	3	Deluxe	6000	18000	Checked-in		3	Corporate Account	5	Call Center	Holiday	Short Stay	
BK00006	C0032	B1	RT8	D0002	01-01-2023	02-01-2023	04-01-2023	2	Premium Sea View	7500	15000	Checked-in		1	Credit Card	0	Mobile App	Holiday	Short Stay	
BK00007	C9359	B3	RT3	D0008	01-01-2023	08-01-2023	09-01-2023	1	Deluxe	6000	6000	No-show		7	UPI	0	Website	Holiday	Day Use	
BK00008	C9778	B3	RT2	D0002	01-01-2023	02-01-2023	04-01-2023	2	Double	4000	8000	Cancelled	Other	1	Cash	5	Mobile App	Vacation	Short Stay	
BK00009	C11646	B5	RT6	D0015	01-01-2023	15-01-2023	29-01-2023	14	Family Room	7000	98000	Checked-in		14	Credit Card	0	Travel Agent	Business	Extended Stay	1
BK00010	C8047	B4	RT5	D0020	06-01-2023	20-01-2023	26-01-2023	6	Executive Suite	9500	57000	Checked-in		14	Corporate Account	0	Mobile App	Business	Long Stay	
BK00011	C2111	B2	RT3	D0015	01-01-2023	15-01-2023	21-01-2023	6	Deluxe	6000	36000	Checked-in		14	Corporate Account	0	Travel Agent	Business	Long Stay	
BK00012	C0684	B3	RT5	D0008	03-01-2023	08-01-2023	11-01-2023	3	Executive Suite	9500	28500	Checked-in		5	UPI	5	Call Center	Vacation	Short Stay	
BK00013	C6716	B5	RT5	D0007	02-01-2023	07-01-2023	08-01-2023	1	Executive Suite	9500	9500	Checked-in		5	Credit Card	0	Mobile App	Business	Day Use	
BK00014	C8824	B5	RT8	D0027	06-01-2023	27-01-2023	31-01-2023	4	Premium Sea View	7500	30000	Checked-in		21	Credit Card	0	Mobile App	Holiday	Long Stay	
BK00015	C4063	B1	RT6	D0022	08-01-2023	22-01-2023	25-01-2023	3	Family Room	7000	21000	Checked-in		14	Credit Card	10	Mobile App	Vacation	Short Stay	
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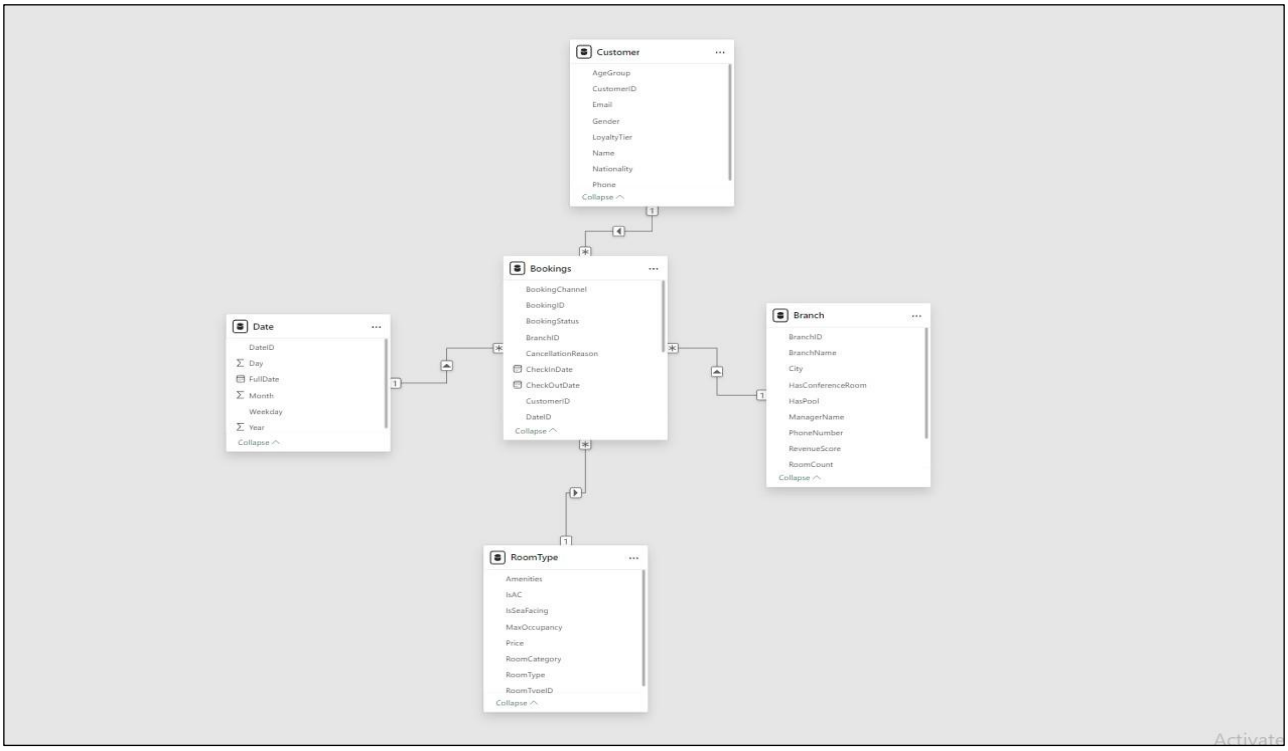
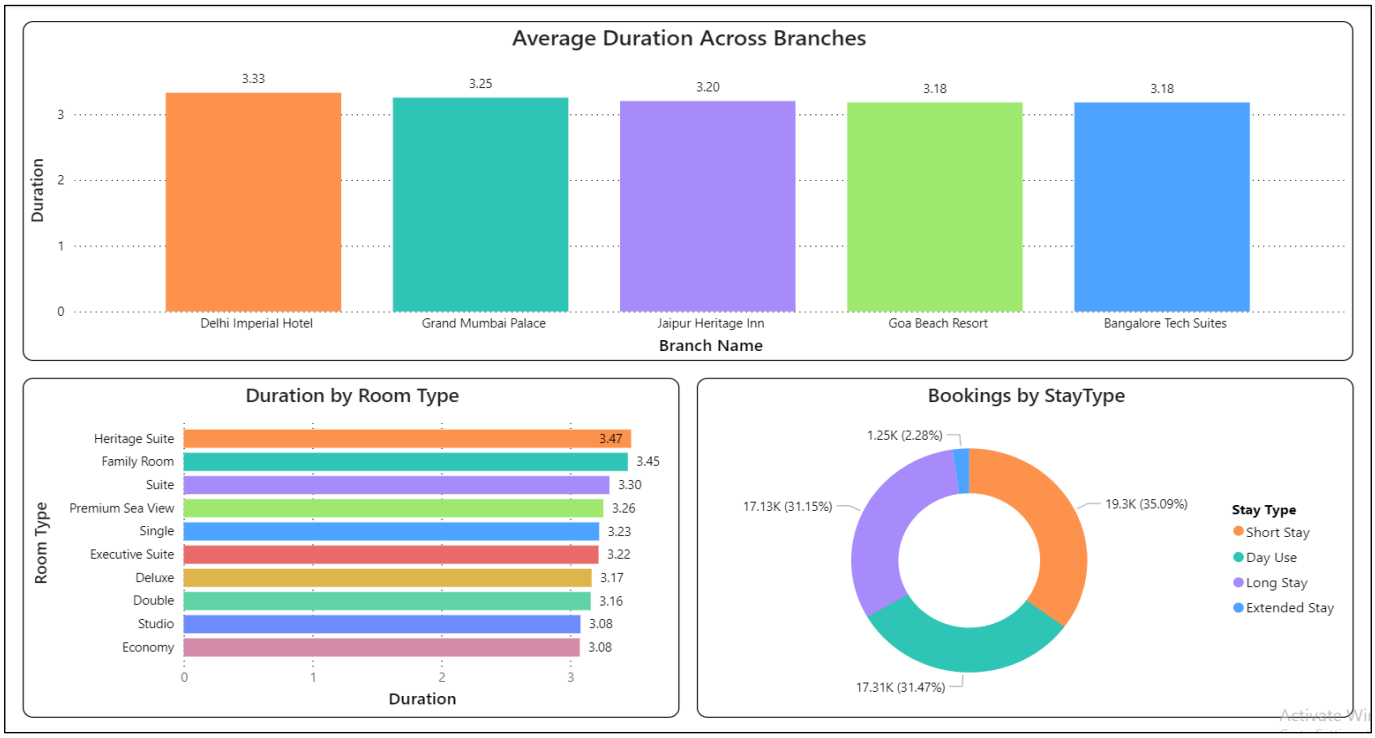
BK00017	C9846	B2	RT1	D0007	04-01-2023	07-01-2023	11-01-2023	4	Single	2500	10000	No-show		3	Credit Card	15	Website	Business	Long Stay	
BK00018	C3734	B5	RT5	D0009	06-01-2023	09-01-2023	10-01-2023	1	Executive Suite	9500	9500	Checked-in		3	Corporate Account	0	Website	Conference	Day Use	
BK00019	C12579	B3	RT9	D0022	01-01-2023	22-01-2023	23-01-2023	1	Heritage Suite	10000	10000	Checked-in		21	Corporate Account	10	Website	Holiday	Day Use	
BK00020	C11780	B3	RT6	D0006	01-01-2023	06-01-2023	10-01-2023	4	Family Room	7000	28000	Checked-in		5	Corporate Account	0	Website	Vacation	Long Stay	
BK00021	C7472	B4	RT7	D0008	06-01-2023	08-01-2023	10-01-2023	2	Economy	1800	3600	Checked-in		2	UPI	0	Travel Agent	Conference	Short Stay	
BK00022	C10557	B2	RT8	D0065	05-01-2023	06-03-2023	12-03-2023	6	Premium Sea View	7500	45000	Checked-in		60	Corporate Account	15	Call Center	Vacation	Long Stay	
BK00023	C4543	B1	RT4	D0007	06-01-2023	07-01-2023	13-01-2023	6	Suite	8500	51000	Checked-in		1	Credit Card	0	Call Center	Holiday	Long Stay	
BK00024	C4835	B4	RT1	D0020	06-01-2023	20-01-2023	22-01-2023	2	Single	2500	5000	Checked-in		14	Credit Card	0	Travel Agent	Holiday	Short Stay	
BK00025	C1553	B1	RT6	D0015	01-01-2023	15-01-2023	17-01-2023	2	Family Room	7000	14000	Cancelled	Other	14	Corporate Account	15	Website	Business	Short Stay	
BK00026	C2441	B4	RT2	D0065	05-01-2023	06-03-2023	09-03-2023	3	Double	4000	12000	Cancelled	Weather	60	Credit Card	0	Website	Business	Short Stay	
BK00027	C7701	B1	RT4	D0015	01-01-2023	15-01-2023	17-01-2023	2	Suite	8500	17000	Checked-in		14	UPI	5	Website	Holiday	Short Stay	
BK00028	C2573	B3	RT4	D0022	01-01-2023	22-01-2023	01-02-2023	10	Suite	8500	85000	Checked-in		21	Corporate Account	0	Call Center	Vacation	Extended Stay	1
BK00029	C4003	B2	RT3	D0015	01-01-2023	15-01-2023	19-01-2023	4	Deluxe	6000	24000	Checked-in		14	Corporate Account	10	Travel Agent	Conference	Long Stay	
BK00030	C10769	B3	RT5	D0022	01-01-2023	22-01-2023	26-01-2023	4	Executive Suite	9500	38000	Checked-in		21	Credit Card	5	Call Center	Holiday	Long Stay	
BK00031	C8412	B1	RT5	D0024	03-01-2023	24-01-2023	28-01-2023	4	Executive Suite	9500	38000	Checked-in		21	Cash	0	Website	Business	Long Stay	

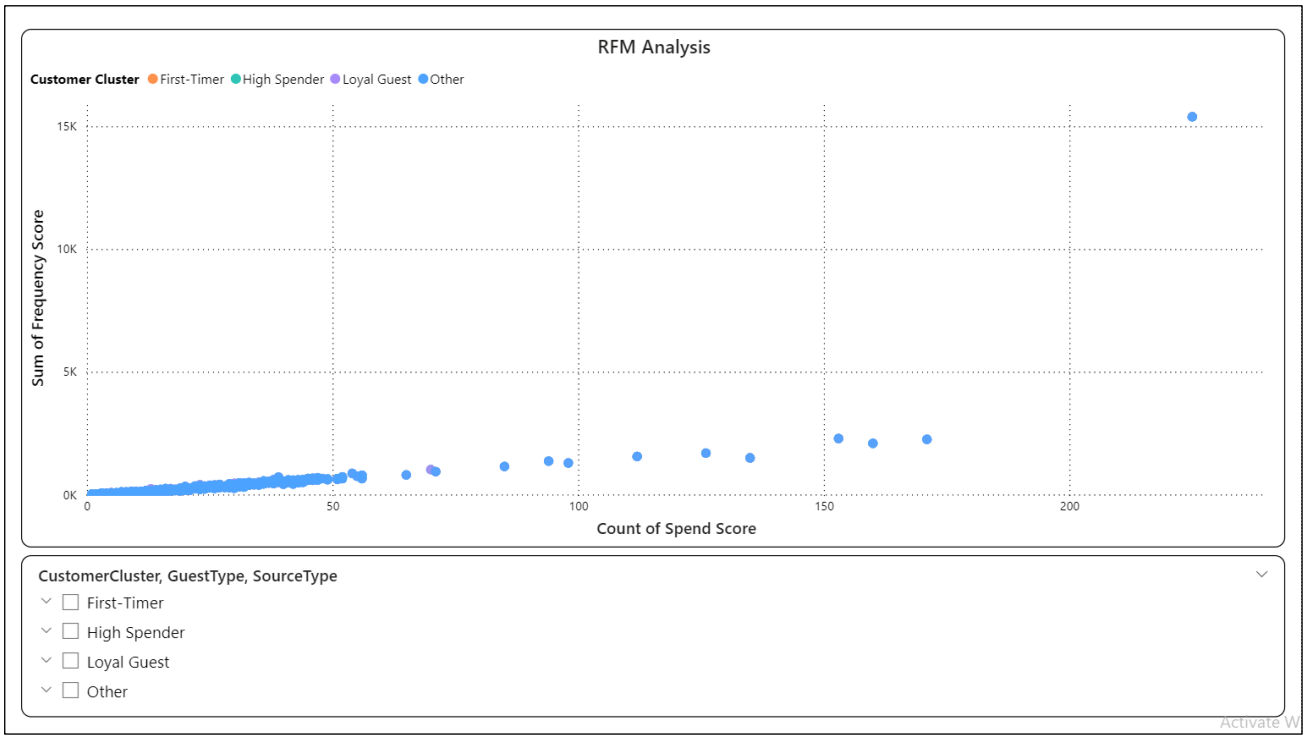
2. Star Schema

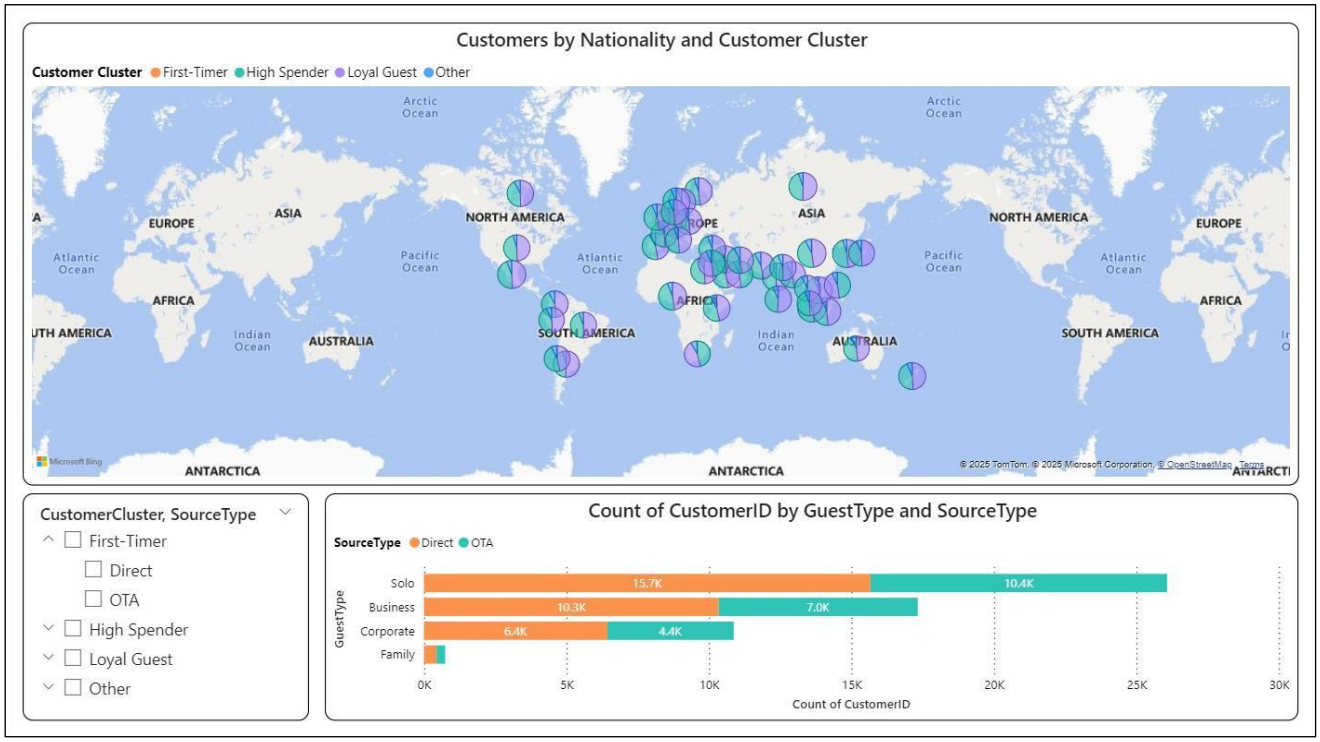




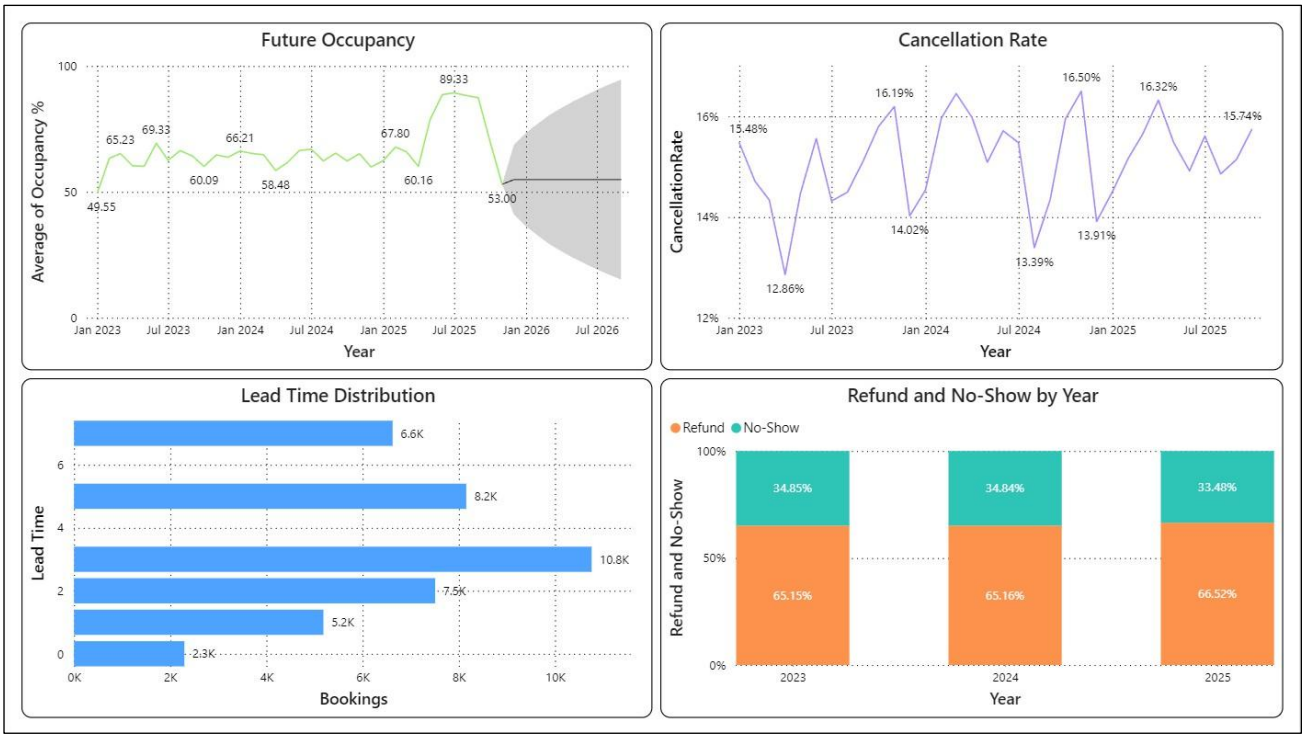
Module 2 - Occupancy & Revenue Metrics

Module 3 - Guest Analysis Module

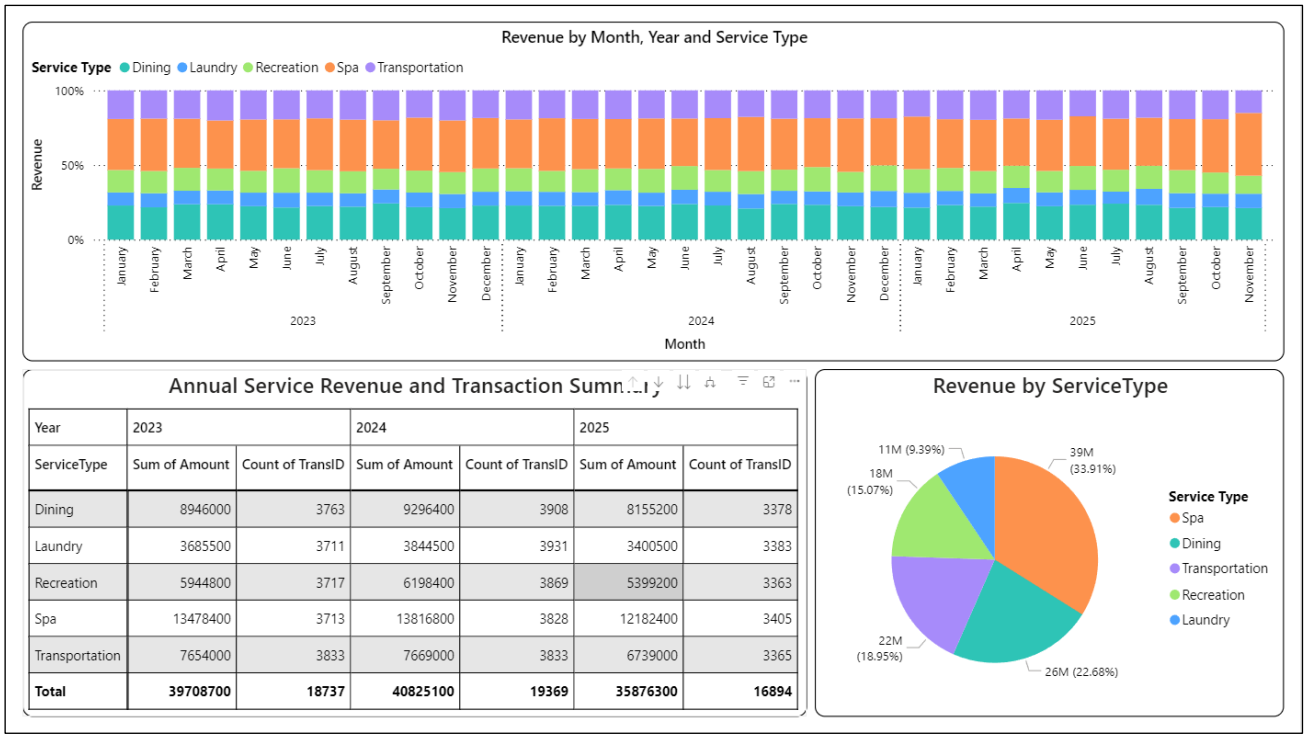



Customers by Nationality and Customer Cluster
Customer Cluster First-Timer High Spender Loyal Guest Other
Arctic Ocean
EUROPE
ASIA
NORTH AMERICA
Atlantic Ocean
Pacific Ocean
AFRICA
Indian Ocean
AUSTRALIA
SOUTH AMERICA
ANTARCTICA
© 2025 TomTom, © 2025 Microsoft Corporation, © OpenStreetMap Terms
CustomerCluster, SourceType
First-Timer
Direct
OTA
High Spender
Loyal Guest
Other
Count of CustomerID by GuestType and SourceType
SourceType Direct OTA
GuestType
Solo
Business
Corporate
Family
15.7K
10.4K
10.3K
7.0K
6.4K
4.4K
0K
5K
10K
15K
20K
25K
30K
Count of CustomerID

Module 4 - Forecasting and Cancellation Trends



Module 5 - Revenue Strategy Dashboard

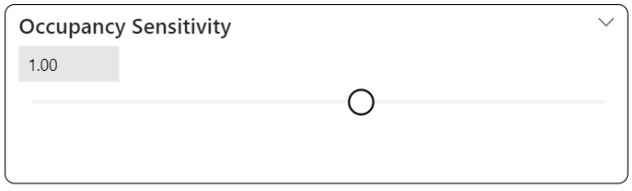


Annual Service Revenue and Transaction Summary

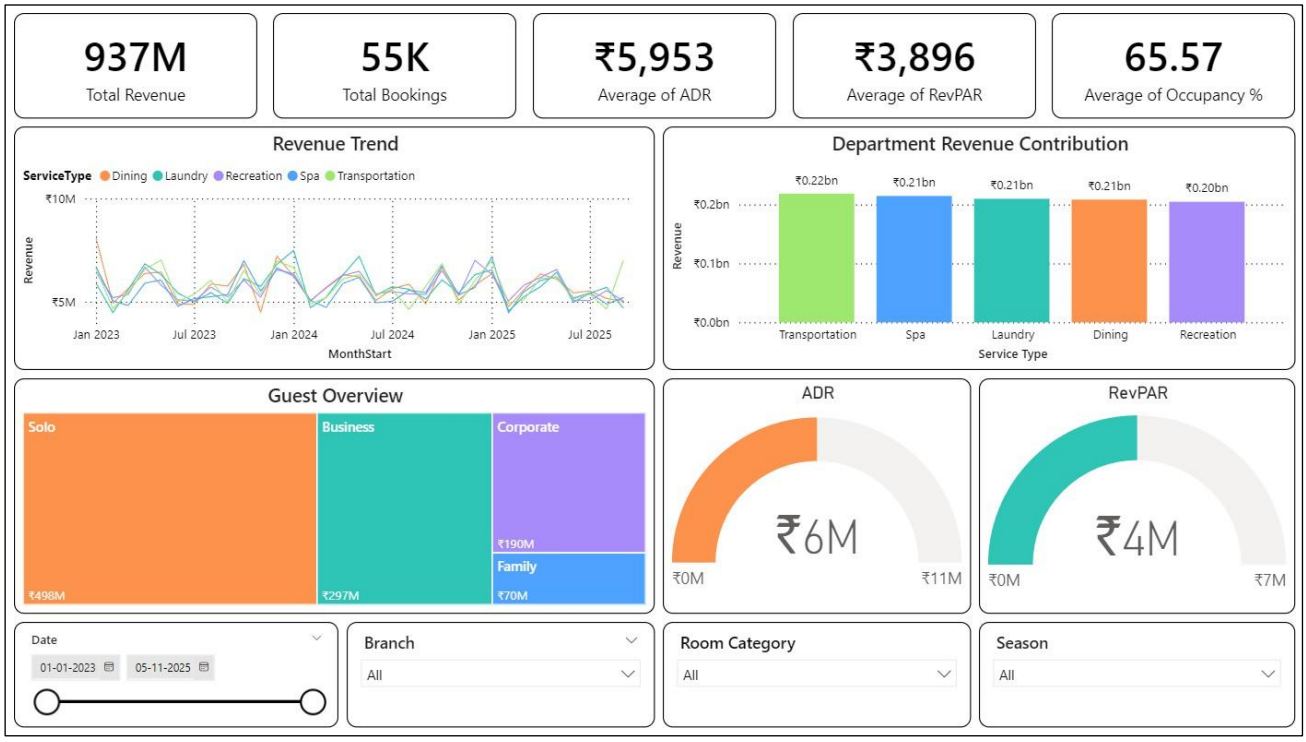
Year	2023		2024		2025	
ServiceType	Sum of Amount	Count of TransID	Sum of Amount	Count of TransID	Sum of Amount	Count of TransID
Dining	8946000	3763	9296400	3908	8155200	3378
Laundry	3685500	3711	3844500	3931	3400500	3383
Recreation	5944800	3717	6198400	3869	5399200	3363
Spa	13478400	3713	13816800	3828	12182400	3405
Transportation	7654000	3833	7669000	3833	6739000	3365
Total	**39708700**	**18737**	**40825100**	**19369**	**35876300**	**16894**

Room Type Revenue Breakdown by Season

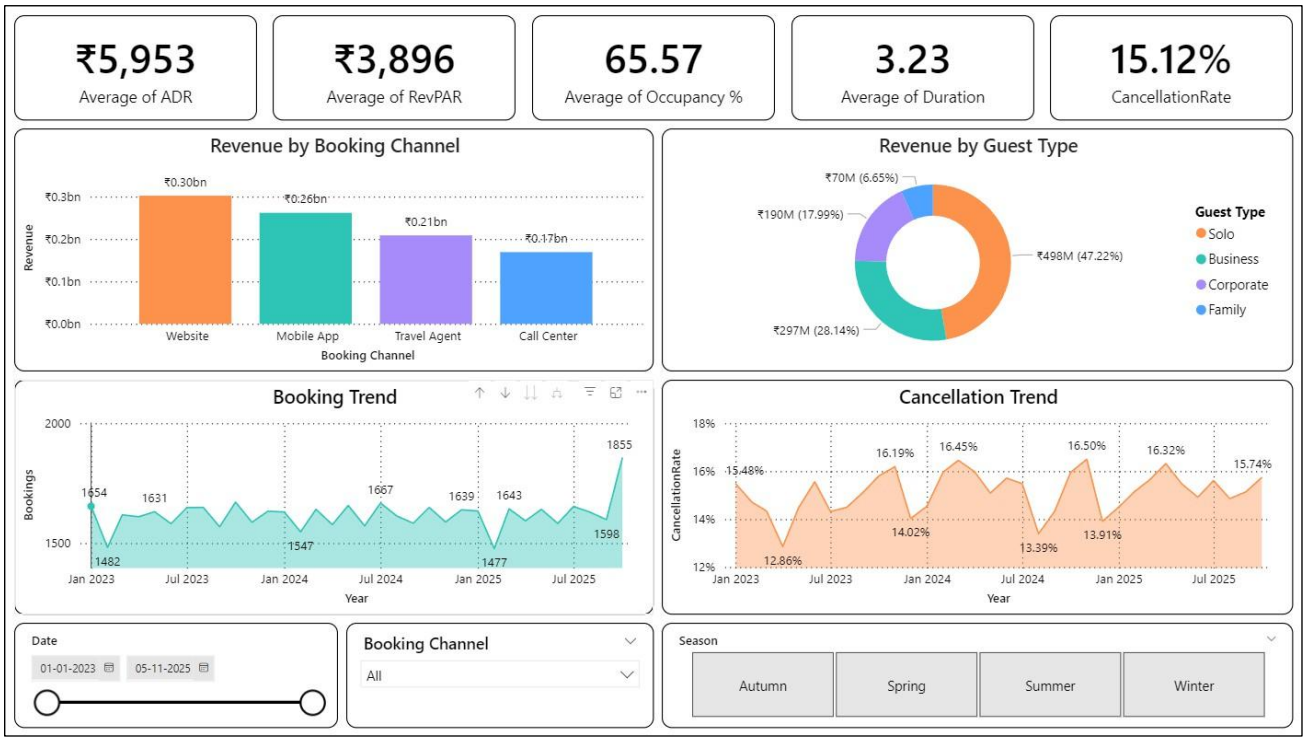
RoomType	High	Low	Shoulder	Total
Heritage Suite	11,500.00	9,000.00	10,500.00	**10,000.00**
Executive Suite	10,925.00	8,550.00	9,975.00	**9,500.00**
Suite	9,775.00	7,650.00	8,925.00	**8,500.00**
Premium Sea View	8,625.00	6,750.00	7,875.00	**7,500.00**
Family Room	8,050.00	6,300.00	7,350.00	**7,000.00**
Deluxe	6,900.00	5,400.00	6,300.00	**6,000.00**
Studio	6,325.00	4,950.00	5,775.00	**5,500.00**
Double	4,600.00	3,600.00	4,200.00	**4,000.00**
Single	2,875.00	2,250.00	2,625.00	**2,500.00**
Economy	2,070.00	1,620.00	1,890.00	**1,800.00**
Total	**7,125.28**	**5,204.31**	**6,024.35**	**5,897.35**



General Manager (GM) Dashboard



Revenue Manager (RM) Dashboard



7. Challenges Faced

During the development and implementation of the **HotelRevAI – AI-Driven Revenue Analysis for Hotels** project, several technical, analytical, and design-related challenges were encountered. These challenges were systematically addressed to ensure the successful completion of the project.

Data Quality and Consistency Issues

Hotel booking datasets contained missing values, inconsistent date formats, and varied representations of booking channels and room categories. Significant effort was required to clean, standardize, and validate the data before analysis.

Complexity in Data Modeling

Designing a scalable **star schema** that accurately represented booking facts while supporting multiple dimensions such as date, room type, customer, and hotel branch required careful planning to avoid redundancy and ensure efficient querying.

Accurate KPI Calculation

Metrics like Occupancy %, ADR, and RevPAR require precise business logic. Ensuring correct calculations across different time granularities (daily, weekly, seasonal) while avoiding aggregation errors was a major analytical challenge.

Guest Segmentation and Classification

Segmenting guests into categories such as business, family, loyal guests, and high spenders involved selecting meaningful features and validating segmentation logic to ensure business relevance.

Forecasting and Trend Interpretation

Predicting future occupancy and interpreting cancellation trends required careful handling of historical data patterns and seasonality to avoid

misleading forecasts.

Dashboard Design and Usability

Creating a single dashboard that balances detailed analytics with clarity for both **General Managers** and **Revenue Managers** was challenging. The dashboard needed to remain interactive, intuitive, and decision-focused without overwhelming users.

8. Learnings & Skills Acquired

The **HotelRevAI** project provided extensive hands-on exposure to hospitality analytics, data modeling, and business intelligence tools. The key learnings and skills acquired during the project include:

Hospitality Domain Knowledge

Gained a strong understanding of hotel revenue management concepts such as occupancy rate, ADR, RevPAR, booking lead time, and cancellation behavior.

Data Modeling & ETL Skills

Learned to design and implement a star schema, handle fact–dimension relationships, and create calculated fields for analytical reporting.

Data Analysis & KPI Development

Developed expertise in calculating and validating business KPIs and analyzing trends across time, customer segments, and booking channels.

Guest Segmentation & Behavioral Analysis

Acquired skills in customer profiling, segmentation, and clustering to identify loyal guests, high-value customers, and different traveler types.

Forecasting & Trend Analysis

Learned to analyze historical booking data to identify demand patterns, seasonal trends, and future occupancy forecasts.

Dashboard Development & Storytelling

Improved proficiency in building interactive dashboards using Power BI, applying slicers, drill-downs, and visual storytelling techniques to present insights effectively.

Analytical Thinking & Decision Support

Strengthened the ability to translate raw data into actionable insights that support strategic decision- making for hotel management.

9.Testimonials from Team

The **HotelRevAI** project team demonstrated strong analytical capabilities, consistent collaboration, and a clear understanding of business-driven data analytics. The project was executed with a structured approach, meeting all planned milestones within the given timeline.

The team showed commendable dedication in understanding hospitality revenue concepts, implementing accurate KPIs, and designing an intuitive dashboard tailored for hotel decision-makers. Their ability to combine technical skills with business insights reflects a high level of professionalism and readiness for real-world analytics challenges.

10.Conclusion

The **HotelRevAI – AI-Driven Revenue Analysis for Hotels** project successfully demonstrates the application of data analytics and AI concepts in the hospitality domain. By integrating data modeling, performance metrics, guest analysis, and forecasting into a unified dashboard, the project delivers actionable insights that support strategic revenue management.

The project enhanced practical understanding of hotel KPIs, data visualization, analytical thinking, and business-oriented storytelling. Overall, HotelRevAI serves as a strong foundation for advanced analytics- driven decision support systems in the hospitality industry.

11.Acknowledgements

I sincerely thank the mentors, coordinators, and reviewers for their valuable guidance and continuous support throughout the project. Their feedback and direction played a crucial role in the successful completion of this project. I am also grateful for the opportunity to apply analytical and AI concepts to a real-world hospitality use case.