Fitness Class Booking Data

1. Objective of Exploratory Data Analysis

The objective of this Exploratory Data Analysis (EDA) is to understand booking behavior, demand patterns, and class utilization across fitness classes. The insights derived from this analysis support subsequent modeling tasks such as demand forecasting, price elasticity analysis, and the development of a dynamic pricing strategy.

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2. Dataset Overview

Data Source:
Historical fitness class booking data from April 2018 to June 2018.

Key Variables Used:

Variable	Description
Activity Description	Type of fitness class
Booking Date	Date of the scheduled class
Price (INR)	Cost of attending the class
Number Booked	Total number of bookings
Maximum Capacity	Maximum allowed bookings
Attendance Ratio	Number Booked / Maximum Capacity

3. Data Preparation Summary

Before conducting EDA, the dataset was processed as follows:

- Missing values were handled appropriately
- Duplicate records were removed
- Monthly datasets were merged into a unified dataset
- Date formats were standardized
- Derived features such as attendance ratio and revenue were created

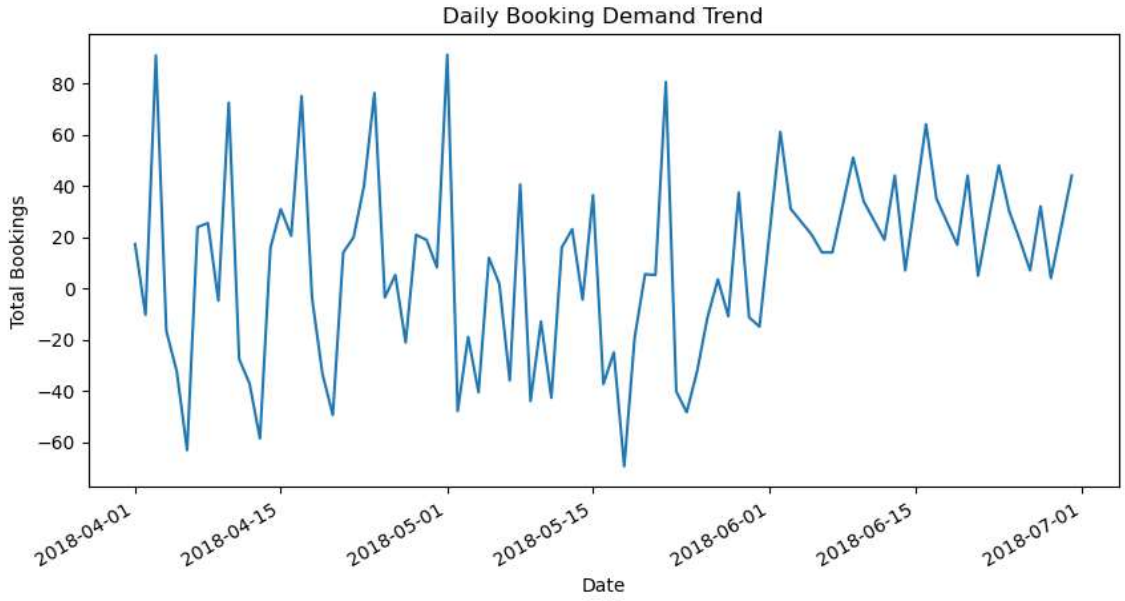
These steps ensured data consistency and analytical reliability.

4. Overall Booking Trends

Observation:
Booking demand varies significantly over time, with noticeable peaks and troughs across the observed period.

Fitness Class Booking Data

Insight:
The presence of temporal demand variation indicates opportunities for time-based pricing and demand forecasting.



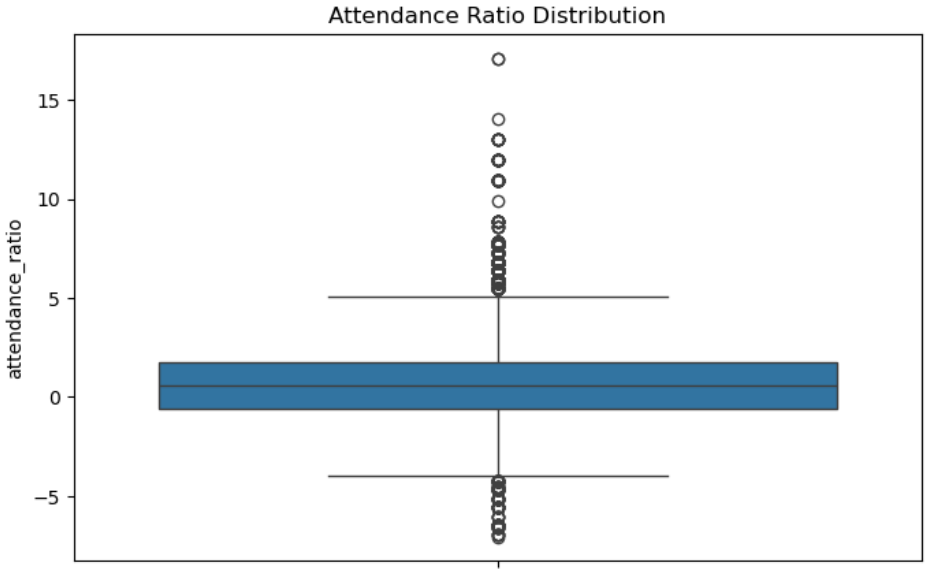
5. Attendance and Capacity Utilization

Observation:

- Some classes consistently operate near full capacity
- Several classes experience low attendance
- Attendance ratios show high variability

Insight:
High-utilization classes present opportunities for premium pricing, while low-utilization classes can be targeted with discounts or promotions to improve occupancy.

Fitness Class Booking Data

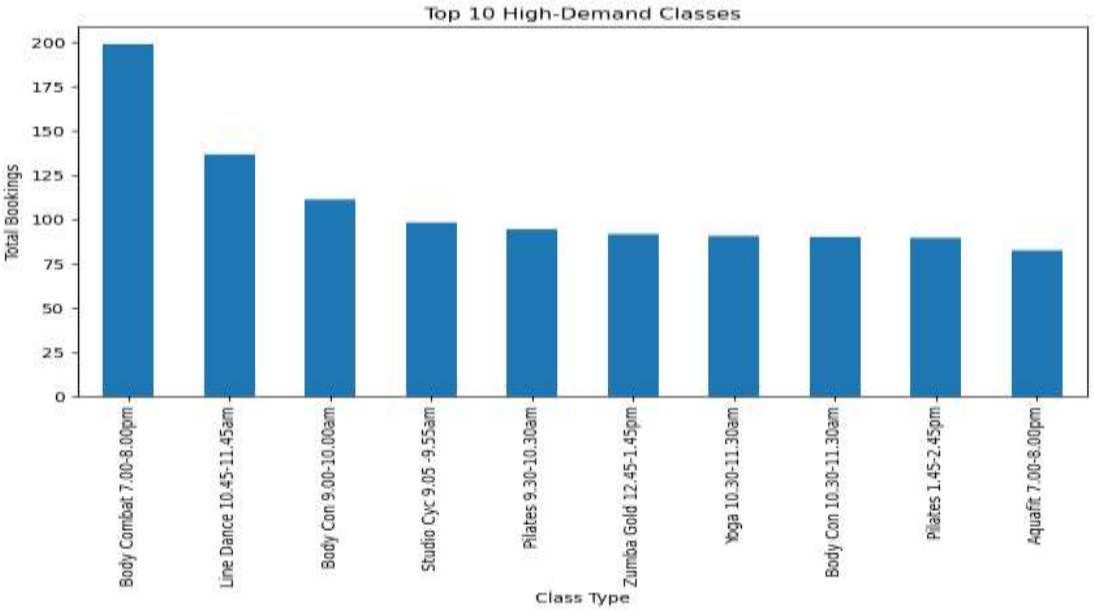


6. Class-Level Demand Analysis

Observation:

- Certain fitness class types attract consistently higher bookings
- Popular classes show stable demand across weeks
- Less popular classes exhibit higher demand volatility

Insight:
Class popularity is a key driver of demand and should be incorporated into pricing and scheduling decisions.



Fitness Class Booking Data

7. Price vs Demand (Preliminary Analysis)

Observation:
Higher-priced classes do not always experience lower demand, especially for popular class types.

Insight:
This suggests varying price sensitivity across classes, justifying the need for a detailed price elasticity model.

8. Outliers and Anomalies

Observation:

- A small number of classes show extremely low attendance
- A few instances reflect unusually high booking volumes

Action Taken:
These data points were retained, as they represent valid real-world business scenarios rather than data errors.

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9. Key EDA Findings (Summary)

- Booking demand varies significantly across time periods
- Attendance ratio is a strong indicator of class demand
- Certain classes are consistently underutilized
- Popular classes show resilience to higher prices
- Static pricing does not reflect demand variability

10. Business Implications

Based on EDA insights:

- Demand forecasting is feasible due to identifiable trends
- Dynamic pricing can improve revenue capture
- Pricing strategies should be class-specific and demand-driven
- Capacity utilization can be improved using targeted discounts

11. Conclusion

The exploratory data analysis reveals strong variability in booking demand across classes and time periods. These insights form a robust foundation for price elasticity modeling, demand forecasting, and the development of a dynamic pricing strategy aimed at maximizing revenue and improving class utilization.

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