Dynamic Pricing Algorithms & Rules Document

1. Introduction

This document outlines the dynamic pricing strategy developed using insights from EDA, Price Elasticity Modelling, and Demand Forecasting. The objective is to optimize pricing to maximize revenue while improving class utilization.

2. Key Insights Used for Dynamic Pricing

• Price Elasticity Coefficient: -0.3235 (inelastic demand).

• Peak booking hours: 10 AM and 6–8 PM.

• Peak weekdays: Tuesday, Wednesday, Thursday.

• High-demand classes: Body Combat, Aquafit, Pilates, Yoga.

• Low-demand periods: 2–4 PM and weekends.

• Forecasting shows weekly seasonality in demand.

• Utilization varies significantly across sessions.

3. Dynamic Pricing Factors Considered

• Class Type

• Hour of Day

• Day of Week

• Price Elasticity

• Utilization Rate

• Forecasted Demand

4. Dynamic Pricing Rules

• Peak Hour Pricing: Increase price by 10–15%.

• High-Demand Class Premium: Increase price by 15–20%.

• Off-Peak Discount: Apply 10–20% discount.

• Weekend Discount: Apply 10–20% off.

• Low Utilization Discount (<30%): Reduce price by 15–25%.

• High Utilization Surge Pricing (>80%): Increase price by 10–15%.

• Forecast-Based Pricing: Raise price 10% when predicted demand is above average.

5. Dynamic Pricing Algorithm (Pseudocode)

base_price = price

IF hour in peak_hours:
price *= 1.15

IF class_type in high_demand_classes:
price *= 1.20

IF utilization < 0.30:
price *= 0.80

IF day in weekends:
price *= 0.90

IF forecasted_demand > average_demand:
price *= 1.10

Final Price = price

6. Revenue Impact Simulation

Example:
Old Price = 1499, New Price = 1699, Elasticity = -0.3235
Old Demand = 20 → New Demand ≈ 19.2

Revenue Before = 20 × 1499 = ■29,980
Revenue After = 19.2 × 1699 = ■32,620

Dynamic pricing increases revenue even with slight drop in attendance.

7. Conclusion

The dynamic pricing framework leverages statistical insights to adjust prices based on demand, time, class type, and utilization. This approach ensures increased revenue in high-demand situations and better seat utilization during low-demand periods.