Flights Dataset Analysis

Comprehensive data analysis of airline ticket pricing behavior using Python-based analytics to uncover booking patterns and fare optimization strategies.

Business Challenge

The Passenger Dilemma

Travelers struggle to identify the optimal booking time for lowest fares in a dynamic pricing environment.

The Airline Objective

Airlines continuously adjust prices to maximize revenue while balancing demand and capacity.

Dataset Overview

Flight Records

Structured booking data with categorical and numerical attributes for pricing analysis.

Route Information

Airline name, source city, destination city, and timing details.

Pricing Data

Ticket fares in Indian Rupees serving as primary dependent variable.

Key Variables Analyzed

1

Days_Left

Number of days remaining before scheduled departure at time of booking.

2

Departure_Time

Categorical time slot of flight departure (Morning, Evening, etc.).

3

Arrival_Time

Categorical time slot indicating arrival at destination.

4

Price

Ticket fare in Indian Rupees—the primary metric for analysis.

Data Preparation Process

Validation

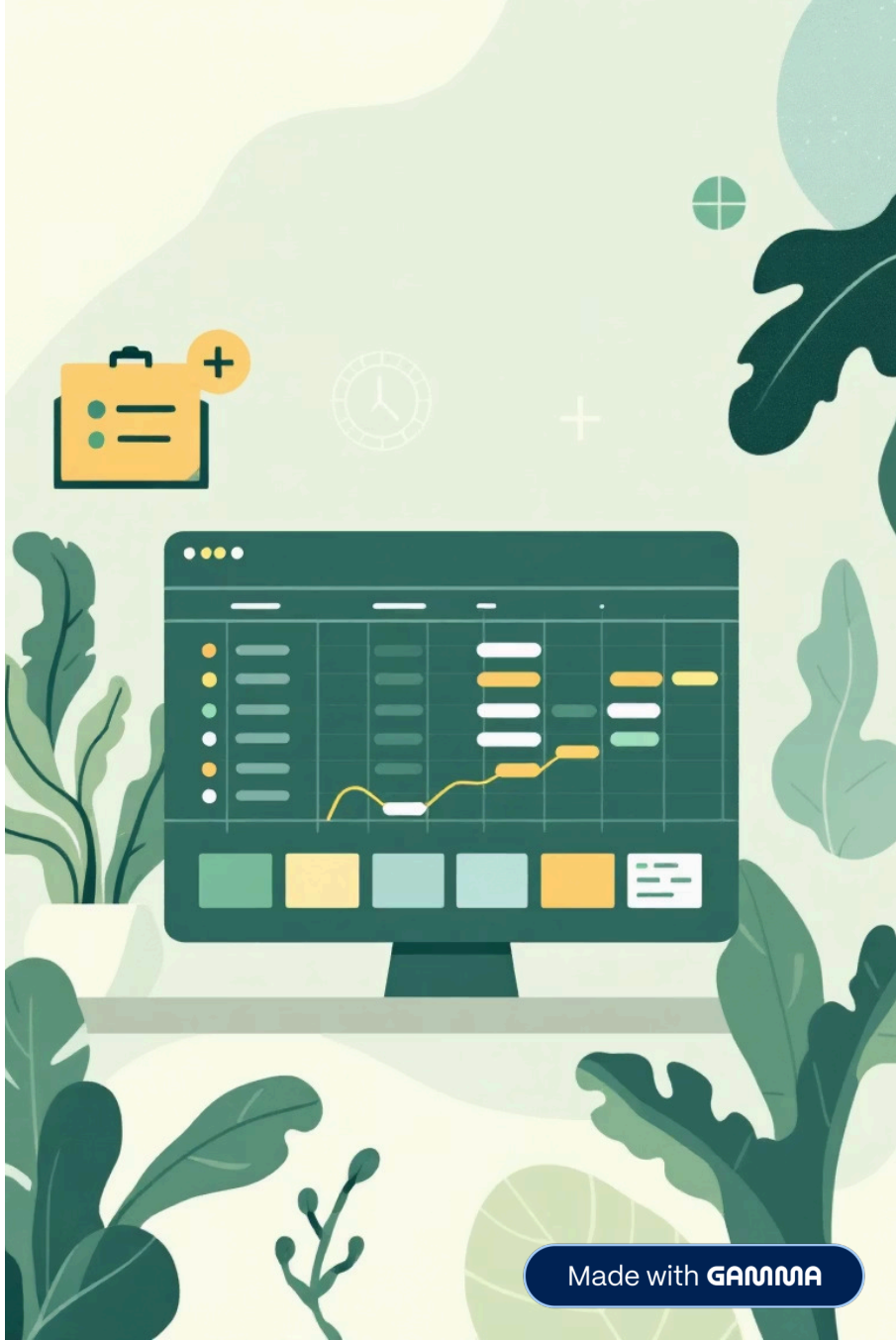
Examined missing values and inconsistent labels.

Standardization

Unified categorical variables and verified data types.

Quality Assurance

Ensured logical ranges for accurate analysis.



Analysis Methodology

Exploratory Approach

- Distribution analysis of ticket prices
- Group-by aggregations for time slots
- Trend analysis across booking windows
- Pattern identification in pricing behavior

Critical Discovery: Timing is Everything

60+ Days Out

Lowest average fares available for early planners.

1

30–60 Days

Moderate pricing as departure approaches.

2

Under 30 Days

Prices begin accelerating upward.

3

Last Minute

Highest fares reflecting peak demand.

4

Key Insight: Clear inverse relationship between days left and ticket prices—fares increase as departure date approaches.

Peak vs. Off-Peak Pricing Patterns

🌅 Peak Hours

Morning and evening departure slots command higher average prices due to business traveler demand and convenience preferences.

🌙 Off-Peak Savings

Late-night and early-morning arrivals show comparatively lower fares, offering cost-conscious options.

Actionable Insights

For Airlines

Dynamic pricing strategies effectively capitalize on last-minute demand and peak travel hours to maximize revenue.

For Travelers

Early booking and flexible travel times are essential strategies to secure significantly lower fares.

Conclusion & Future Directions

Project Achievement

Transformed raw flight data into actionable insights demonstrating practical Python analytics for business intelligence.

Future Enhancements

Build predictive ML models, incorporate flight duration and stops, perform airline-wise comparative analysis.

Current Limitations

Analysis limited to descriptive techniques; external factors like seasonality and holidays not explicitly modeled.