

Name: Hamza Nasir

Student id: 23121983

GitHub repository: <https://github.com/hamz-boop/hamza2.git>

Dataset Overview and Analysis

Dataset Overview

The dataset contains daily records of traveler numbers and flight ticket costs for an aircraft over a specified period. The key factors within the dataset are:

Date: The date when the information was recorded (in YYYY-MM-DD format).

Number: The number of travelers traveling on that day.

Price: The cost of a flight ticket on that specific day.

Dataset Structure

The information is organized such that each row represents a single day of the year, with columns as follows:

Date: A timestamp for the date of the flight.

Number: An integer representing the traveler counts on that day.

Price: A floating-point number representing the ticket cost for that day's flight.

Visualizations and Descriptions

Average Daily Travelers per Month with Fourier Series Approximation:

The average number of daily travelers for each month, along with a Fourier series approximation. The estimation captures long-term patterns while filtering out short-term fluctuations.

Power Spectrum of Daily Traveler Variability:

The power spectrum of traveler counts, which helps identify dominant seasonal patterns in the data, such as weekly or yearly cycles. The spectrum highlights frequency components that contribute to overall traveler variability.

Calculating Values X and Y

X: Percentage of Revenue from Summer Months (June, July, August)

The percentage of total revenue generated by summer travelers is computed as:

$$X = (\text{Summer Revenue} / \text{Total Revenue}) \times 100$$

Where:

Summer Revenue: The total revenue generated from flights during the summer months (calculated as the sum of (Price x Number) for those months).

Total Revenue: The total revenue across all flights in the dataset.

Y: Percentage of Passengers Flying in Summer Months

The percentage of total travelers traveling during the summer months is calculated as:

$$Y = (\text{Summer Passengers} / \text{Total Passengers}) \times 100$$

Where:

Summer Passengers: The total number of travelers flying during the summer months.

Total Passengers: The overall number of travelers across the entire dataset.

Analysis of Results

Values X and Y

X (Summer Revenue Percentage): A higher X value indicates that the summer months contribute a significant portion of the airline's total revenue.

Y (Summer Travelers Percentage): A higher Y value suggests that a substantial portion of the airline's travelers fly during the summer months, indicating seasonal demand spikes.

Conclusion

Significance of Summer Months

The values of X and Y provide crucial insights into how much the summer months (June, July, August) contribute to the airline's total revenue and traveler activity. Higher percentages in both metrics indicate that summer is a peak period for the airline, both in terms of revenue generation and passenger load.

Seasonal and Periodic Patterns

The Fourier series and power spectrum analyses reveal seasonal patterns in traveler counts. These insights can be leveraged to optimize pricing strategies, resource allocation, and marketing efforts during peak travel periods.