Colder Days, Cheaper Tickets?

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Introduction

- **Objective:** Investigate if air travel tickets are cheaper during colder months in North America.
- **Context:** Common advice suggests traveling in winter for cheaper tickets, but is this true?

Data Used

- **Flight Data:**
  - Source: 2018 Airplane Flights from Kaggle
  - Key Columns: `PricePerTicket`, `Miles`, `Quarter`
  - License: CC0: Public Domain
- **Weather Data:**
  - Source: Average day weather for 2018 from Kaggle
  - Key Columns: `DailyAverageDewPointTemperature`, `DATE`
  - License: CC0: Public Domain

Methodology

- **Data Preparation:**
  - Downloaded and cleaned datasets from Kaggle.
- **Mapping:**
  - Mapped weather data to flight quarters.
- **Analysis:**
  - Calculated average temperature and price per mile for each quarter.

Pipeline Details

- **Data Downloading:**
  - Python script to automatically download and manage datasets from Kaggle.
- **Data Cleaning:**
  - Ensured datasets were clean with no missing values, which simplified the analysis.
- **Feature Mapping:**
  - Converted 'DATE' from weather data to match 'Quarter' in flight data for integration.
- **Aggregation:**
  - Computed average temperature and price per mile by quarter to match data granularity.
- **Output Generation:**
  - Produced a new dataset with 'AvgTemperature', 'PricePerMiles', and 'Quarter' as features.
- **Output**:
  - CSV file selected to store the output of pipeline because it produces a few rows as output.

Analysis Method

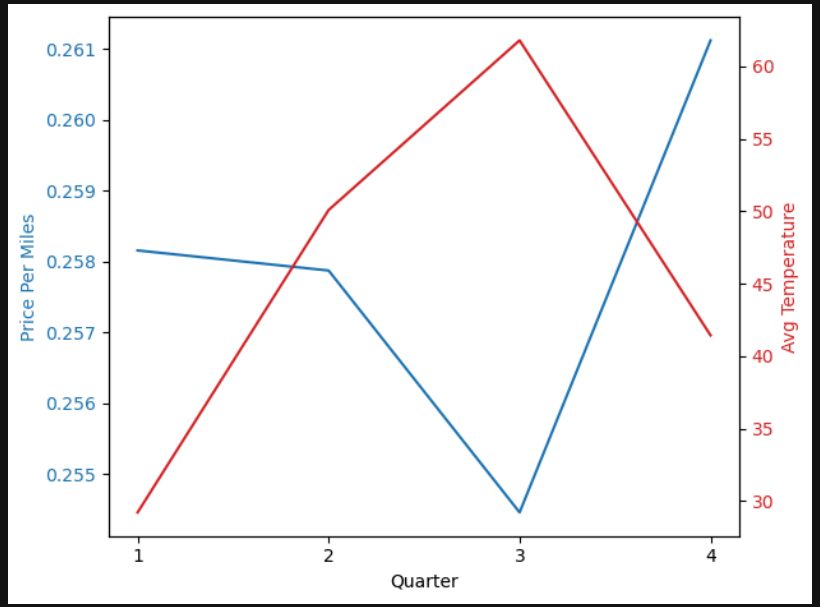
- **Correlation Analysis:**
  - **Method:** Pearson Correlation Coefficient (PCC).
- **Pearson Correlation Coefficient (PCC):**
  - **What is PCC?**
    - A measure of the linear correlation between two sets of data.
  - **Range:**
    - Values range from -1 to 1.
  - **Interpretation:**
    - **1:** Perfect positive correlation
    - **-1:** Perfect negative correlation
    - **0:** No correlation

Pearson Correlation Coefficient Formula

- **Formula:**
  - $r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2 \cdot \sum_{i=1}^{n}(Y_i - \bar{Y})^2}}$
  - Where X and Y are the two variables, $\bar{X}$ and $\bar{Y}$ are their means, and n is the number of observations.
- **Use Case:**
  - Ideal for determining if changes in temperature directly relate to changes in ticket prices.

Correlation Analysis Results

- **Pearson Correlation Coefficient:**
  - **Result:** -0.65, indicating an inverse relationship between temperature and price per mile.
  - **Implication:** As temperature decreases, ticket prices per mile tend to increase.



Conclusions

- **Finding:** Contrary to popular belief, colder temperatures correlate with higher ticket prices.
- **Results:**
  - **PCC Value:** -0.65, suggesting a moderate to strong negative correlation.
  - **Temperature Impact:** Colder days are linked with higher flight costs.
- **Implications:**
  - **Travel Planning:** Winter might not be the best time for budget travel in North America.
  - **Market Dynamics:** Higher demand or operational costs during colder months could explain this trend.
- **Reasons:**
  - Winter holidays increase travel demand.
  - Tourism patterns shift (cold to warm, warm to cold for winter sports).
  - Additional operational costs in winter (de-icing).

Limitations

- **Data Granularity:** Data by quarter, not by month or day, which might miss short-term fluctuations.
- **Holiday Effects:** No consideration for public or school holidays which influence price.

Future Work

- **Enhance Data:** Monthly or daily flight data for more precision.
- **Include Holidays:** Incorporate holidays as variables in analysis.
- **Operational Costs:** Investigate how operational costs affect pricing.

Thank You

- **Questions?**