NYC Taxi Fare Prediction - Exploratory Data Analysis

This presentation delves into the analysis of NYC taxi fare trends, employing tools like Python, Pandas, and Seaborn to uncover insights.

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Presenter Designation

Essential Steps in Data Cleaning

Preprocessing Steps for Accurate Data Analysis

- **Removed Negative Fare Entries**

  Eliminated any fare entries with negative values to ensure data integrity.

- **Dropped Rows with Missing Values**

  Removed rows that had missing values to maintain a complete dataset.

- **Filtered Invalid Coordinates**

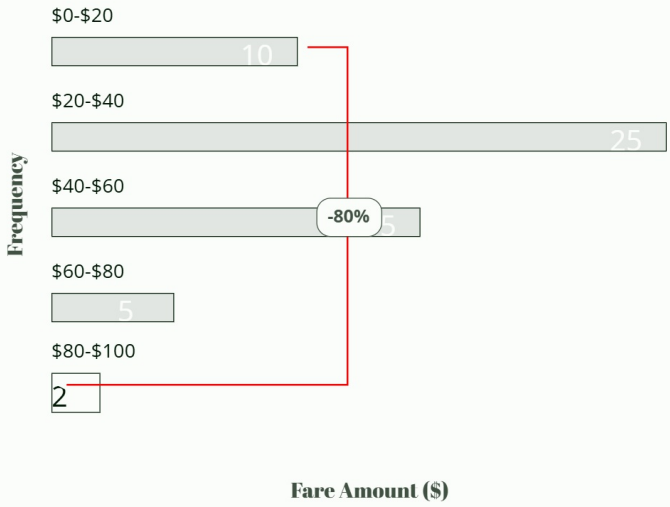
  Excluded latitudes and longitudes that fell outside the NYC boundaries.

- **Ensured Clean Data for Modeling**

  Ensured only valid and clean data is used in the modeling pipeline for accuracy.

Distribution of NYC Taxi Fare Amounts

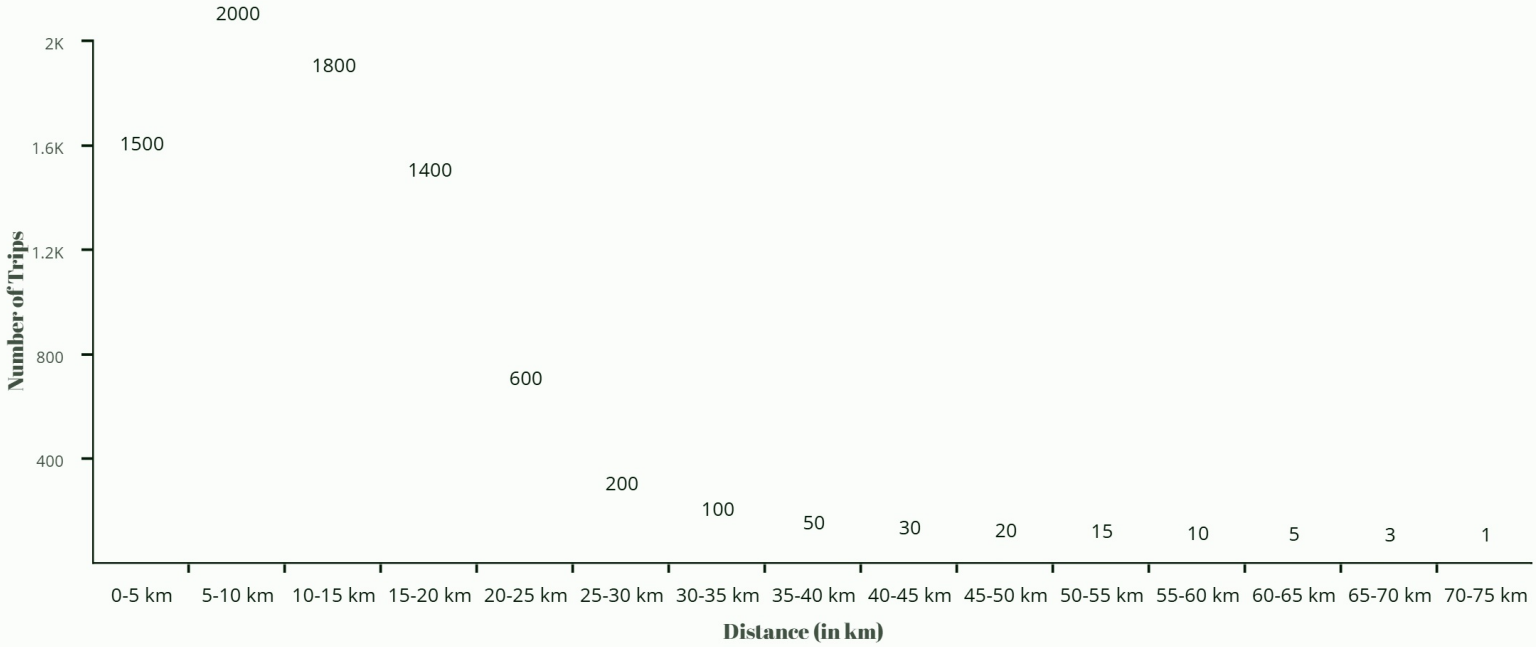
Analyzing the Cost Trends of Taxi Rides



- The histogram shows a long tail distribution of taxi fares.
  Description of a primary heading
- There are noticeable small spikes in fares between $40 and $60.
  Description of a primary heading
- Outliers have been trimmed to improve model performance.
  Description of a primary heading

NYC Taxi Fare Dataset

Analyzing Ride Distances in NYC

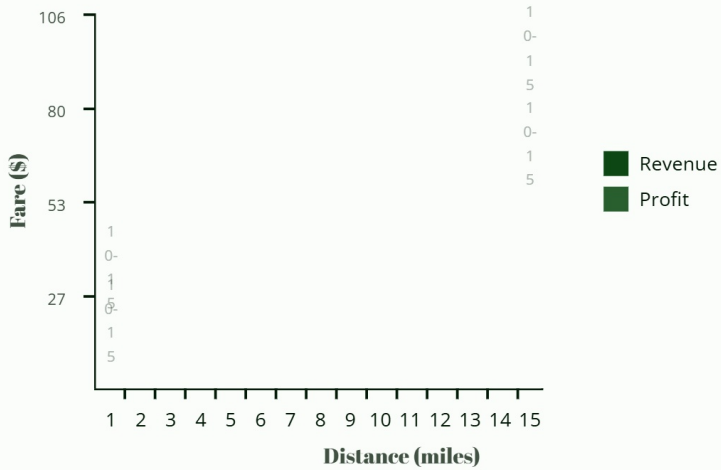


Source: Companies Market Cap

Exploring Distance and Fare Correlation

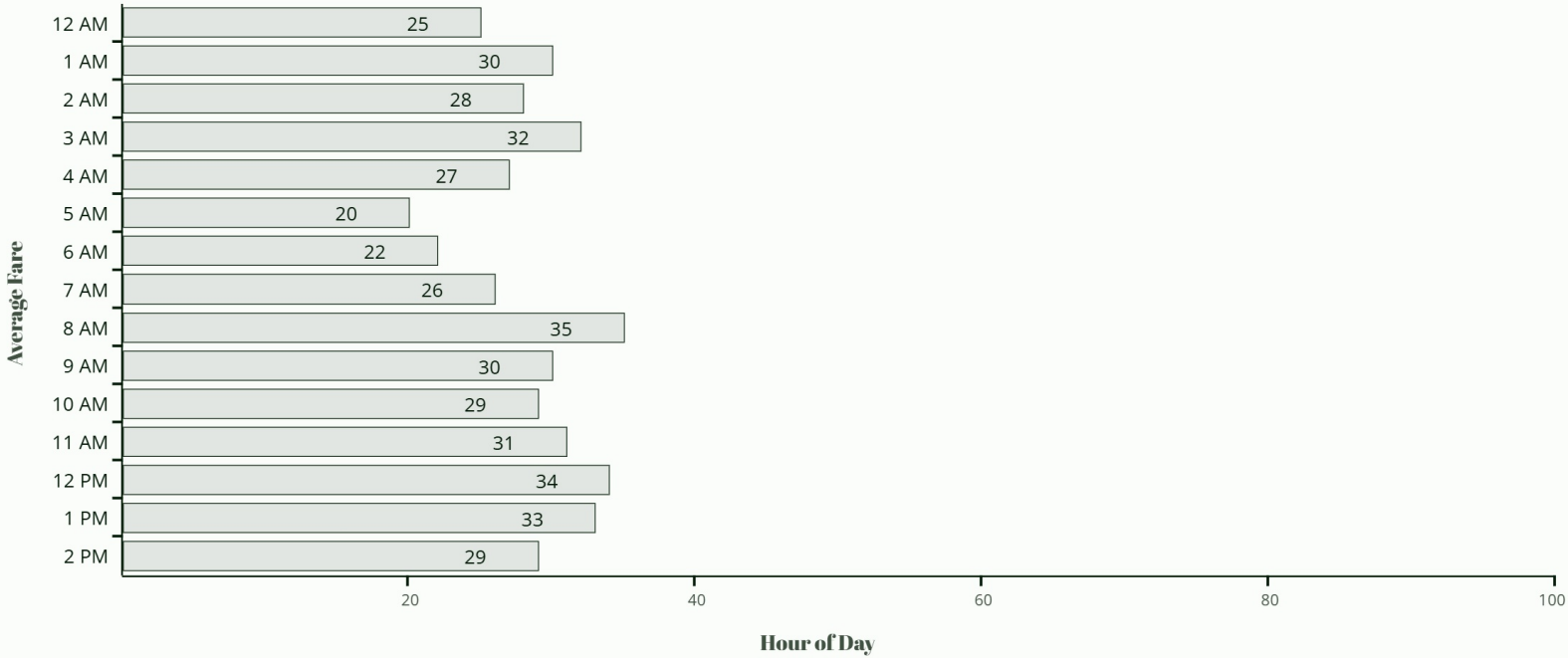
Analyzing the relationship between distance and fare

- Fare tends to increase with distance traveled
- Scatter plot indicates a strong linear relationship
- Fixed fare rides create horizontal clusters



NYC Taxi Fare Data (2023)

Exploring Time-Based Fare Variations



Source: Companies Market Cap

Impact of Passenger Count on Fares

1 **Majority of rides are solo or duo**

Most taxi rides are undertaken by 1 or 2 passengers, highlighting a common usage pattern.

2 **Fare independence from passenger count**

The total fare amount does not significantly fluctuate based on how many people are riding.

3 **Slight fare changes for large groups**

Larger groups may see minor fare adjustments, but these are not substantial.

Key Observations and Outliers in Data

Identifying Key Anomalies in Taxi Fare Data

- **Zero-distance trips with fares**

  These trips show non-zero fares, indicating possible data entry errors or unique circumstances.

- **Long trips with low fares**

  Instances of extended trips costing significantly less than expected, suggesting irregular pricing structures.

- **Fixed-price clusters**

  Data reveals horizontal lines indicating fixed-price fare clusters, calling for detailed analysis.

- **Need for custom handling**

  Identified anomalies may require tailored treatments or exclusions in predictive modeling.

Comprehensive Pivot Table Analysis

Insights into taxi fare structures and usage patterns

Distance Bucket (km)	Avg. Fare ($)	Passenger Count	Ride Frequency
0-1	$2.50	150	200
1-2	$4.00	200	300
2-3	$6.00	250	350
3-4	$8.00	300	400
4-5	$10.00	350	450

Exploring Key Insights on NYC Taxi Fares

Summary of Findings on Fare Dynamics and Patterns

- **Short-Distance Rides Predominate**

  Most NYC taxi rides are short, highlighting commuter patterns.

- **Fare Increases with Distance**

  The fare amount generally increases linearly with the distance traveled.

- **Fixed Fare Patterns for Airports**

  Certain rides, like those to airports, have fixed fare structures.

- **Importance of Data Cleaning**

  Data cleaning is crucial for enhancing model performance.

- **Time of Day Influences Fares**

  The time of day significantly affects taxi fare dynamics.