

Part 1: Categorical/Linguistic Analysis

Stakeholder Category/Text Analysis Needs

- **Restaurants and Food Delivery Services:** Need insights into the most popular food categories to optimize menus, manage inventory, and plan promotions.
- **Delivery Logistics Teams:** Need to understand how traffic and weather conditions impact delivery time and performance.
- **Customers:** May benefit from knowing which food categories are trending, helping them make ordering decisions.
- **City and Traffic Planners:** Can analyze how road traffic density affects food delivery delays, which can inform better city planning.

Data Assessment

- **Categorical Data:**
 - Type_of_order (e.g., Snacks, Drinks, Buffet)
 - City (e.g., Urban, Metropolitan)
 - Road_traffic_density (Low, Medium, High, Jam)
 - Weatherconditions (Sunny, Cloudy, Stormy, etc.)
- **Text Data:**
 - Type_of_order can be analyzed using word frequency analysis (Word Cloud).
 - Weatherconditions can be used to track seasonal trends in deliveries.
- **Data Quality Checks:**
 - Remove any missing values in Type_of_order, Road_traffic_density, and Weatherconditions.
 - Standardize city names to maintain consistency.
- **What is the quality and consistency of your categorical/textual data?**

The dataset appears well-structured, but some data cleaning is needed:

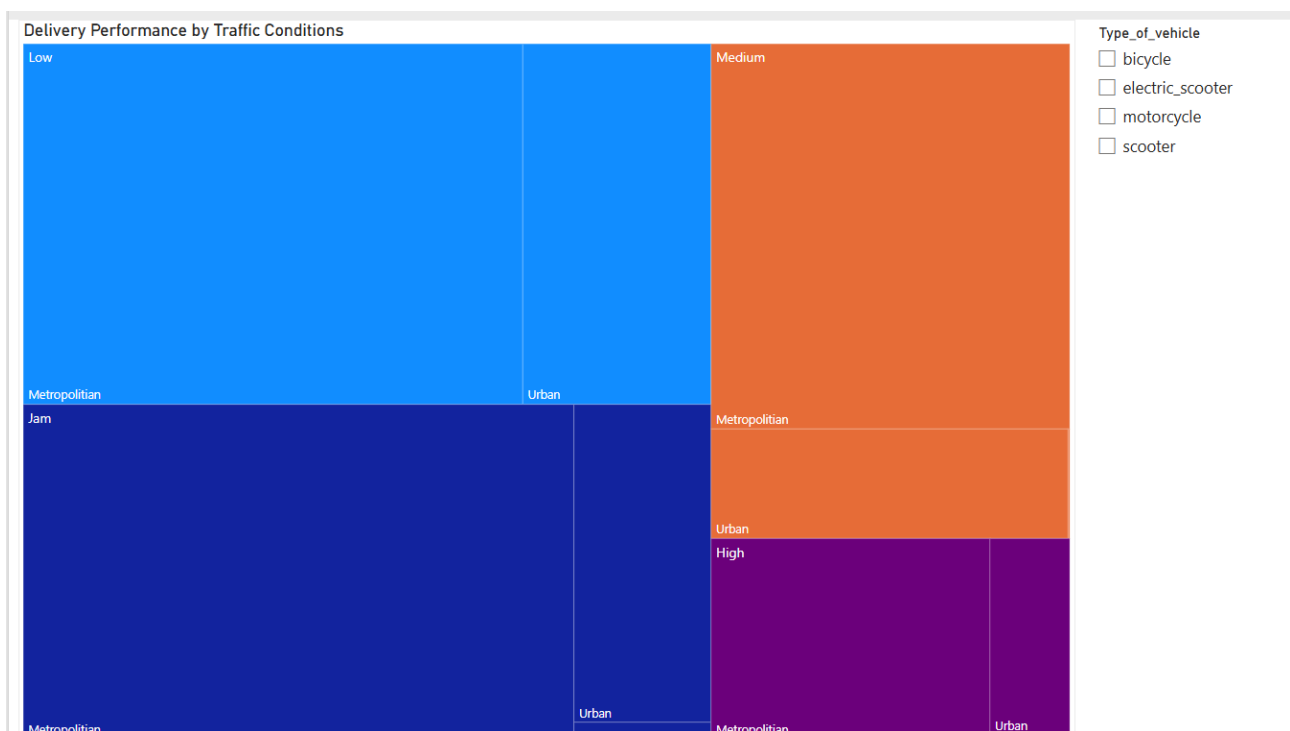
- Standardizing weather conditions (Sunny, Cloudy, Stormy, etc.).
- Ensuring order categories (Snack, Meal, etc.) are correctly classified.
- **What additional context might be needed?**
 - Information about order volume by time of day could help identify peak demand times.
 - Understanding customer feedback or ratings for different food categories would improve service insights.

Initial Design Exploration

I chose two different visualization approaches to analyze categorical patterns in food delivery:

1. Treemap: Delivery Performance by Traffic Conditions

- **Why this visualization?**
 - It helps visualize the impact of traffic conditions on delivery performance across different cities.
- **How is the data structured?**
 - **Hierarchy:** Road_traffic_density → City
 - **Size Metric:** Number of orders (count of deliveries).
 - **Filters:** Type of vehicle (motorcycle, scooter, bicycle).



- **Insights from this treemap:**
 - Which traffic conditions cause the most delays?
 - How urban and metropolitan areas compare in delivery efficiency.
 - How different vehicle types perform under different traffic conditions.

2. Word Cloud: Most Ordered Food Categories

- **Why this visualization?**
 - It provides a quick visual representation of the most popular food categories.

- **How is the data structured?**
 - **Data Source:** Type_of_order column (e.g., Snack, Meal, Buffet, Drinks).
 - **Processing:**
 - Convert categories into a text corpus.
 - Generate a word cloud where larger words represent more frequent orders.



- **Insights from this word cloud:**
 - Which food categories are most popular?
 - Are certain categories more ordered in specific seasons or cities?

Part 2: AI-Assisted Design Process

AI Interactions & Tools Used

- **AI Model Used:** ChatGPT-4o
- **Prompts Used:**
 1. "How can I visualize the most popular food categories in a dataset?"
 - AI suggested word cloud analysis, which was implemented.
 2. "What's the best way to compare traffic impact on deliveries in Power BI?"
 - AI recommended a stacked column chart, which worked well.

Implementation Plan

1. Data Cleaning:

- **Remove missing values** in Type_of_order, Road_traffic_density, and Weatherconditions to ensure accurate visualization.
- **Standardize food category names** (e.g., ensuring "Snack" and "snacks" are grouped correctly).
- **Fix inconsistent city names** for better grouping in the treemap visualization.

2. Tools Used:

- **Python (Matplotlib, WordCloud)** for text analysis and generating the word cloud of most ordered food categories.
- **Power BI** for the treemap visualization, allowing interactive filtering by traffic conditions, cities, and vehicle types.

3. Interactive Features in Power BI:

- **Filter by City** analyze how delivery performance varies across different locations.
- **Select Vehicle Type (Motorcycle, Scooter, Bicycle)** to check which mode of transport is most efficient under different traffic conditions.

Challenges & AI Limitations

- AI Didn't Consider Data Cleaning Needs:
 - Had to manually clean food order categories and standardize city names for consistent visualization in Power BI.
- Suggested Default Colors Without Accessibility Considerations:
 - AI did not optimize for readability, so I had to adjust colors in Power BI to ensure charts were easy to interpret for all users.
- AI Missed the Importance of Interactive Filtering in Power BI:
 - Had to manually add vehicle-type filters to improve analysis in the treemap.