Overview
With rapid urbanization, Prayagraj faces significant traffic congestion issues that impact commute times, increase emissions, and lower the quality of life for residents. Efficient traffic management can help solve these challenges at certain levels.

Objective
The aim of this analysis is to uncover insights into congestion patterns across Prayagraj intersections and provide data-driven recommendations to optimize traffic flow. This report documents the methodology, findings, and recommended actions based on the analysis of historical traffic data.

Data Description
The dataset consists of historical traffic data collected from intersections across Prayagraj over a week. Key columns include `timestamp`, `vehicle_count`, `average_speed`, `weather_condition`, `day_of_week`, `is_holiday`, and `event`.

Data Cleaning Steps

1. **Handling Missing Values:**
    - Filled missing values in `vehicle_count` and `average_speed` with the column mean.
    - Filled missing values in `weather_condition` with the mode, and missing `intersection_name` with "NA"
2. **Outlier Detection:**
    - Used the Interquartile Range (IQR) to identify and treat outliers in `vehicle_count` and `average_speed`.

Weather Impact Analysis

- **Objective:** Examine how different weather conditions affect traffic.
- **Findings:** Traffic volume and average speed show clear patterns. Adverse weather, such as rain and fog, correlates with reduced speeds and sometimes higher vehicle counts as congestion builds.

Holiday and Event Impact

- **Objective:** Assess the impact of holidays and events on traffic.
- **Findings:** Events like local market fairs and holidays significantly increase vehicle count. Average vehicle counts are notably higher on event days.

Correlation Analysis

- **Objective:** Identify relationships between variables.

- **Findings:** There is a negative correlation between `vehicle_count` and `average_speed`, indicating that higher congestion reduces average speed. Traffic volume also shows a moderate correlation with `pollution_level`, especially during peak hours

Data set after cleaning and processing:-
Final Dataset

Power BI Dashboard of the Dataset:-

Dashboard

All the Python codes:-
Python Codes

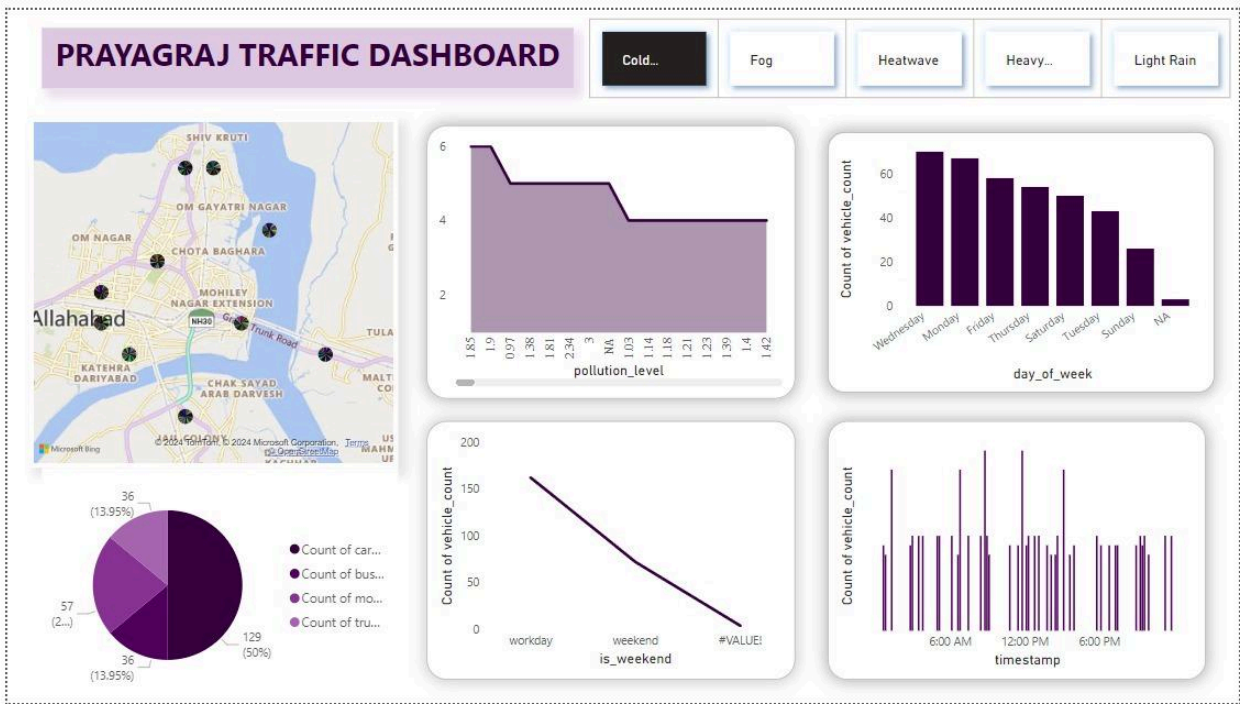
Recommendations:-

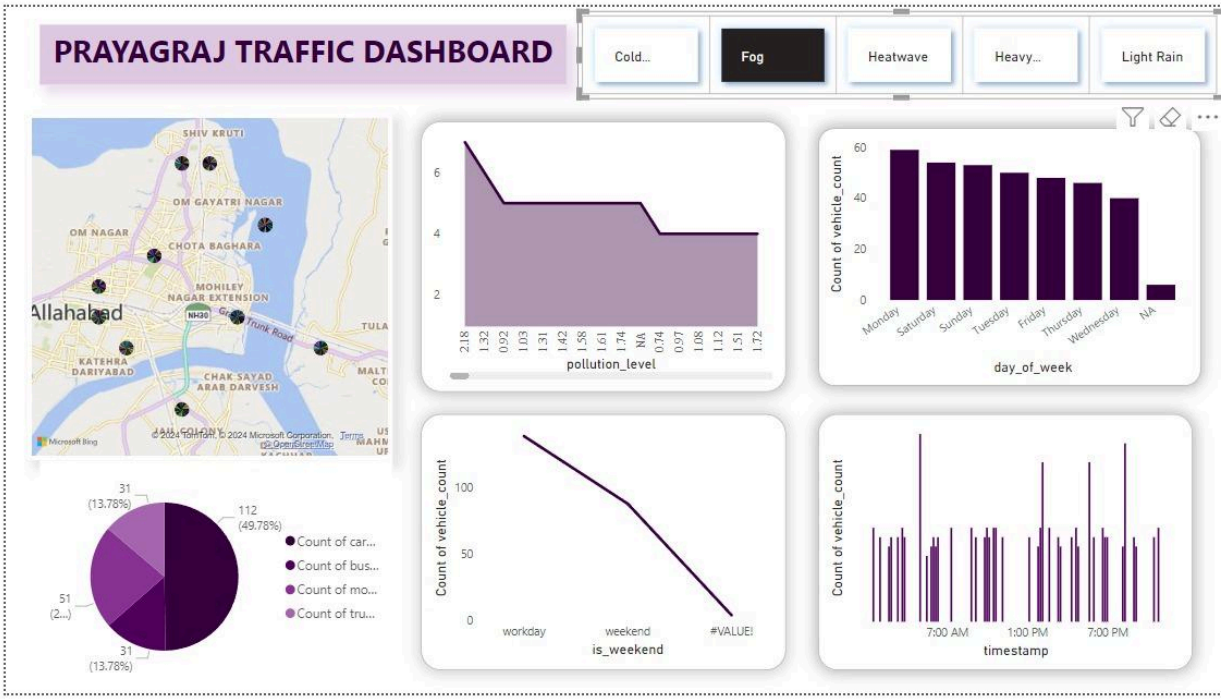
Adaptive Traffic Signals
Install smart signals at busy intersections that adjust based on live traffic data to reduce waiting times, especially during peak hours and bad weather.

Event-Based Traffic Management
Increase traffic control during local events and fairs to manage high traffic flow, and consider redirecting vehicles as needed.

Enhance Public Transit
Offer more frequent public transit during peak hours and events to reduce road congestion in busy areas.

Promote Off-Peak Travel
Run awareness campaigns to encourage off-peak travel, helping to balance traffic around popular destinations.


PRAYAGRAJ TRAFFIC DASHBOARD
Cold...
Fog
Heatwave
Heavy...
Light Rain
SHIV KRUTI
OM GAYATRI NAGAR
OM NAGAR
CHOTA BAGHARA
MOHILEY NAGAR EXTENSION
Allahabad
NH30
Trunk Road
KATEHRA DARIYABAD
CHAK SAYAD ARAB DARVESH
pollution_level
Count of vehicle_count
day_of_week
Wednesday
Monday
Friday
Thursday
Saturday
Tuesday
Sunday
NA
is_weekend
workday
weekend
#VALUE!
timestamp
6:00 AM
12:00 PM
6:00 PM
36 (13.95%)
57 (2...)
129 (50%)
36 (13.95%)
Count of car...
Count of bus...
Count of mo...
Count of tru...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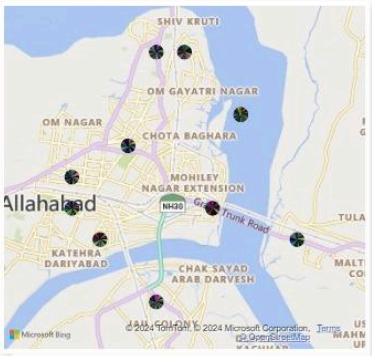
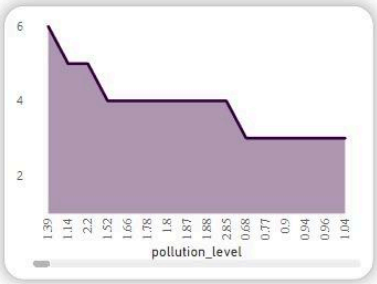
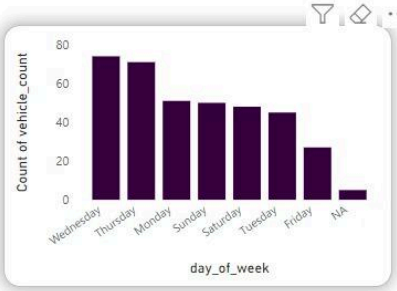
pollution_level
Count of vehicle_count
day_of_week
Monday
Saturday
Sunday
Tuesday
Friday
Thursday
Wednesday
NA
is_weekend
workday
weekend
#VALUE!
timestamp
7:00 AM
1:00 PM
7:00 PM
31 (13.78%)
112 (49.78%)
51 (2...)
31 (13.78%)
Count of car...
Count of bus...
Count of mo...
Count of tru...

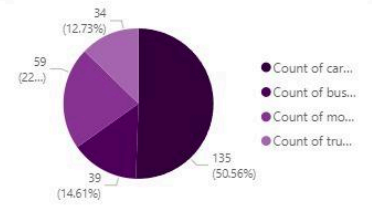
PRAYAGRAJ TRAFFIC DASHBOARD

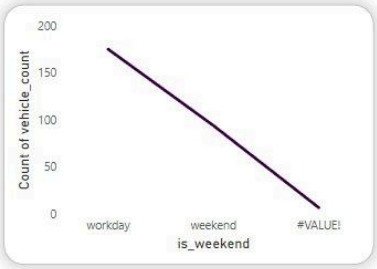
Cold... | Fog | Heatwave | Heavy... | Light Rain

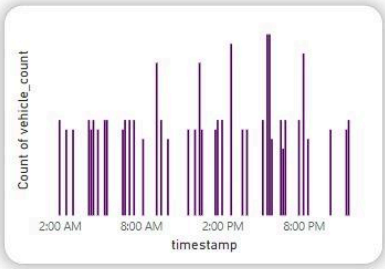












PRAYAGRAJ TRAFFIC DASHBOARD

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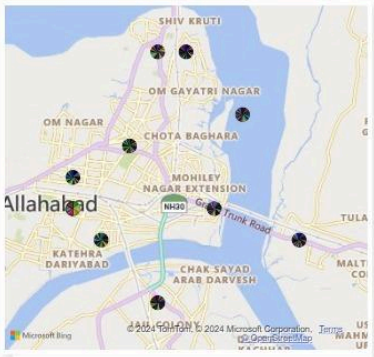

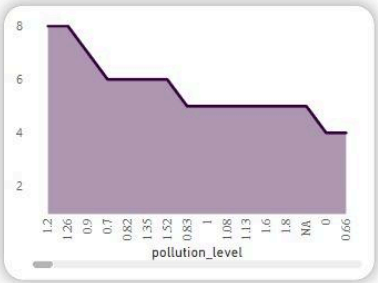

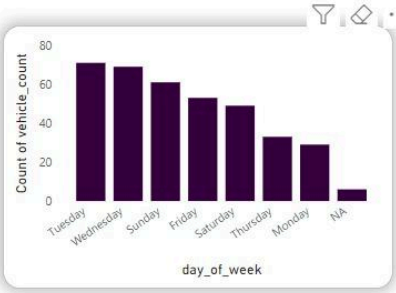

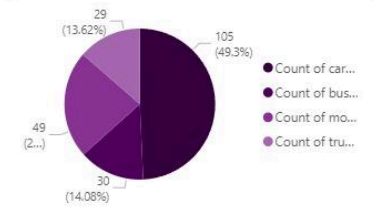

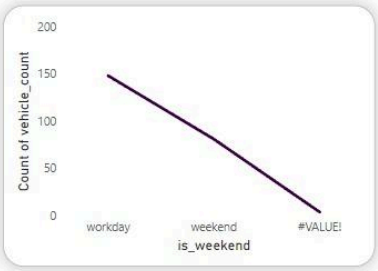

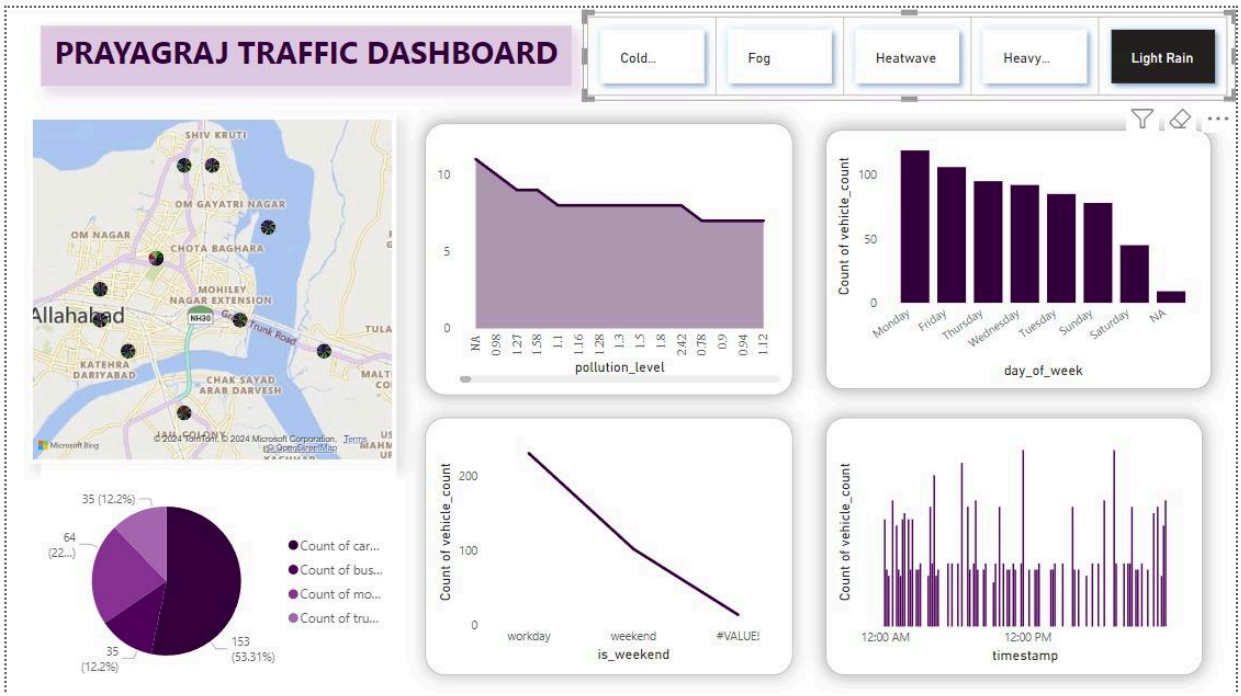

Conclusions

- Traffic at “Chowk” and “Naini Bridge” is comparatively more than other sites.
- During peak hours i.e 8:00 AM-10:00 AM and 6:30 PM - 9:00 PM the traffic is more congested.
- During afternoon traffic is comparatively less than peak hours.

- In every case Car count comprises more than 50% than bikes, trucks and buses.
- During weekends traffic decreases compared to working days.

- During Fog or Heavy rain traffic is less.