

ROAD ACCIDENT DATA ANALYSIS

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Challenges:

Road accidents are a major public health and economic issue

Project's aim:

To analyze accident data to identify key contributing factors
and provide actionable recommendations to reduce accidents
and improve road safety.

About dataset:

Dataset contains 307973 rows and 19 columns(features).

The features include:

accident_index, accident_date, day_of_week, junction_control,
junction_detail, accident_severity, light_conditions,
local_authority, carriageway_hazards, number_of_casualties,
number_of_vehicles, police_force, road_surface_conditions,
road_type, speed_limit, time, urban_or_rural_area,
weather_conditions, vehicle_type

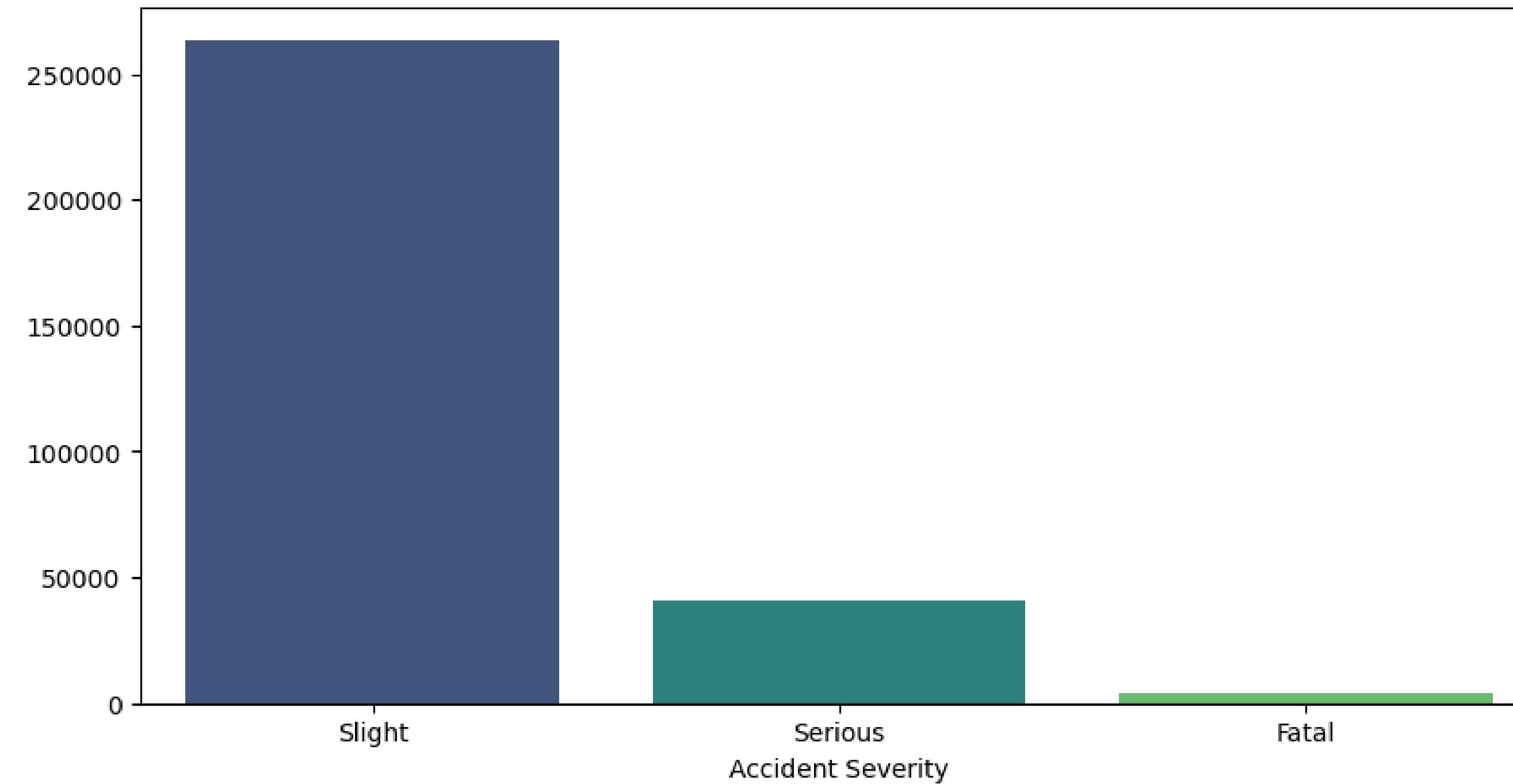
Methodology:

- Python for EDA and modeling
- SQL for data extraction
- Excel & Power BI for dashboards

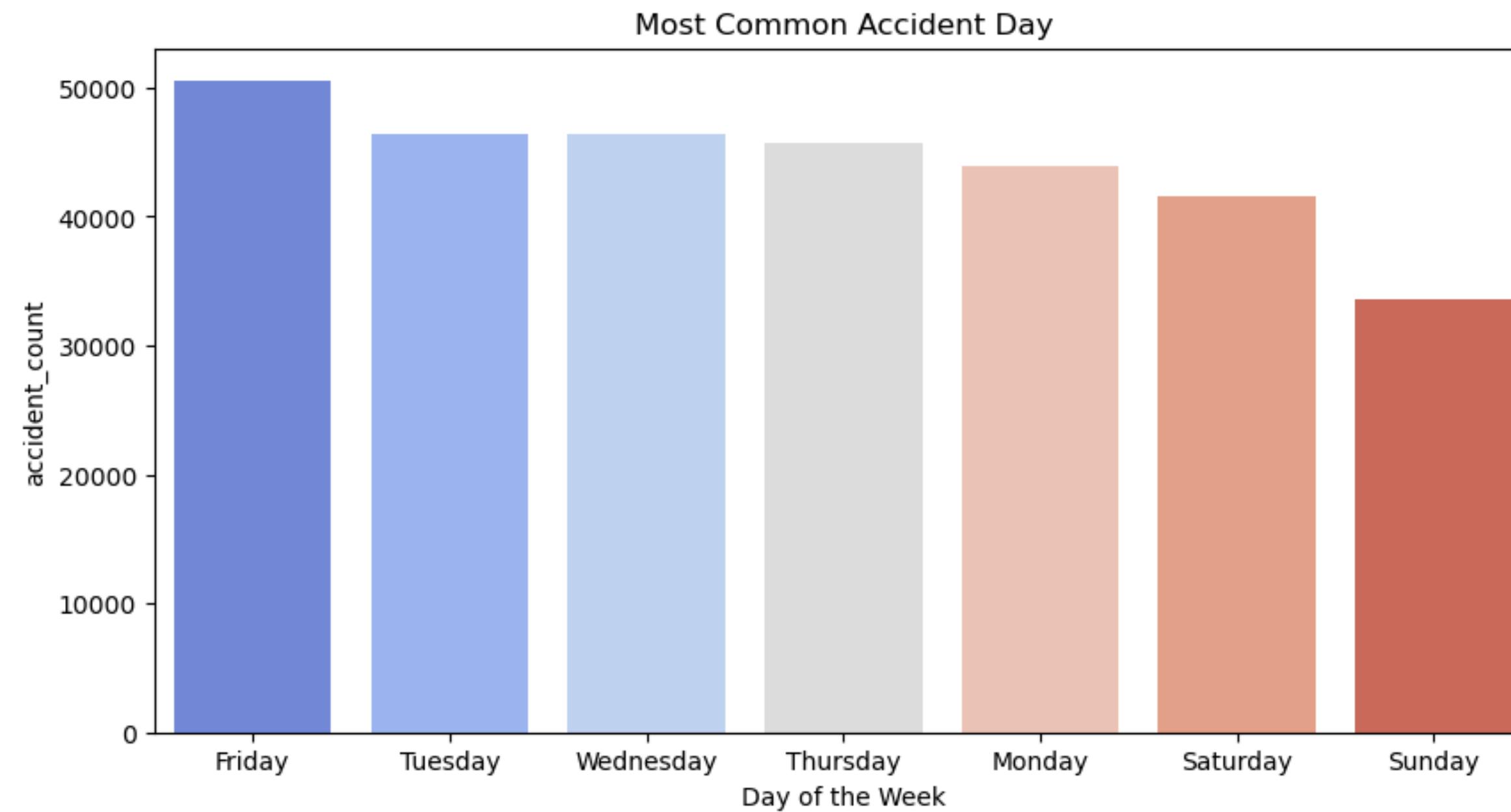


Visualizations

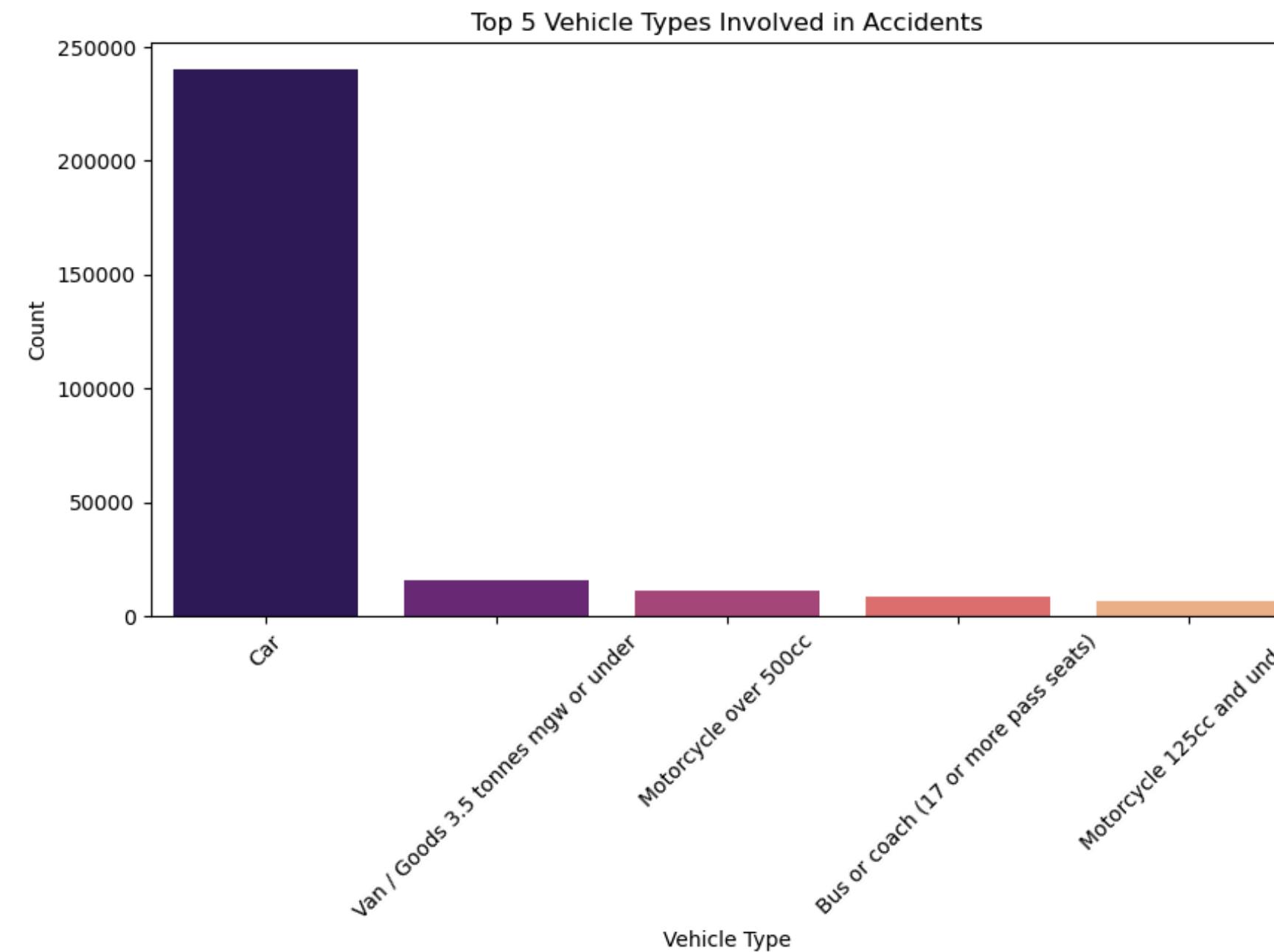
Number of accidents by severity



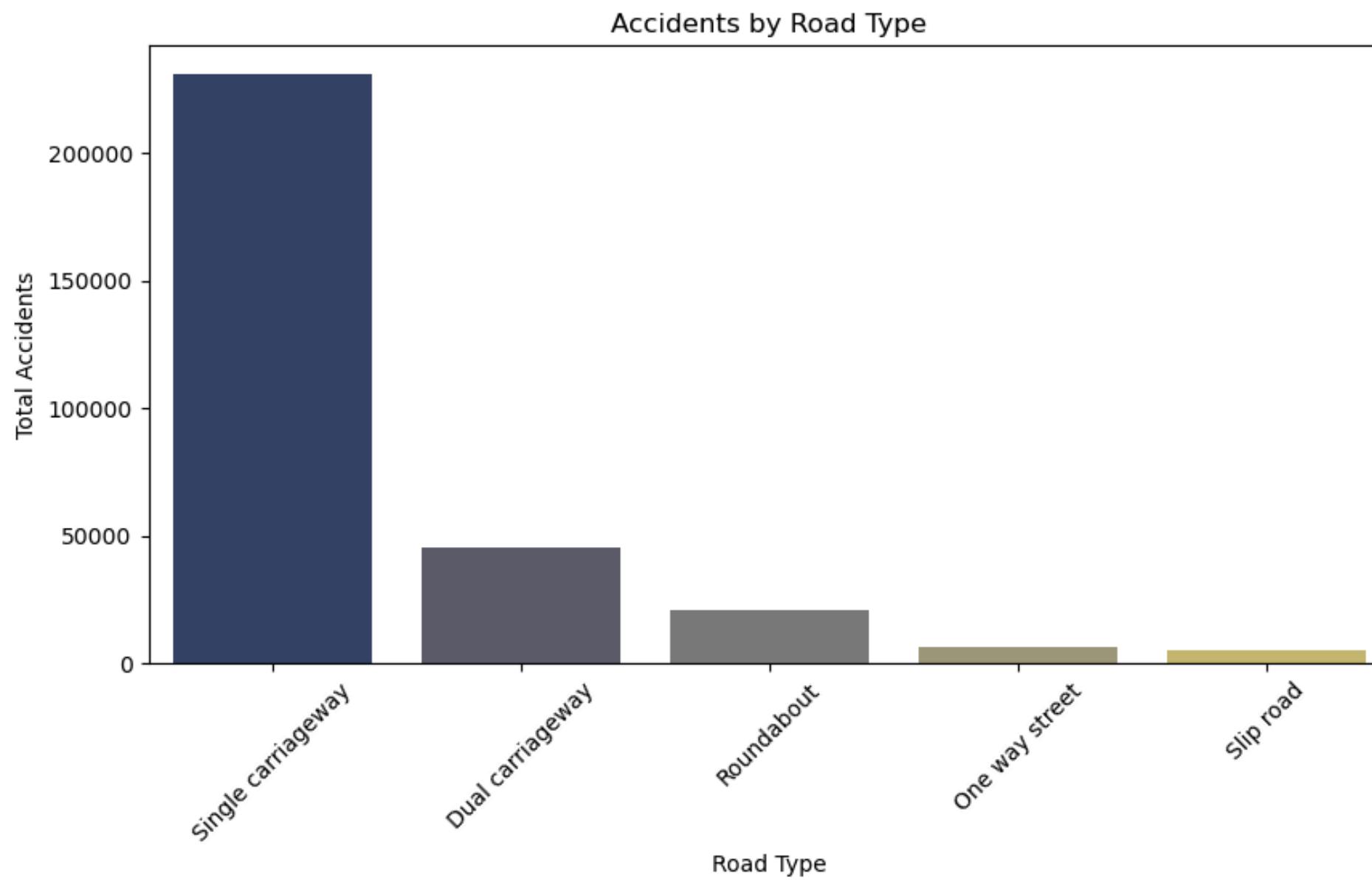
Most common accident day



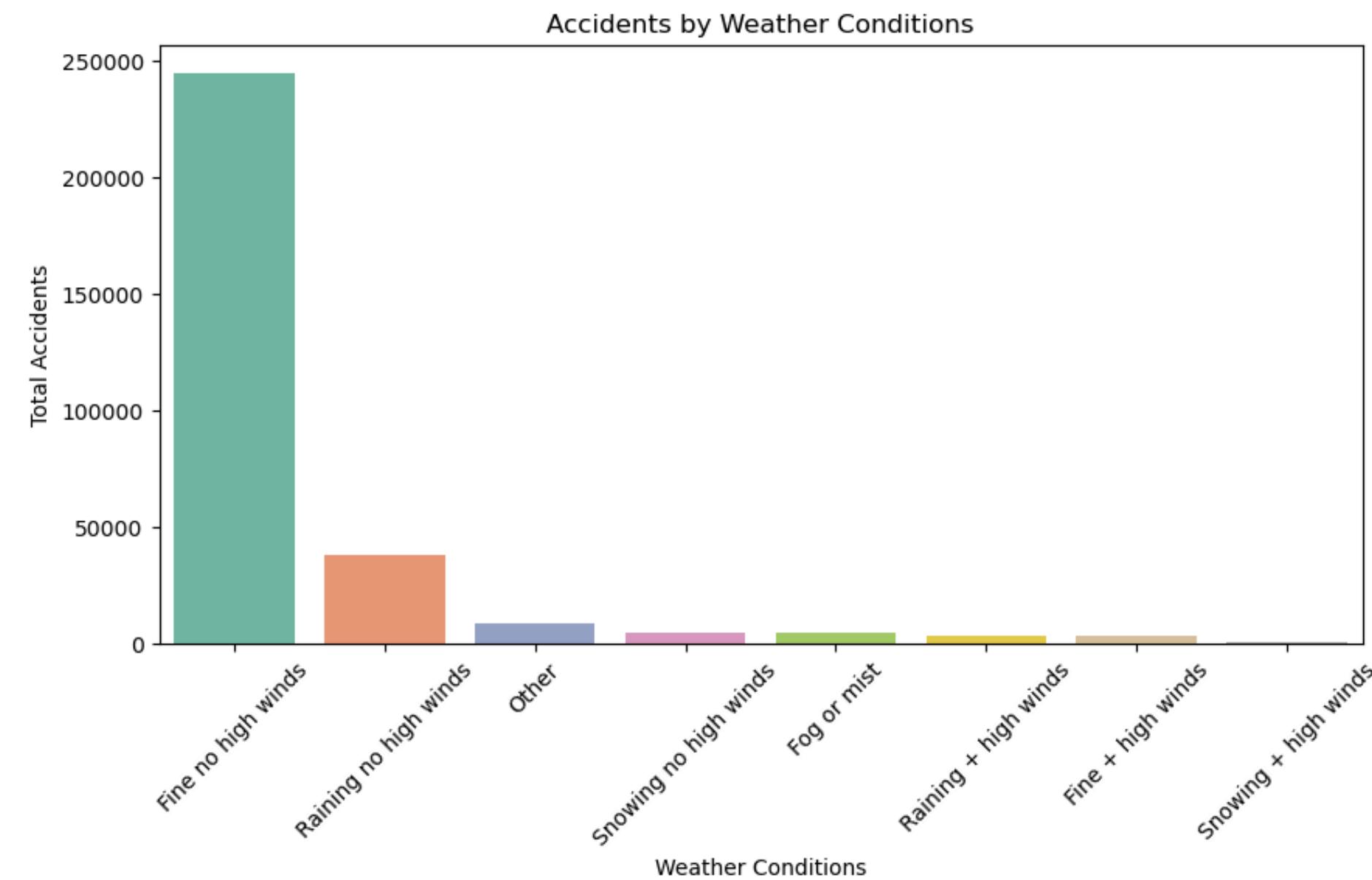
Top 5 vehicle types involved in accidents



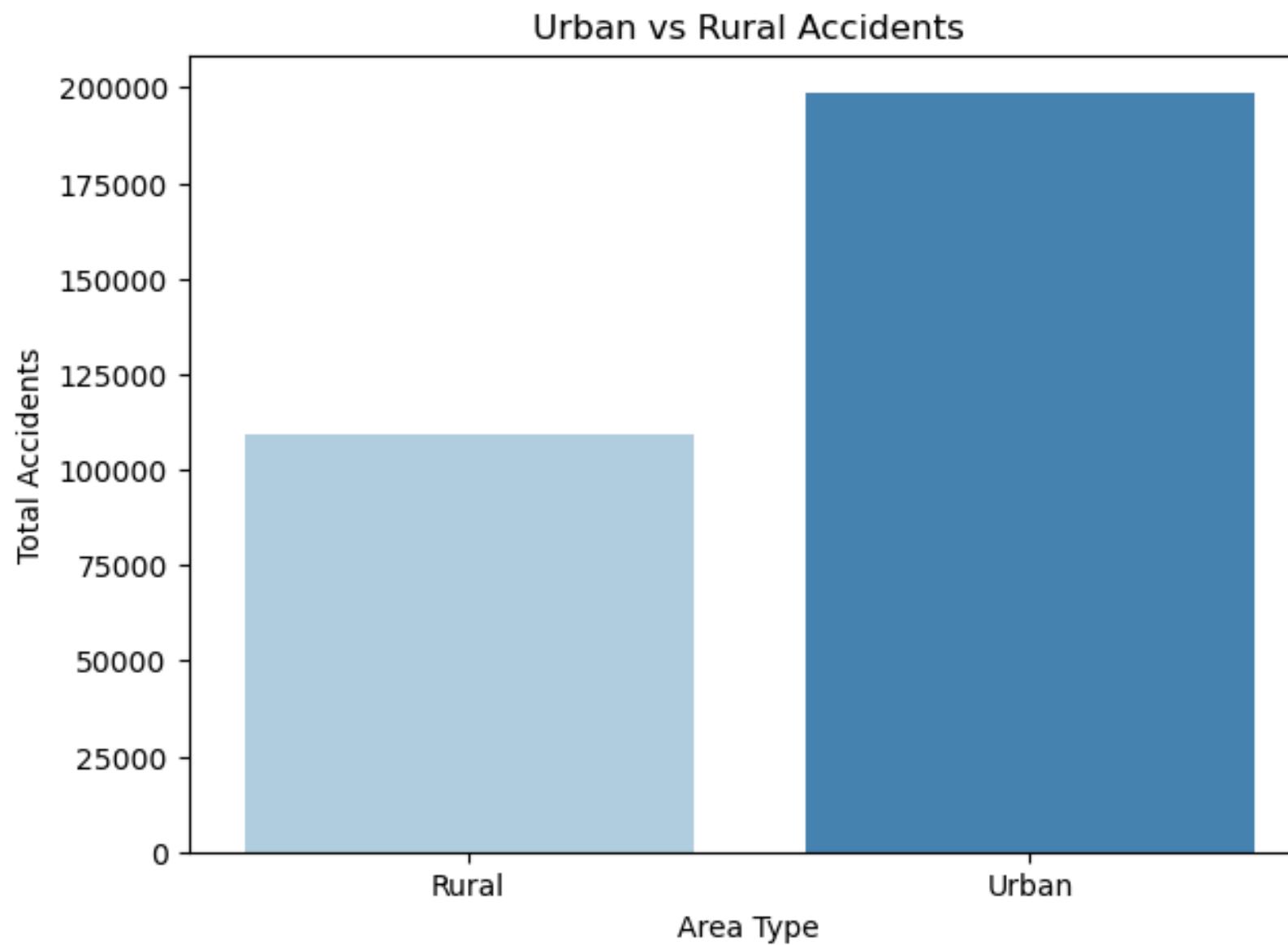
Number of accidents per road type



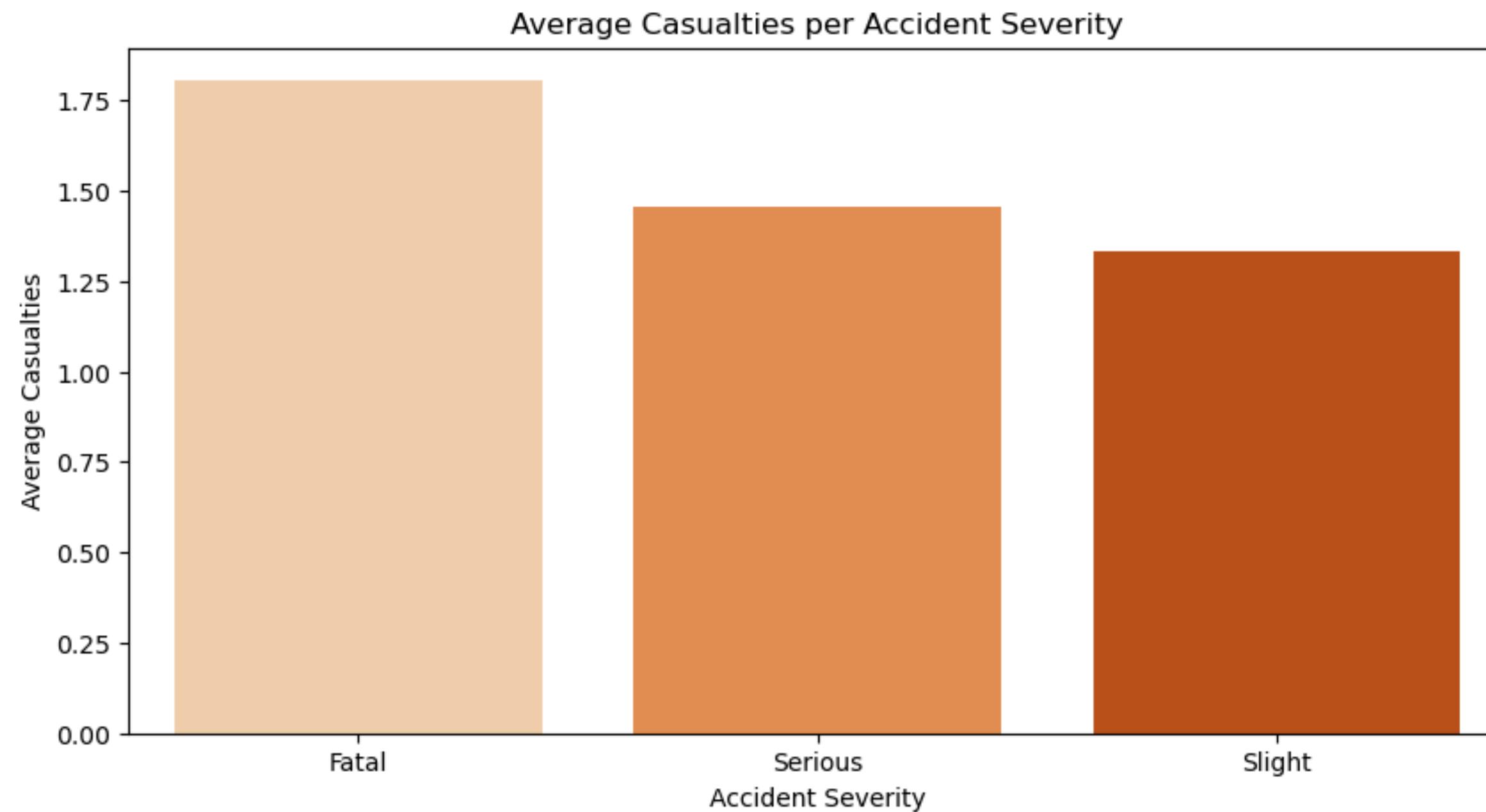
Most common weather conditions for accidents



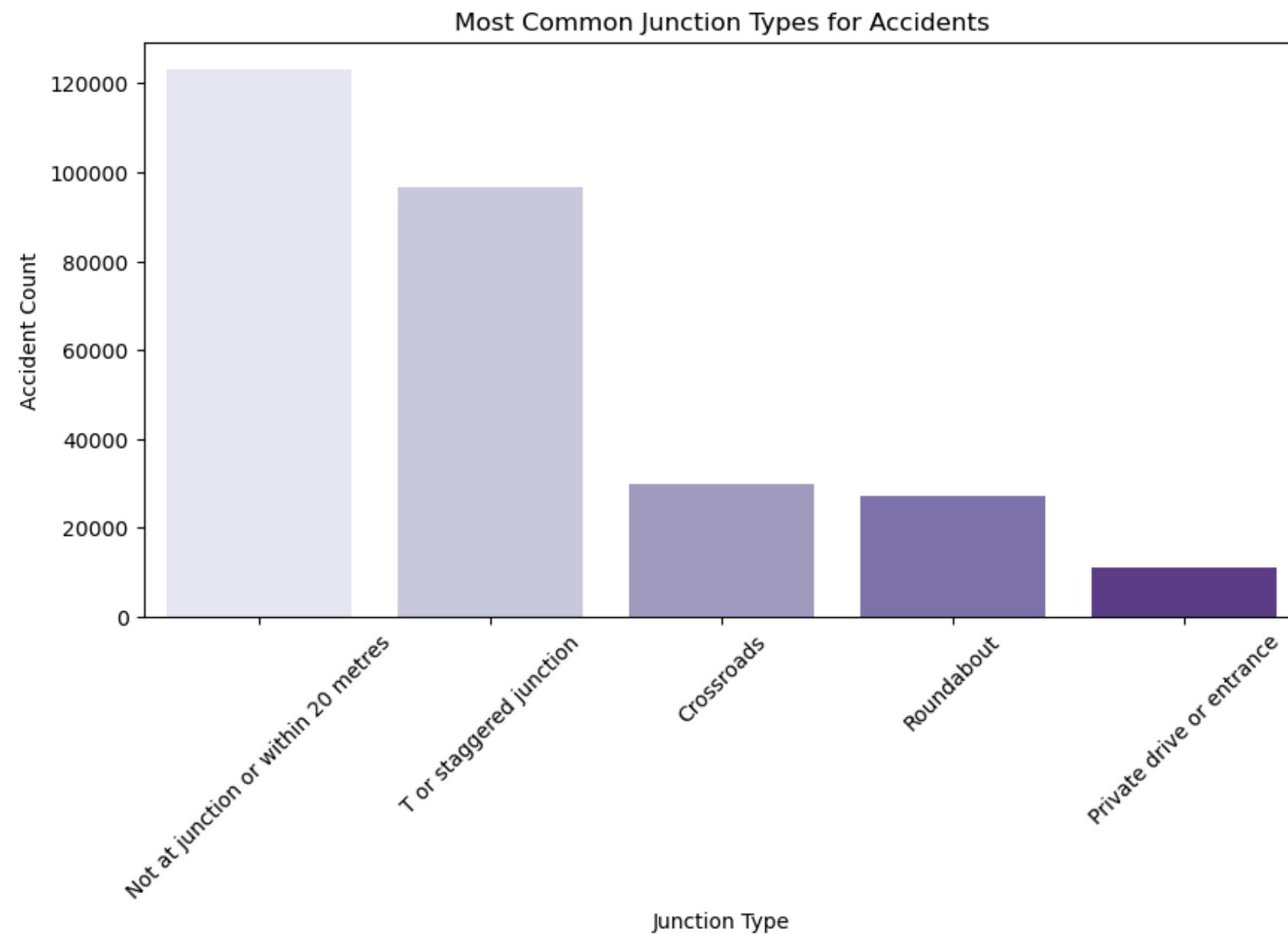
Accident counts for urban vs rural areas



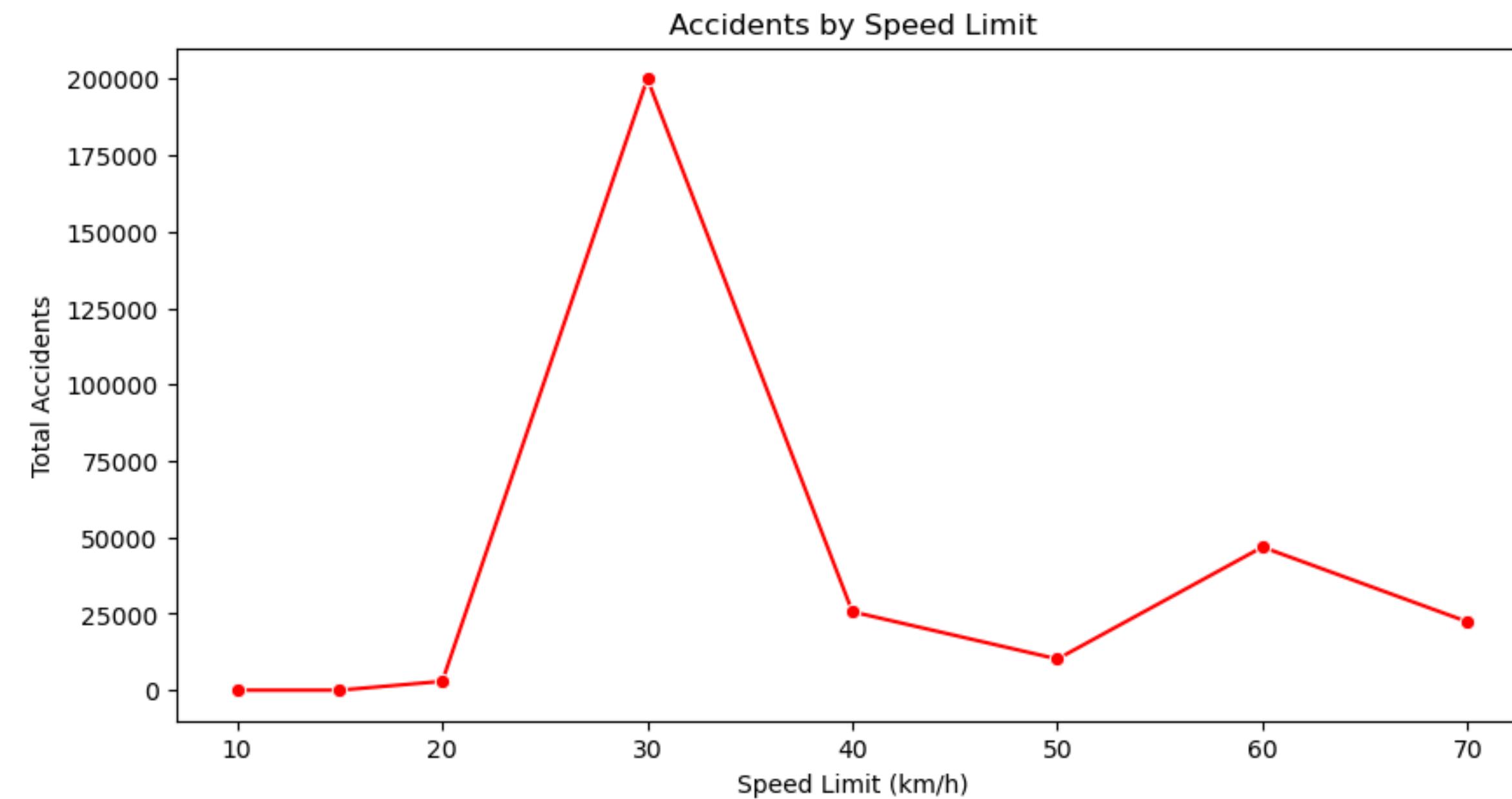
Average number of casualties per accident severity



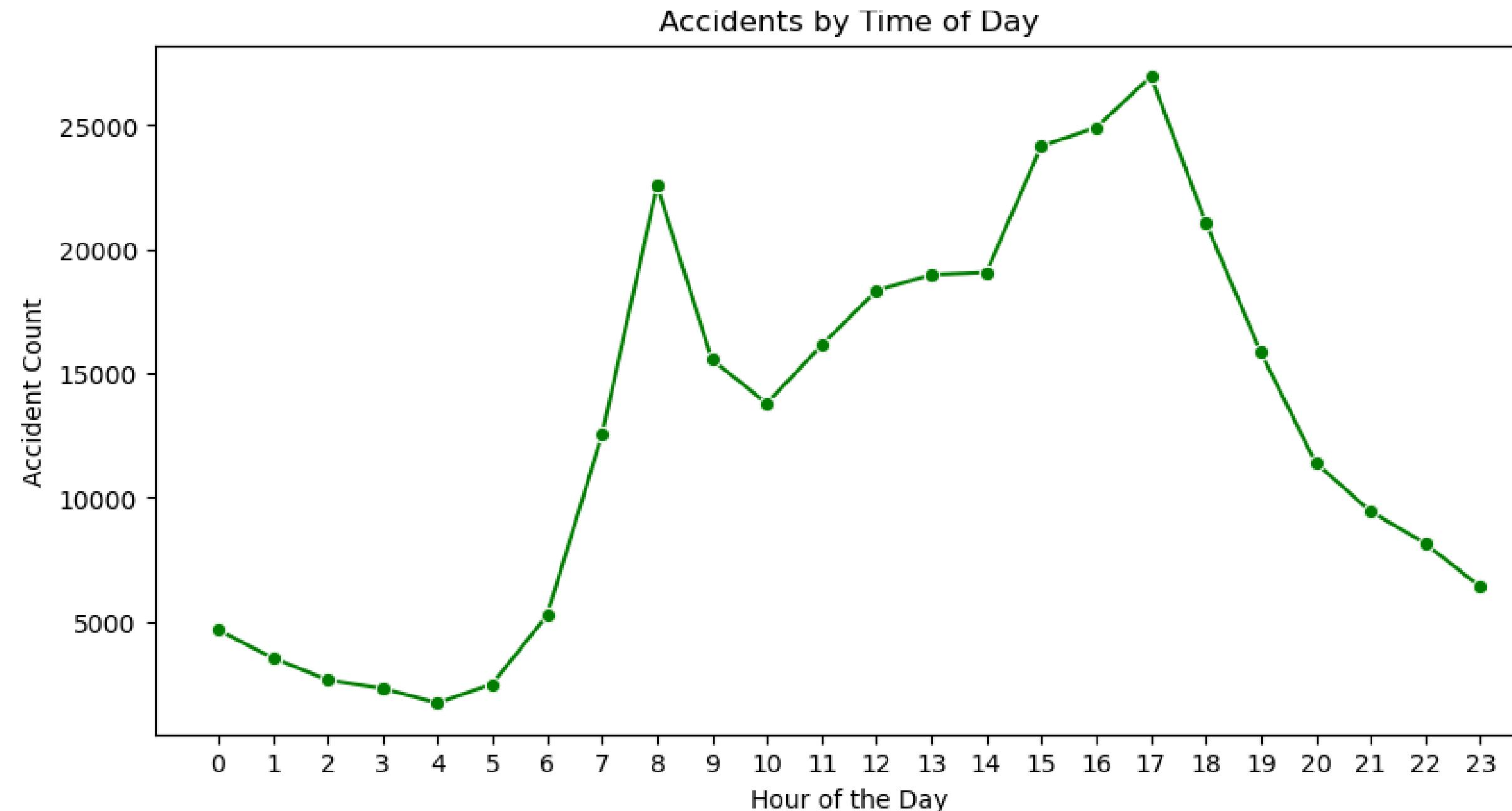
Most common junction type where accidents occur



Number of accidents per speed limit category



Time period with the most accidents



Modeling:

Model used: Random Forest

Accuracy: 85.46%





Excel Dashboard

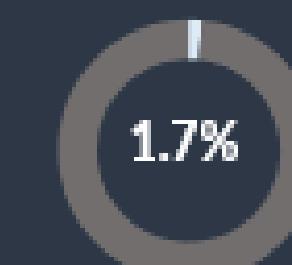
ROAD ACCIDENT DASHBOARD

Total Casualties **417883**



Fatal Casualties

7135



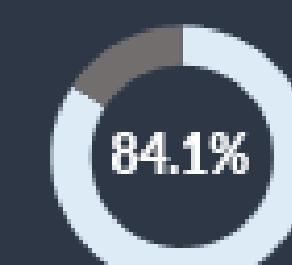
Serious Casualties

59312



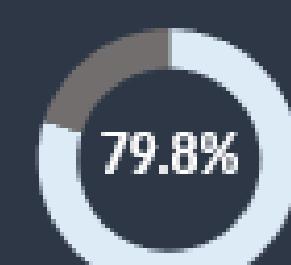
Slight Casualties

351436



Casualties by Car

333485



Total Casualties
by Vehicle Type

333485

33472

12798

33672

1032

3424

Current Year Casualties vs. Previous Year
Casualties Monthly Trend



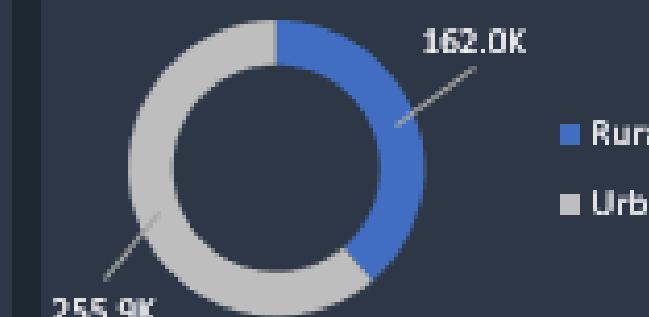
Casualties by Road Type



Casualties by Road Surface



Casualties by Location/
Area



Casualties by Light
Condition



Filter Panel

Accident Date

All Periods	YEARS	
2021	2022	2023

Navigation: [Left] [Right]

Urban or Rural Area

- Rural
- Urban



PowerBI Dashboard

Insights and Conclusion:

- **Slight accidents** are the most frequent, followed by serious and then fatal accidents.
- **Fridays and Tuesdays** show the highest number of accidents.
- **Cars** are the most common vehicle type involved in accidents.
- **Single carriageways** are associated with the highest number of accidents.
- **Urban areas** have a higher number of accidents overall.
- Accidents are most frequent during the **rush hour**.
- **Fatal accidents** have the highest average number of casualties, followed by serious and then slight accidents.

Recommendation:

- **Focus road safety campaigns** on high-risk days, times and locations.
- **Promote vehicle safety awareness**, particularly for car drivers.
- **Issue timely warnings and advisories** during adverse weather conditions (rain, snow, fog).
- **Implement strict speed measures**, especially on single carriageways and in areas with a history of high-speed accidents.
- **Improve the safety of junctions**, particularly T or staggered junctions and crossroads.
- **Continuously monitor accident data**.