



# **USA TRAFFIC ACCIDENT ANALYSIS**

**POWER BI PROJECT**

**BY ELMA FORTUNATE PHIRI**

# Introduction

- This project aims to analyze traffic accidents data to identify patterns related to road conditions, weather, and time of the day and visualize accidents hotspots and contributing factors
- It aims to analyze the provided dataset to discover insights that can be visually expressed through the data

## **Data Source**

US Accidents dataset(February 2016 to March 2023)

# Dataset Description

## US Accidents dataset

- This is a countrywide car accident dataset that covers 49 states of the USA.
- The accident data were collected from February 2016 to March 2023, using multiple APIs that provide streaming traffic incident (or event) data.
- This dataset consists of 45 columns



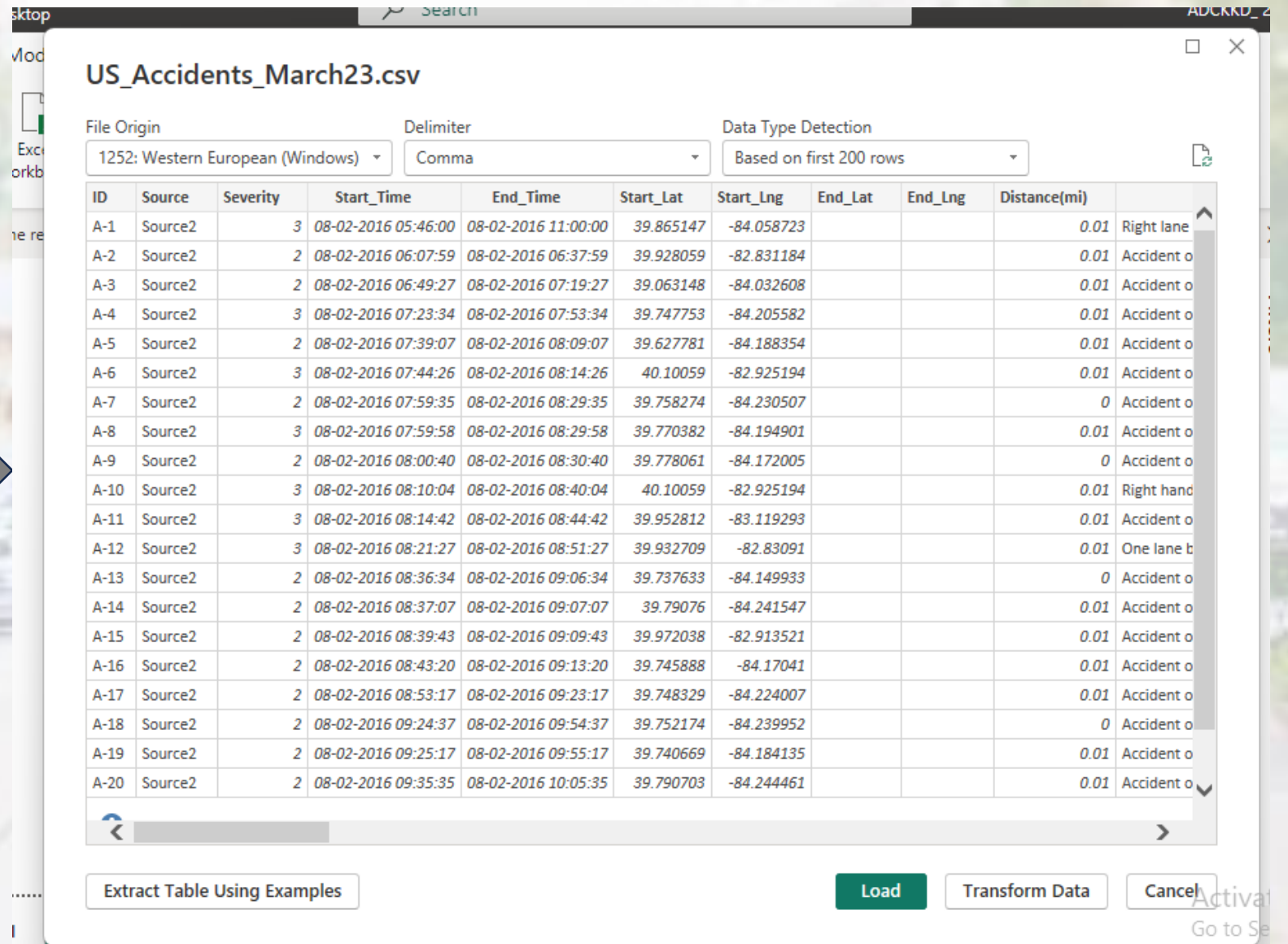
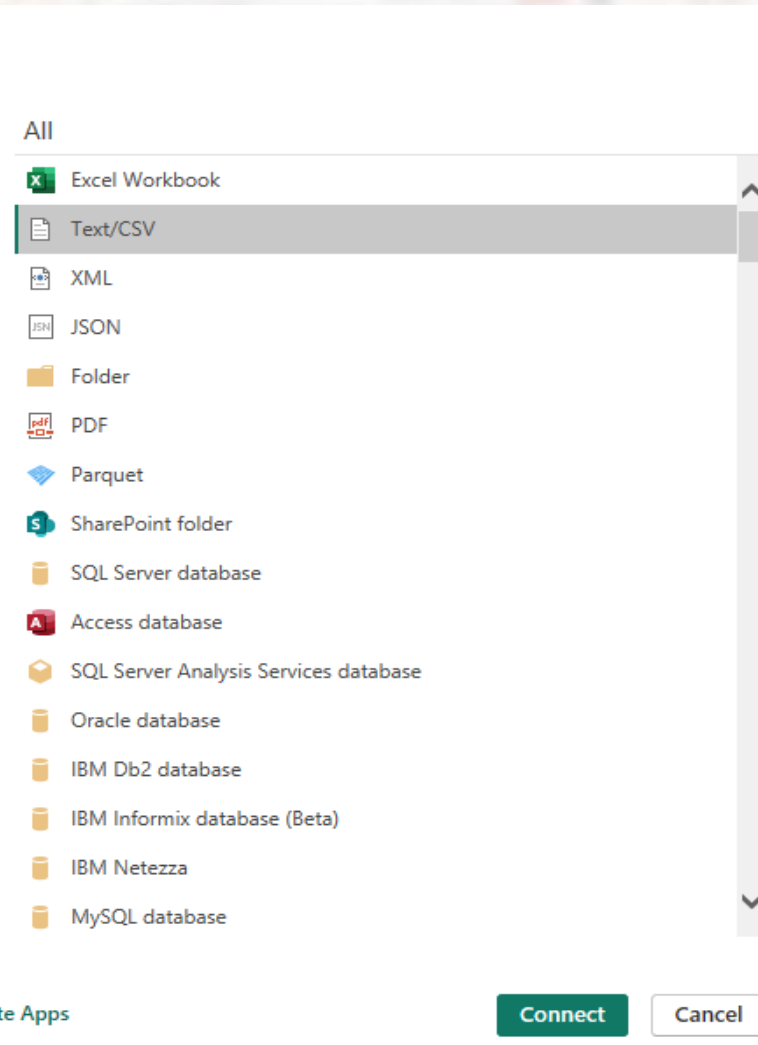
# Objectives

- Identify 5 states have the highest number of accidents?
- Clean and organize the data to ensure consistency and integrity of information.
- Conduct exploratory data analysis to identify patterns, trends, and potential anomalies.
- To determine the time of day with the most frequent accidents
- Identify the days of the week with the most accidents
- Identify the month have the most accidents?
- Analyze the year-over-year trend in accidents

# Overview

- Data Loading
- Data Transformation
- Time Series Analysis
- Trend Analysis
- Dashboard
- Summary and Key Insights
- Reference and Acknowledgements

# Data Loading





# Data Transformation

- Filtered Rows
- Removed unnecessary Columns
- Changed Data type of some of the columns
- Removed Blank Rows

The screenshot displays the Power Query Editor interface. The main area shows a table with columns: Severity, Start\_Time, End\_Time, End\_Lat, End\_Lng, and Distance(mi). The table contains 23 rows of accident data from March 2016. The right-hand pane shows the 'Query Settings' for 'US\_Accidents\_March23'. Under the 'APPLIED STEPS' section, the following steps are listed: Source, Promoted Headers, Changed Type, Removed Columns, Filtered Rows, Removed Columns1, and Removed Blank Rows. The 'Removed Blank Rows' step is currently selected and highlighted.

Series [1]

US\_Accidents\_March23

Severity Start\_Time End\_Time End\_Lat End\_Lng Distance(mi)

1 3 08-02-2016 00:37:08 08-02-2016 06:37:08 40.11206 -83.03187

2 2 08-02-2016 05:56:20 08-02-2016 11:56:20 39.86501 -84.04873

3 2 08-02-2016 06:15:39 08-02-2016 12:15:39 39.10209 -84.52396

4 2 08-02-2016 06:15:39 08-02-2016 12:15:39 39.09841 -84.52241

5 2 08-02-2016 06:51:45 08-02-2016 12:51:45 41.06217 -81.53546999999998

6 3 08-02-2016 07:53:43 08-02-2016 13:53:43 39.170476 -84.501798

7 2 08-02-2016 08:16:57 08-02-2016 14:16:57 39.06731 -84.05851

8 2 08-02-2016 08:16:57 08-02-2016 14:16:57 39.06302 -84.03254

9 2 08-02-2016 08:15:41 08-02-2016 14:15:41 39.77275 -84.18805

10 2 08-02-2016 11:51:46 08-02-2016 17:51:46 41.36786 -81.82174

11 2 08-02-2016 14:19:57 08-02-2016 20:19:57 40.69911 -84.084293

12 2 08-02-2016 15:16:43 08-02-2016 21:16:43 41.1078 -82.984

13 2 08-02-2016 15:43:50 08-02-2016 21:43:50 39.19615 -84.47335

14 2 08-02-2016 16:50:57 08-02-2016 22:50:57 39.13977 -84.5343

15 2 08-02-2016 17:27:39 08-02-2016 23:27:39 41.47388 -81.70559

16 2 08-02-2016 17:30:18 08-02-2016 23:30:18 39.603013 -83.63731899999998

17 3 08-02-2016 18:11:11 09-02-2016 00:11:11 40.151747 -81.312682

18 3 08-02-2016 18:11:11 09-02-2016 00:11:11 40.151785 -81.312635

19 3 08-02-2016 19:47:42 09-02-2016 01:47:42 39.98529 -82.85667

20 2 08-02-2016 19:47:42 09-02-2016 01:47:42 39.9725 -82.84746

21 3 08-02-2016 20:13:22 09-02-2016 02:13:22 40.01228 -82.99218

22 4 08-02-2016 21:00:17 09-02-2016 03:00:17 41.666124 -83.566335

23 2 08-02-2016 21:10:10 09-02-2016 03:10:10 40.98987 -85.26986

Query Settings

PROPERTIES

Name

US\_Accidents\_March23

All Properties

APPLIED STEPS

Source

Promoted Headers

Changed Type

Removed Columns

Filtered Rows

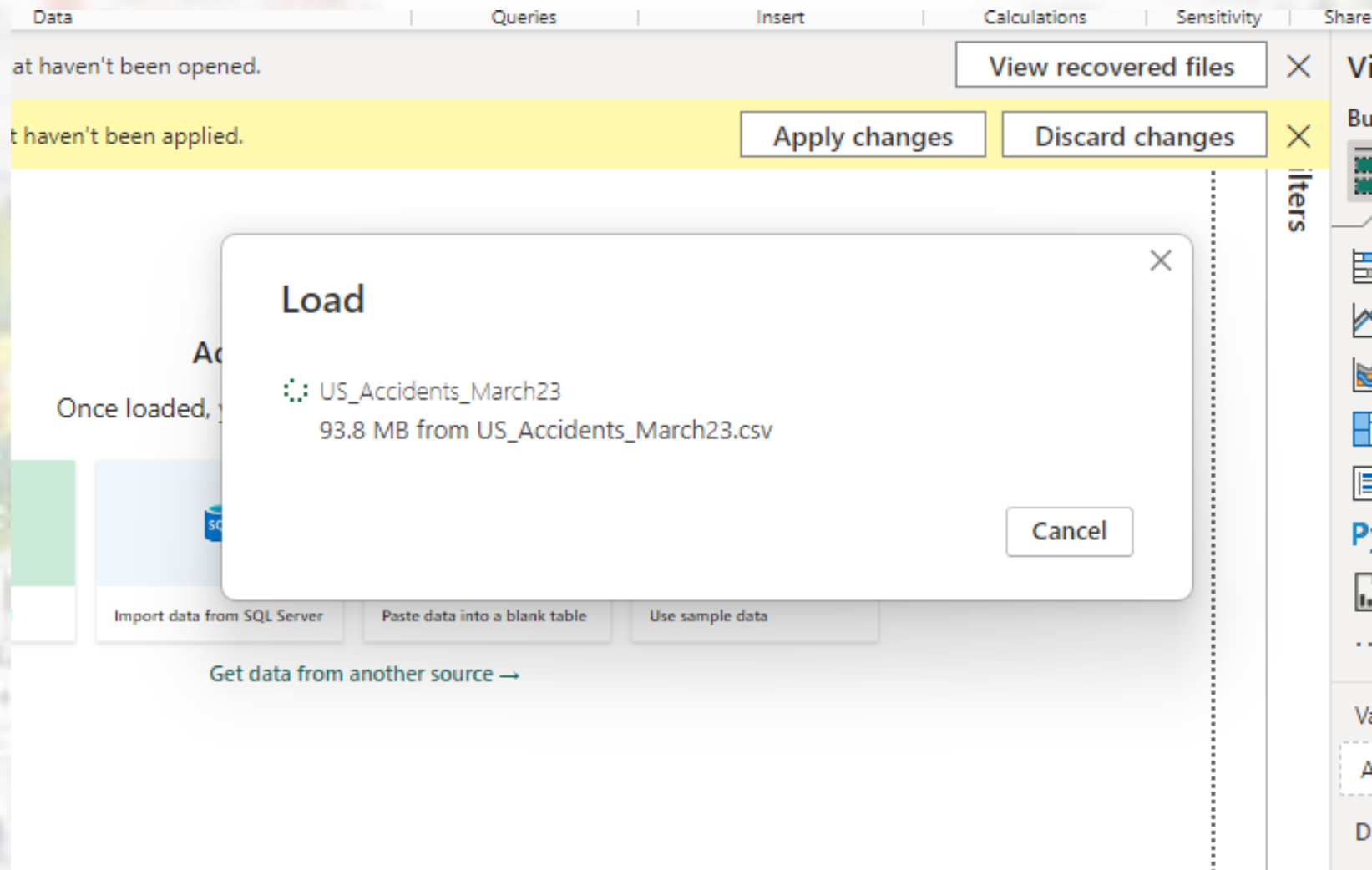
Removed Columns1

Removed Blank Rows

Activate Windows

Go to Settings to activate Windows.

- Loading transformed data





# Time Series Analysis

- Analyzed the number of accidents over time

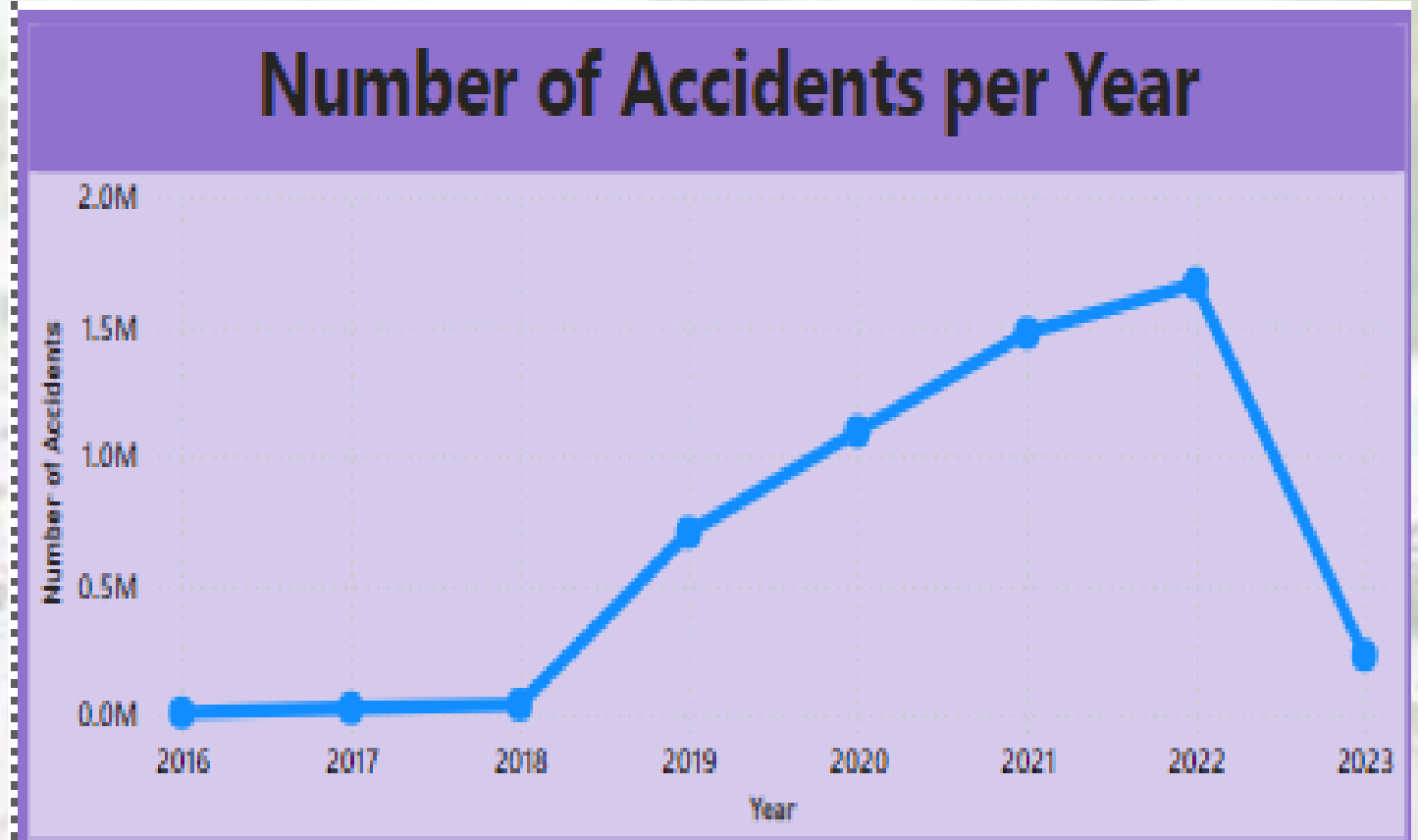
**Chart Type:** Line Chart

## **Conclusion:**

The year 2022 had the highest number of accidents

From 2018 to 2022 there has been an exponential increase in the number of accidents in USA

The occurrence of accidents decreases significantly in 2023, likely due to data availability only until March 2023.

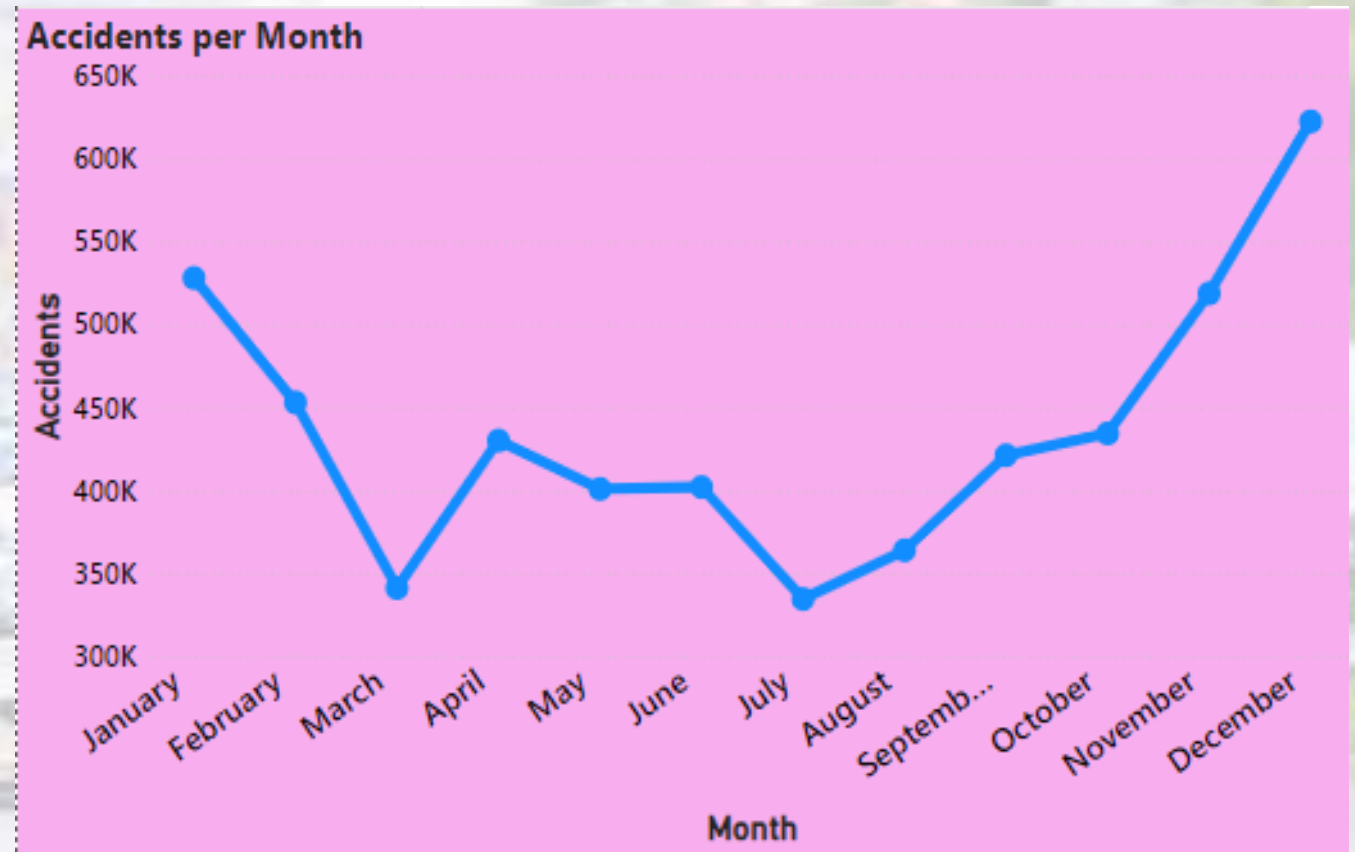


# Analyzed the number of accidents monthly

**Chart Type:** Line Chart

**Conclusion:**

From the graph, most accidents occurred in the month of December with 62K total accidents followed by January with 52.8 K accidents. This may have been caused by the festive season

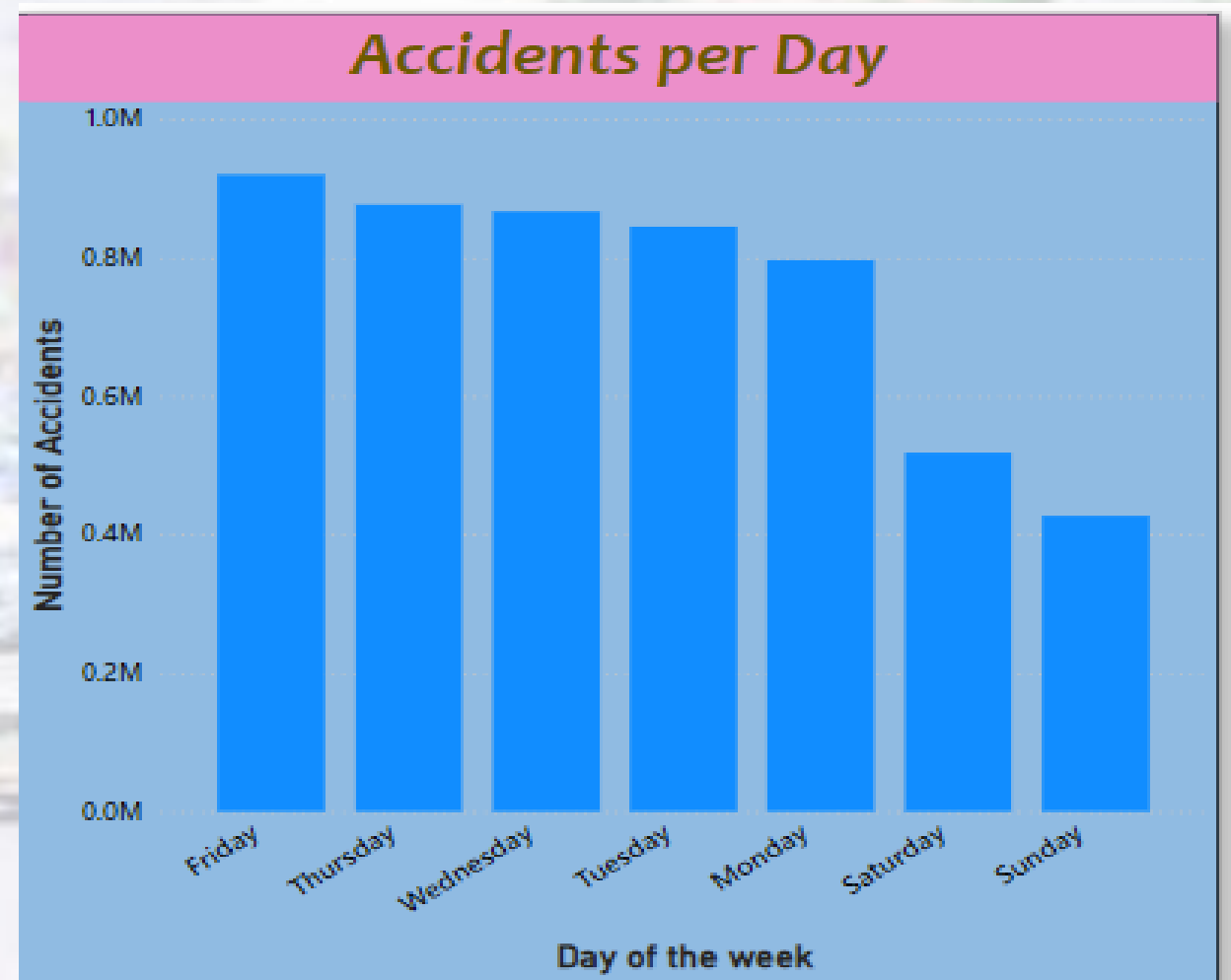


Analyzed the number of accidents daily

**Chart Type:** Column Chart

**Conclusion:**

From the graph, 91.9K accidents occurred on Friday followed by Thursday with 87.6K accidents



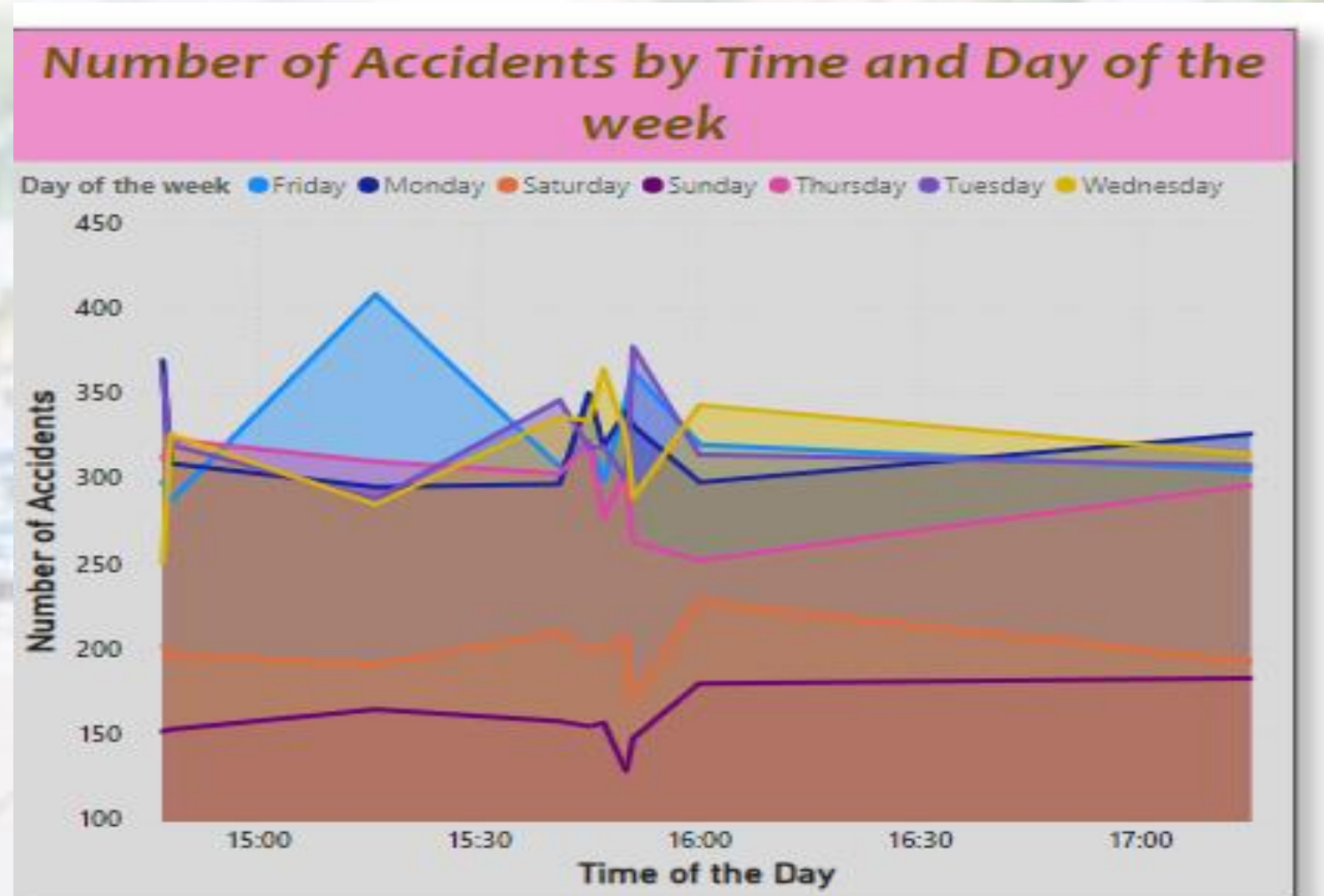


# Time of day with the most frequent accidents

**Chart Type:** Area Chart

**Conclusion:**

From the graph, the time of the day with the most frequent accidents is between 15:15 and 16:00

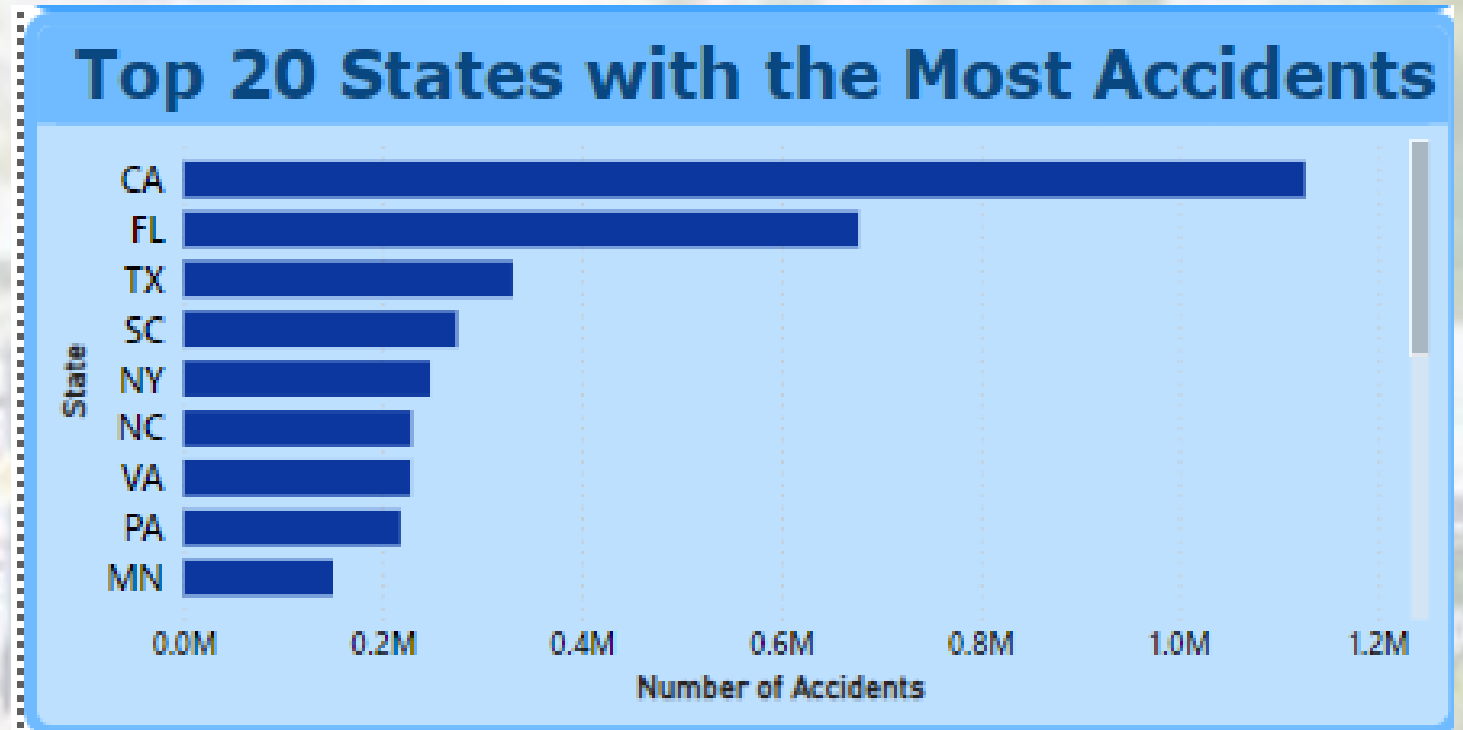


# Trend Analysis

**Chart Type:** Bar Chart

## Conclusion:

The top 3 states with most accidents are CA with 1.12M accidents followed by Florida with 67.7K accidents and Texas with 33K accidents

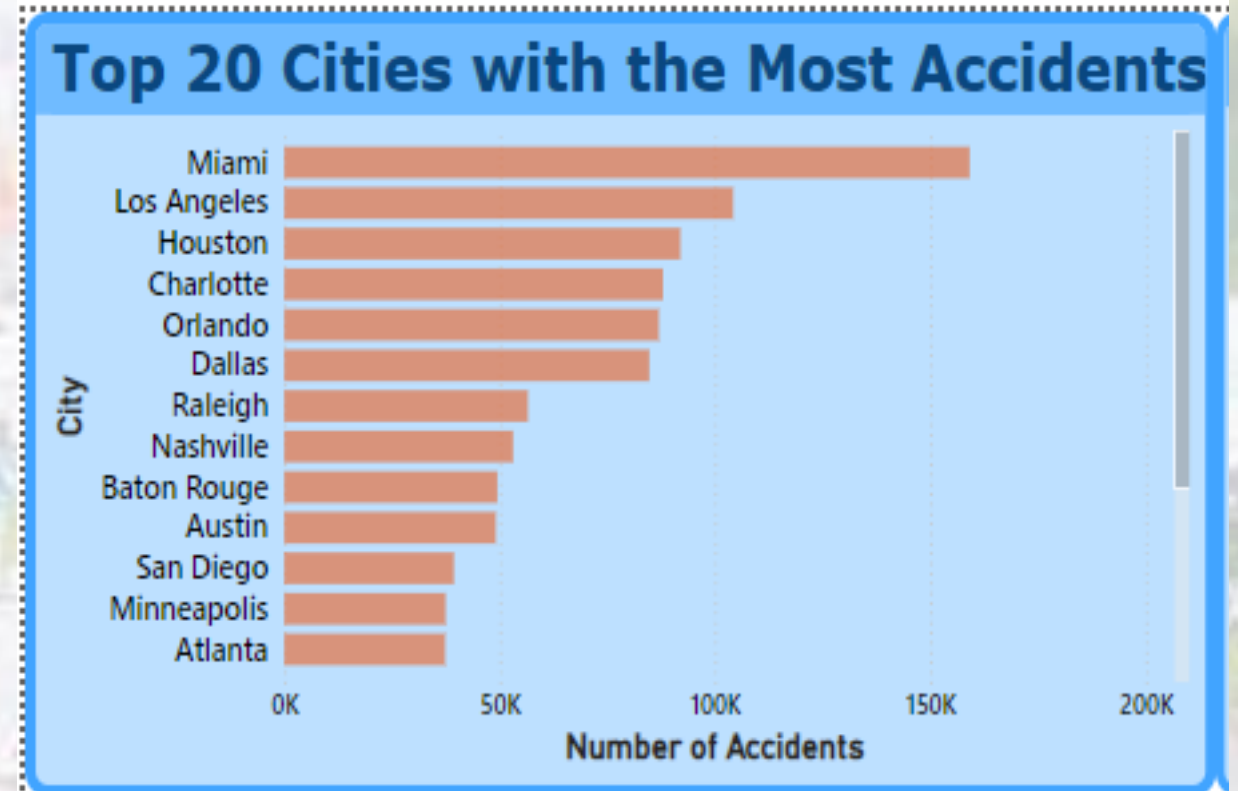


# Cities with the most Accidents

**Chart Type:** Bar Chart

## **Conclusion:**

The top 5 cities with most accidents are Miami with 159K accidents, Los Angeles with 104K accidents, Houston with 92K accidents, Charlotte with 88K accidents and Orlando with 87K accidents



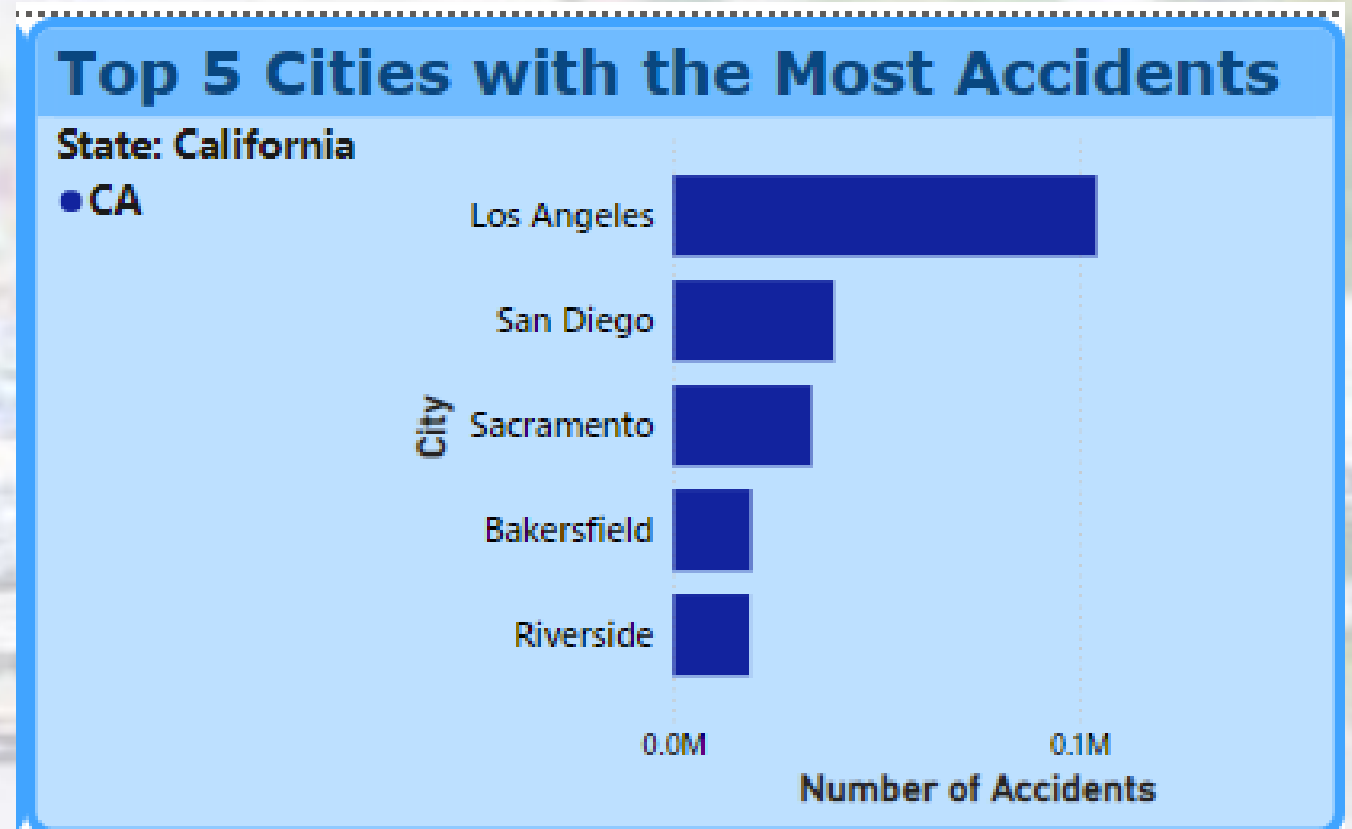


# Top 5 Cities with the most accidents in California

**Chart Type:** Bar Chart

## **Conclusion:**

From the graph, Los Angeles has the most accidents - 104K followed by San Diego with 39K accidents,

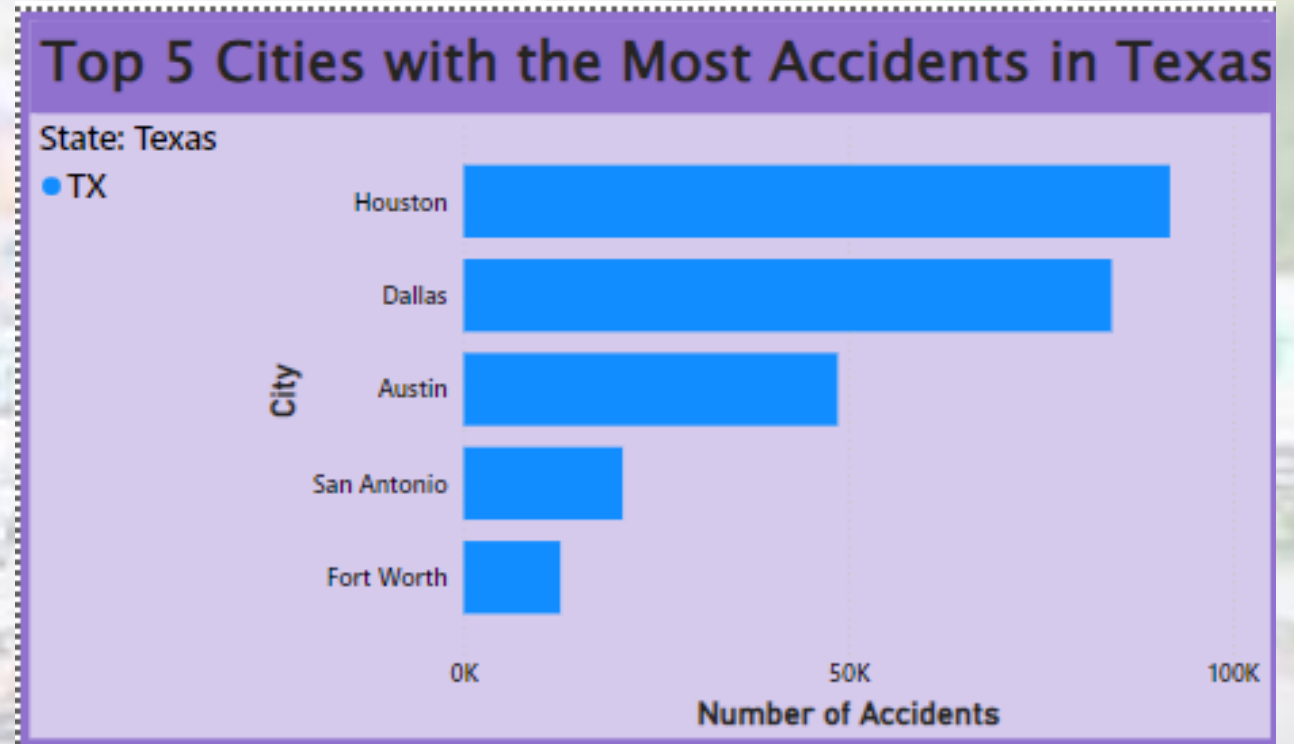


# Top 5 Cities with the most accidents in Texas

**Chart Type:** Bar Chart

## **Conclusion:**

From the graph, Houston has the most accidents - 92K followed by Dallas with 84K accidents,

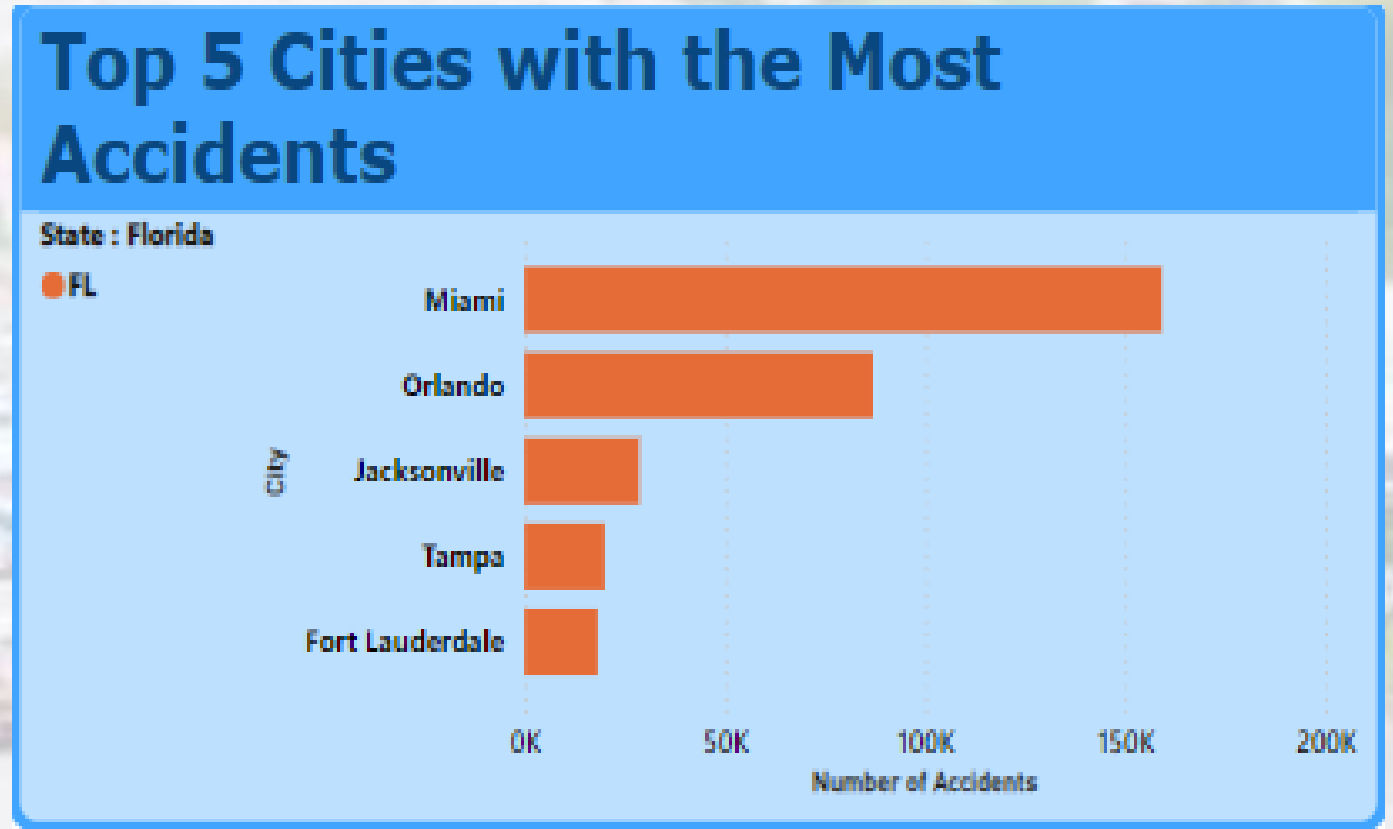


# Top 5 Cities with the most accidents in Florida

**Chart Type:** Bar Chart

## **Conclusion:**

From the graph, Miami has the most accidents - 159K followed by Orlando with 87K accidents,



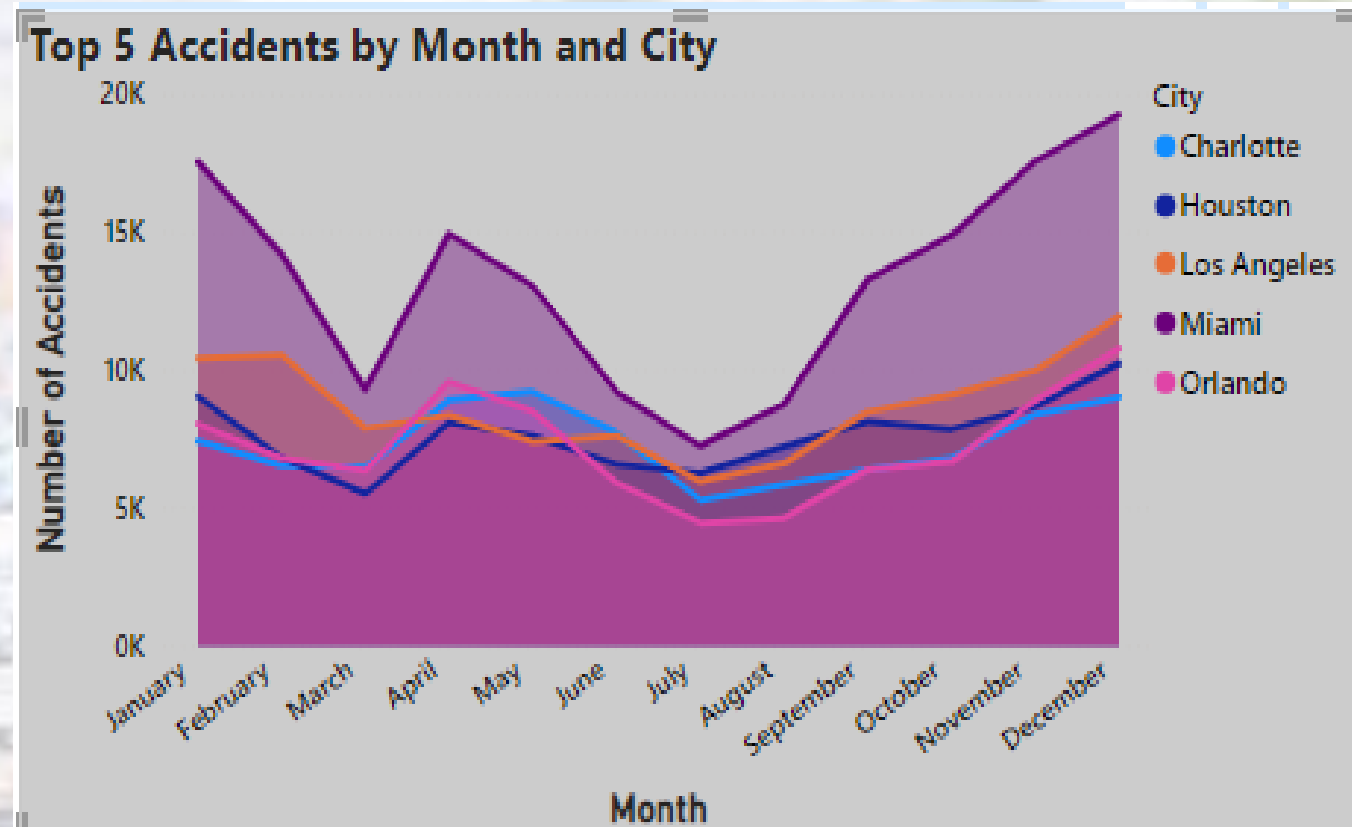


# Top 5 Accidents by Month and City

**Chart Type:** Area Chart

**Conclusion:**

From the graph, most accidents occurred in December. Miami has 19.2K accidents, followed by Los Angeles with 11.9K accidents

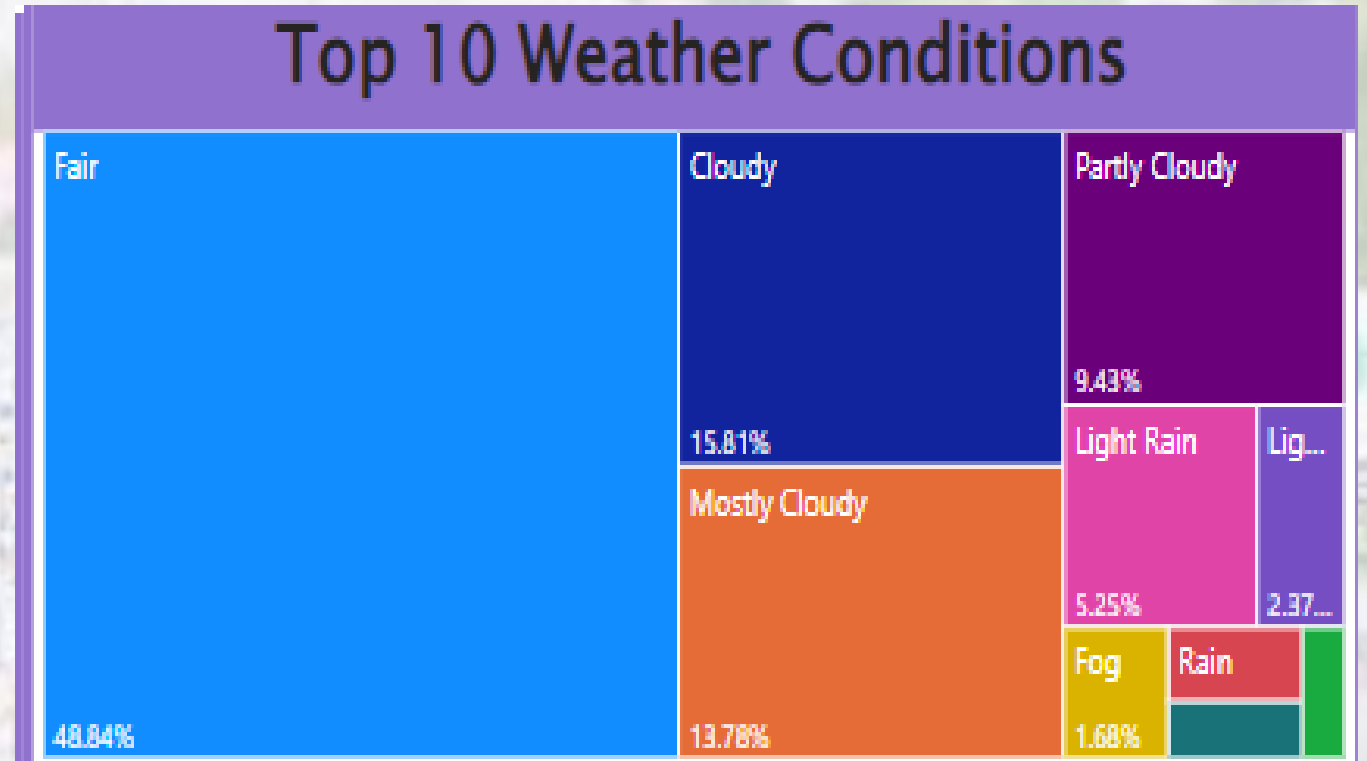


# Distribution of Weather Conditions

**Chart Type:** Tree Map

**Conclusion:**

Most accidents occurred in fair conditions – 48.84%, Cloudy conditions – 15.1% and Mostly Cloudy conditions – 13.78%

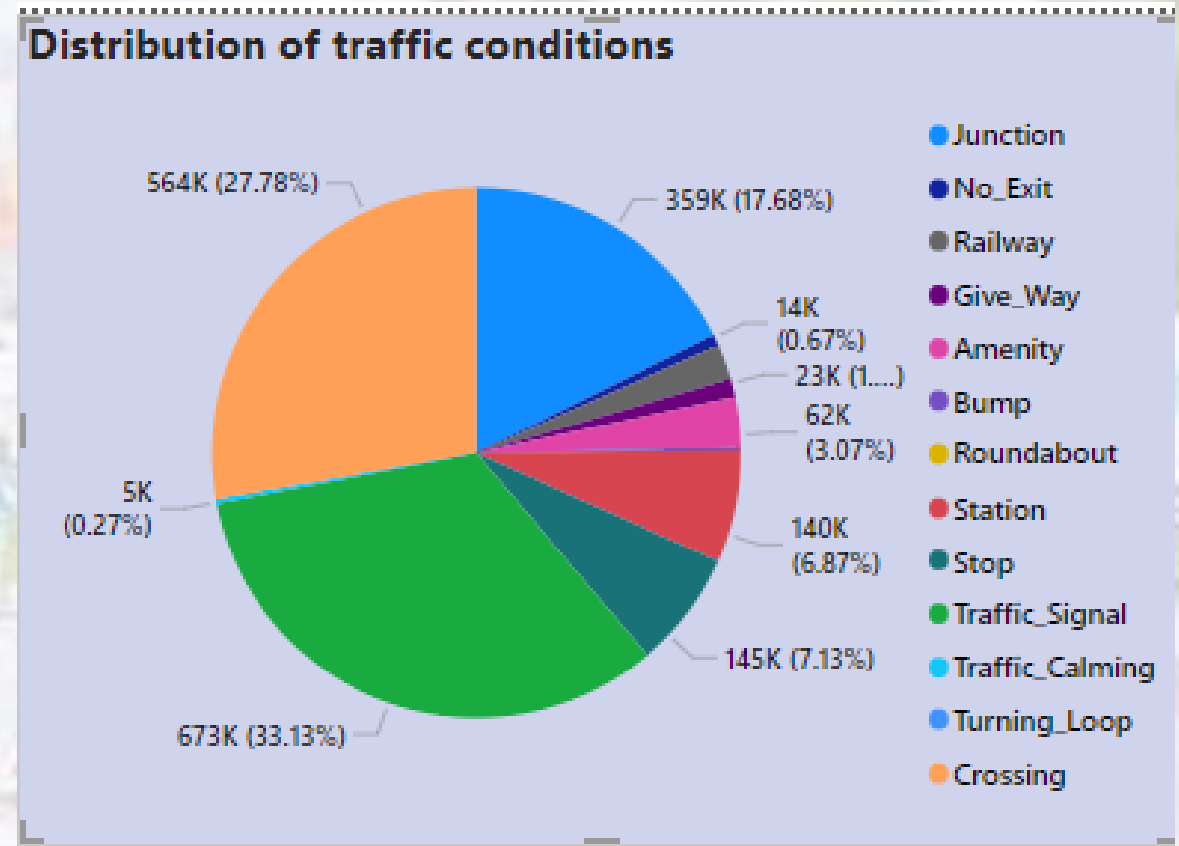


# Distribution of Traffic Conditions

**Chart Type:** Pie Chart

**Conclusion:**

The majority of accidents involve traffic signals, crossings, or junctions.



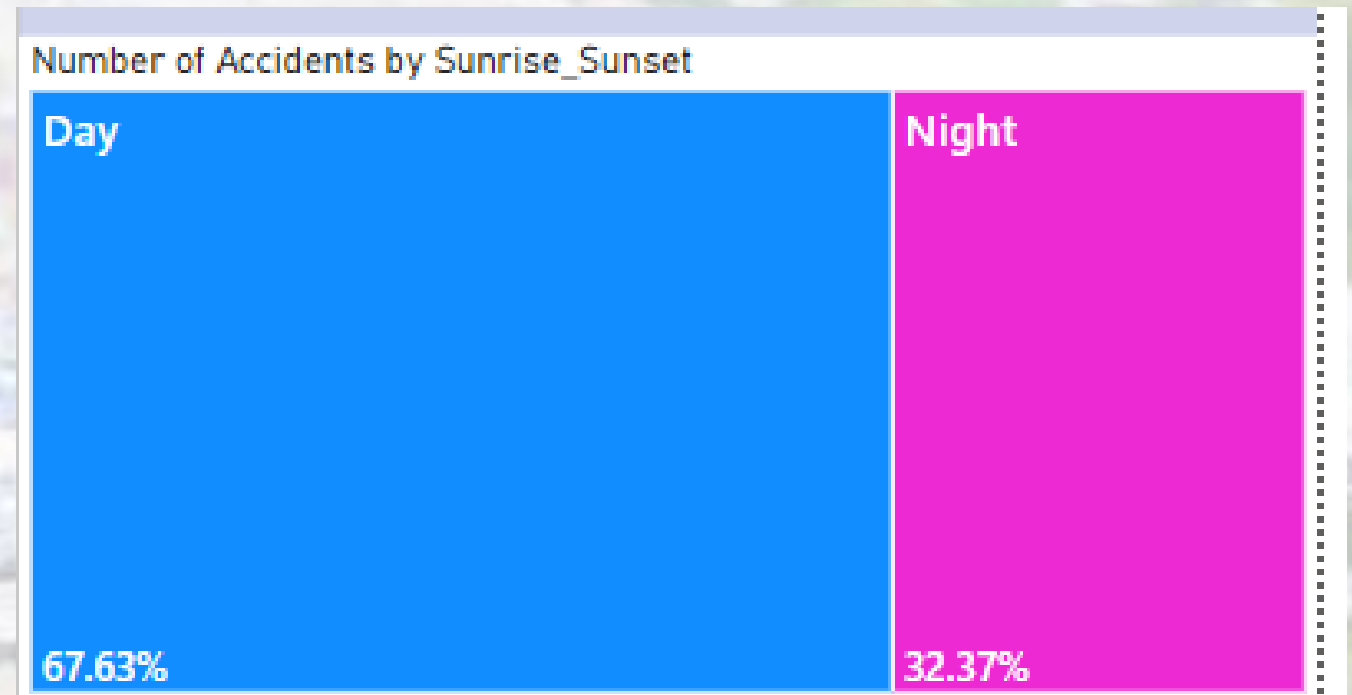


# Accident occurrence by Time of the day

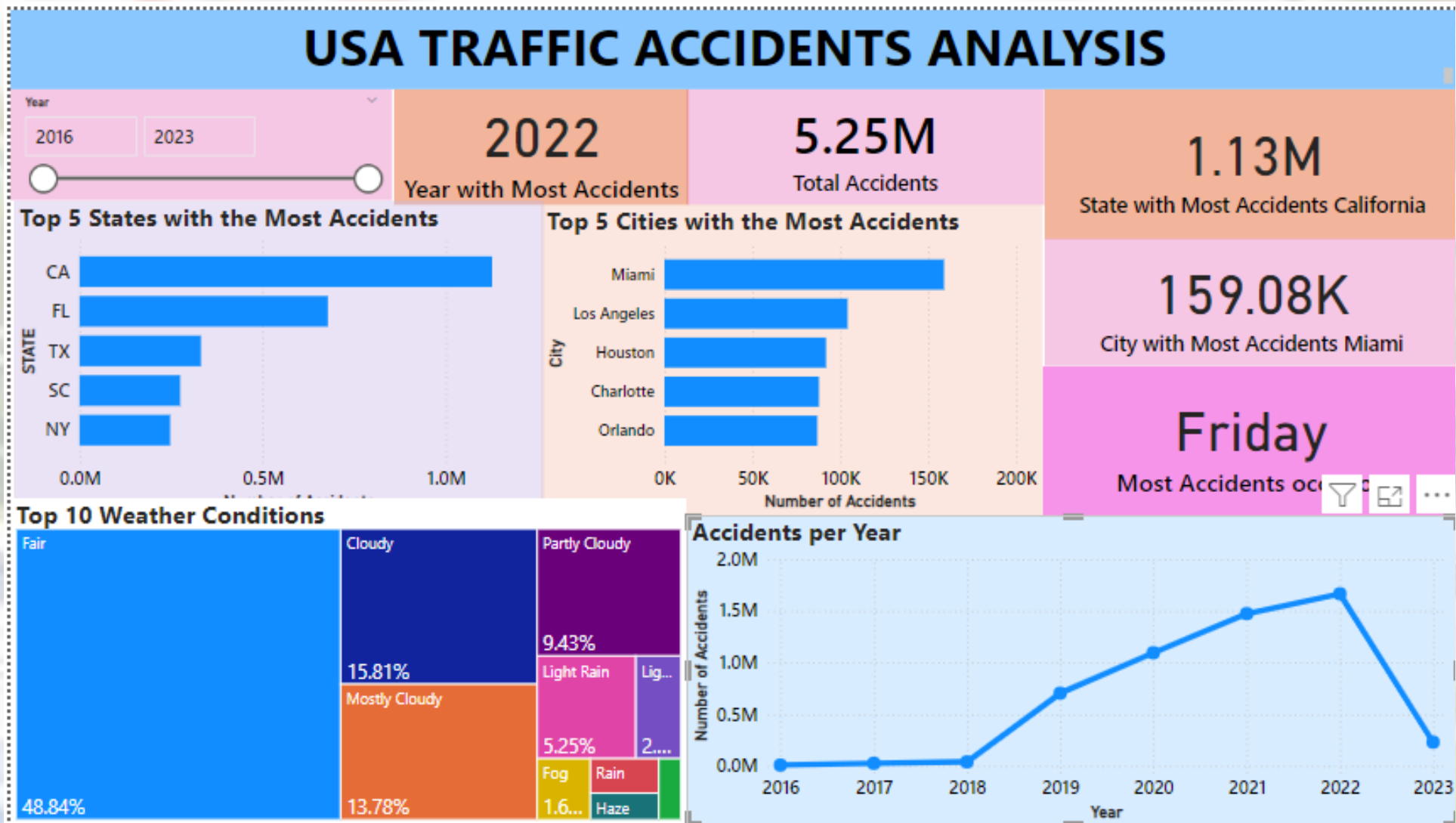
**Chart Type:** Tree Map

**Conclusion:**

From the graph, we can observe that a significant number of accidents occur during the day



# Dashboard



# Summary and Key Insights

1. The states with the highest number of accidents in the dataset are California, Florida and Texas. In California, the city with the most accidents is Los Angeles, in Texas, the city with the most accidents is Houston. In Florida, the city with the most accidents is Miami..
2. The five cities with the highest number of accidents in the dataset are Miami, Houston, Los Angeles, Charlotte, and Dallas.
3. The occurrence of accidents decreases significantly in 2023, likely due to data availability only until March 2023
4. A significant number of accidents occur during the day
5. The majority of accidents involve traffic signals, crossings, or junctions.
6. Majority of accidents occur under fair weather conditions



# REFERENCE AND ACKNOWLEDGEMENTS

## •References:

US Accidents dataset(February 2016 to March 2023)

## •Acknowledgements:

Many thanks to mentors, colleagues, and data providers.