

# U.S. ACCIDENT ANALYSIS

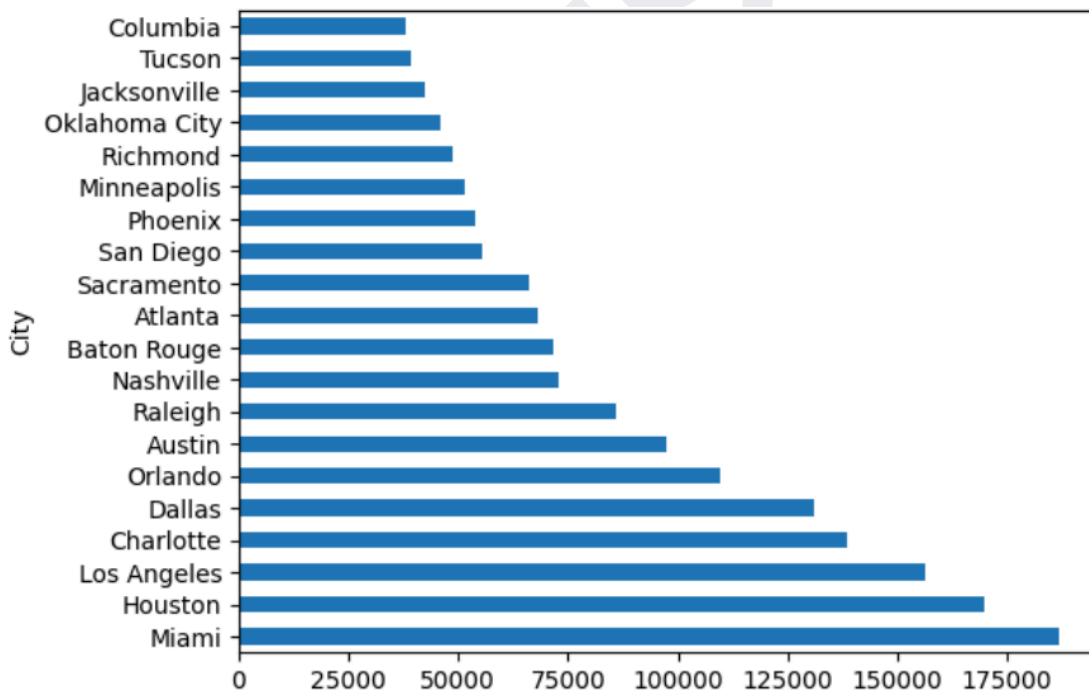
## Problem Statement

Investigate the patterns and trends in accident occurrences across the United States from 2016 to 2023 to address the problem of increasing accident rates and their causes. Focus on city-specific accident rates, seasonal and time-of-day variations, and the impact of weather conditions. The goal is to identify key factors contributing to high accident frequencies and trends, including geographic and temporal patterns, to inform safety measures and traffic management strategies. The planning process will involve data collection, analysis, and the development of actionable insights to enhance road safety.

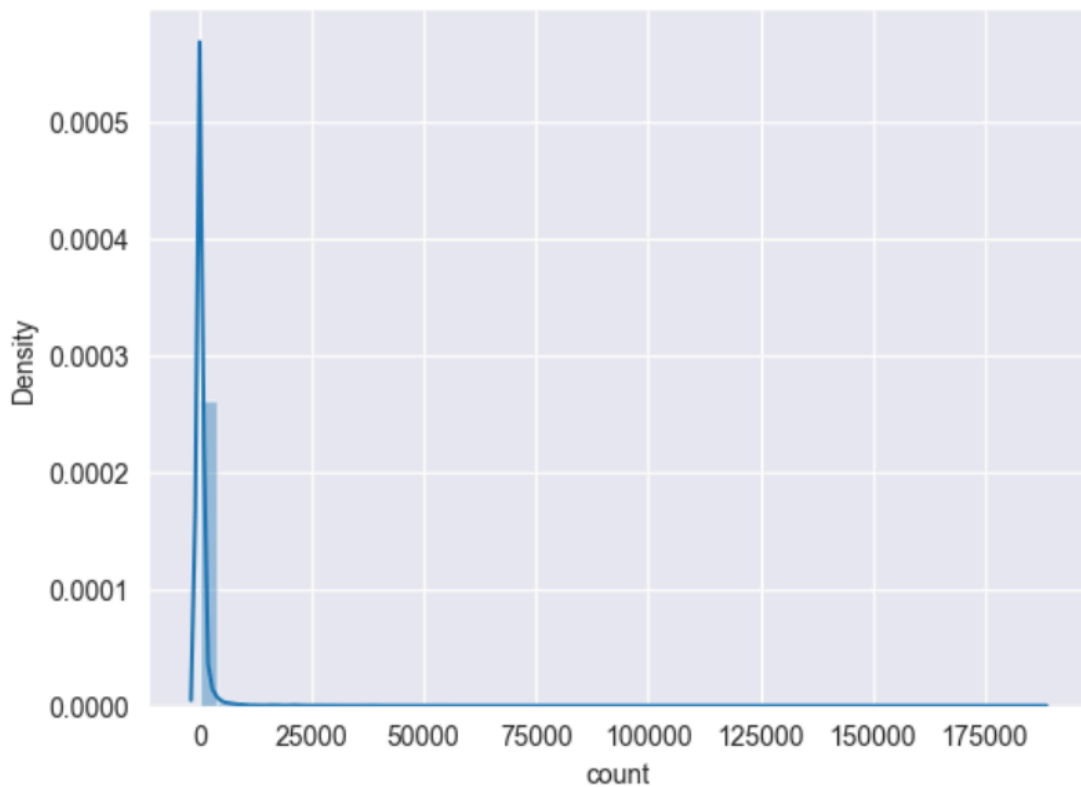
## General Information

- The US is the 4th largest country in the world.
- The United States consists of 50 states.
- The United States consists of 19,495 cities.
- 14,768 of these have populations below 5,000.
- Top 5 populated states are
  - New York - 8,258,035
  - Los Angeles - 3,820,914
  - Chicago - 2,664,452
  - Houston - 2,314,157
  - Phoenix - 1,650,070

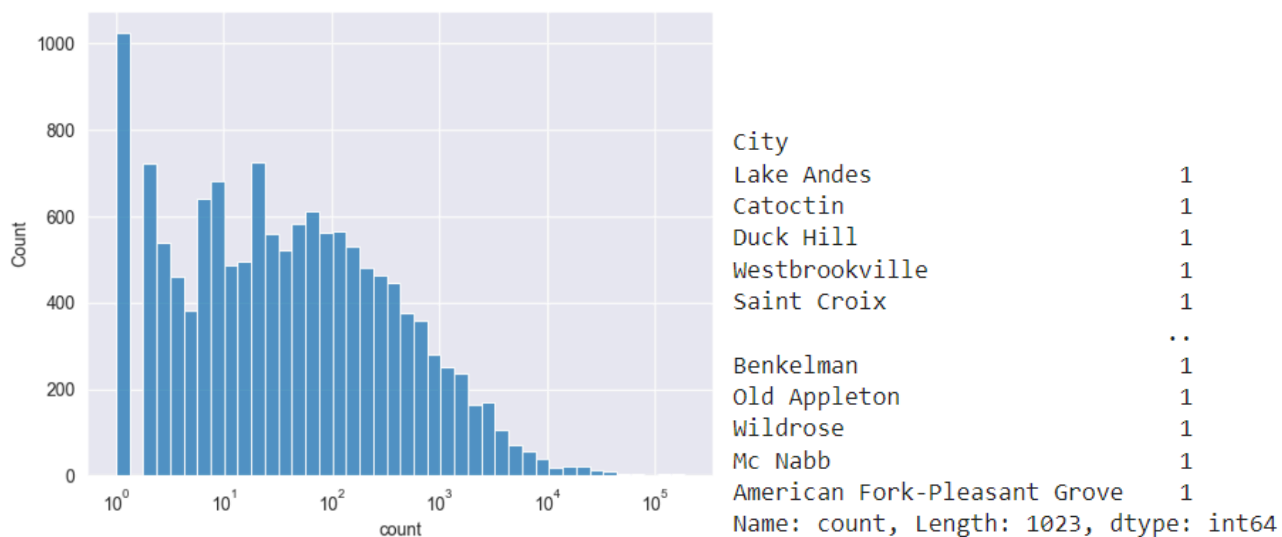
## Report



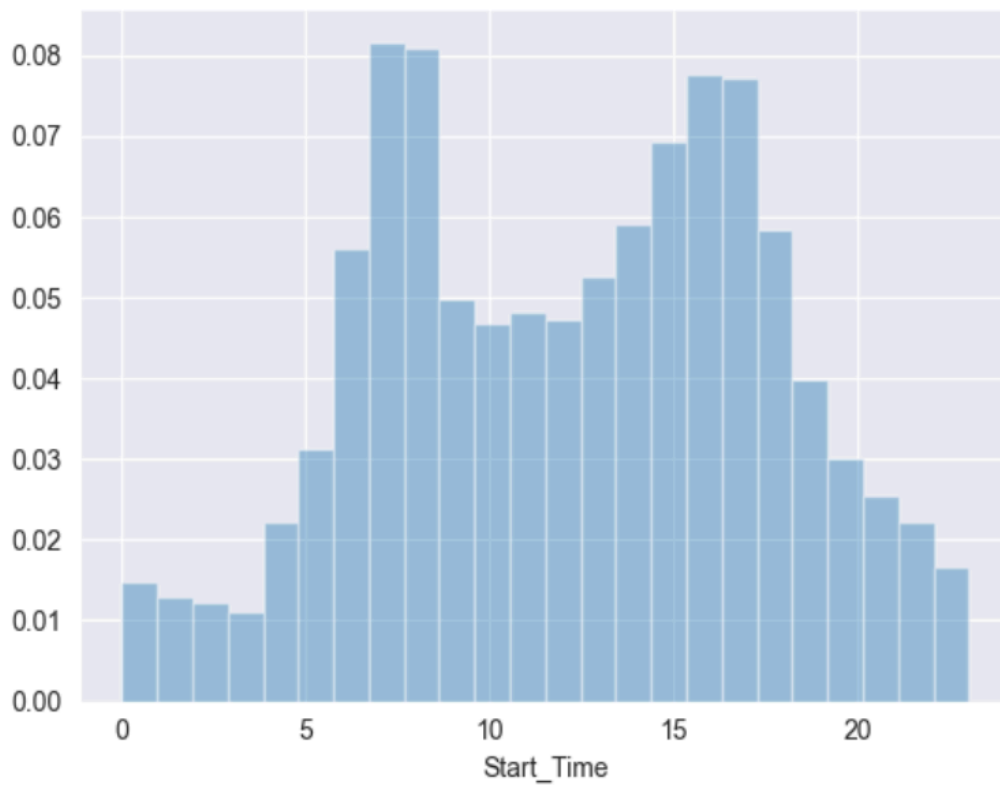
From the above graph we can see that Miami has the highest number of accidents in the US. This dataset doesn't contain 'New York City' data, even if this is the most populated city of the US.



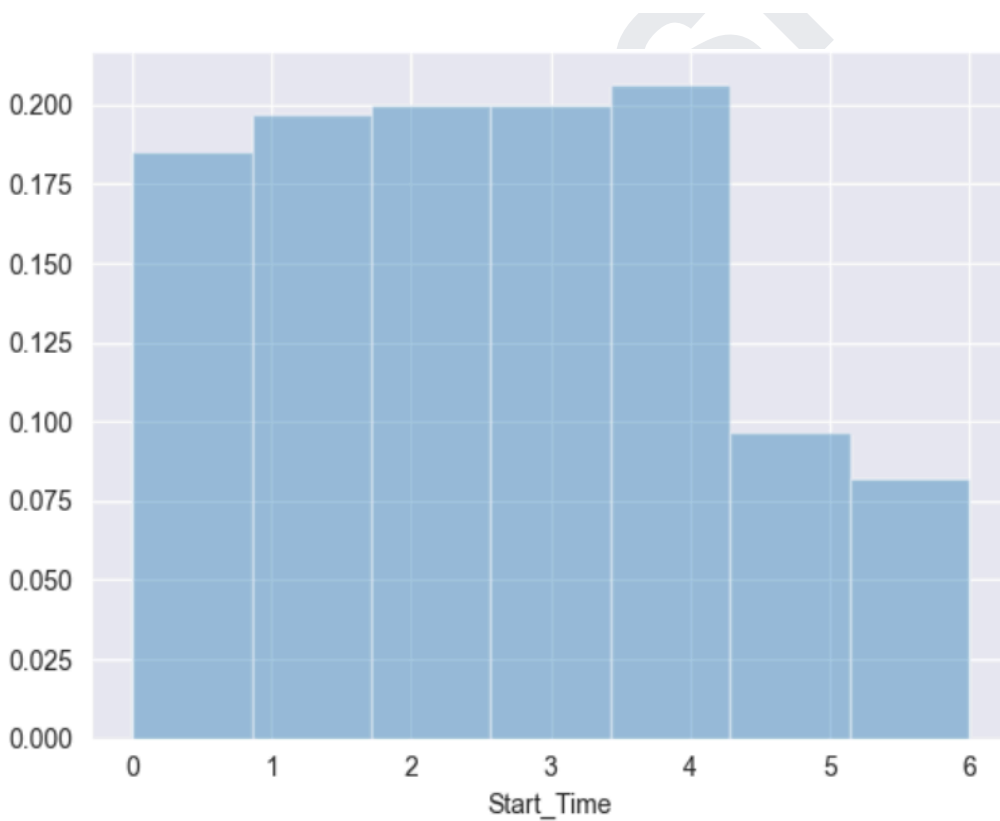
From the above graph we can see that most of the cities in the US have very less number of accidents.



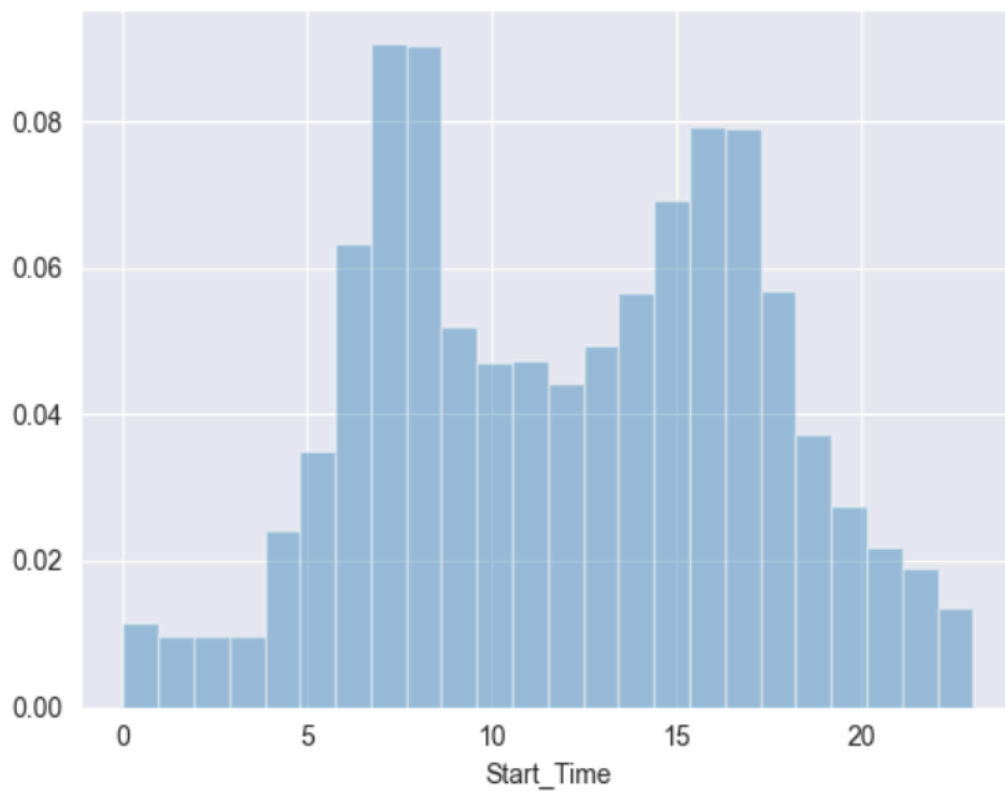
From the above graph and observation we can see that most of the cities in the US have less than 1000 cases of accidents but among them more than 1000 cities have reported just one accident.



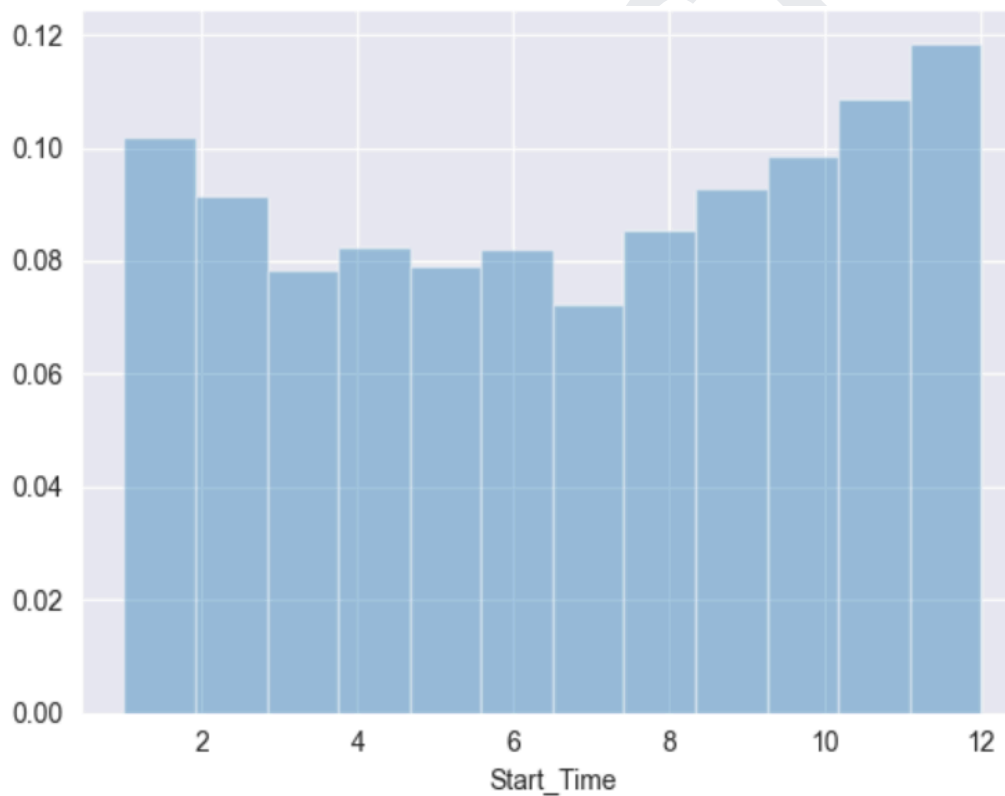
From the above graph we can see that a higher percentage of accidents occurs between 6am to 10pm and 3pm to 6pm.



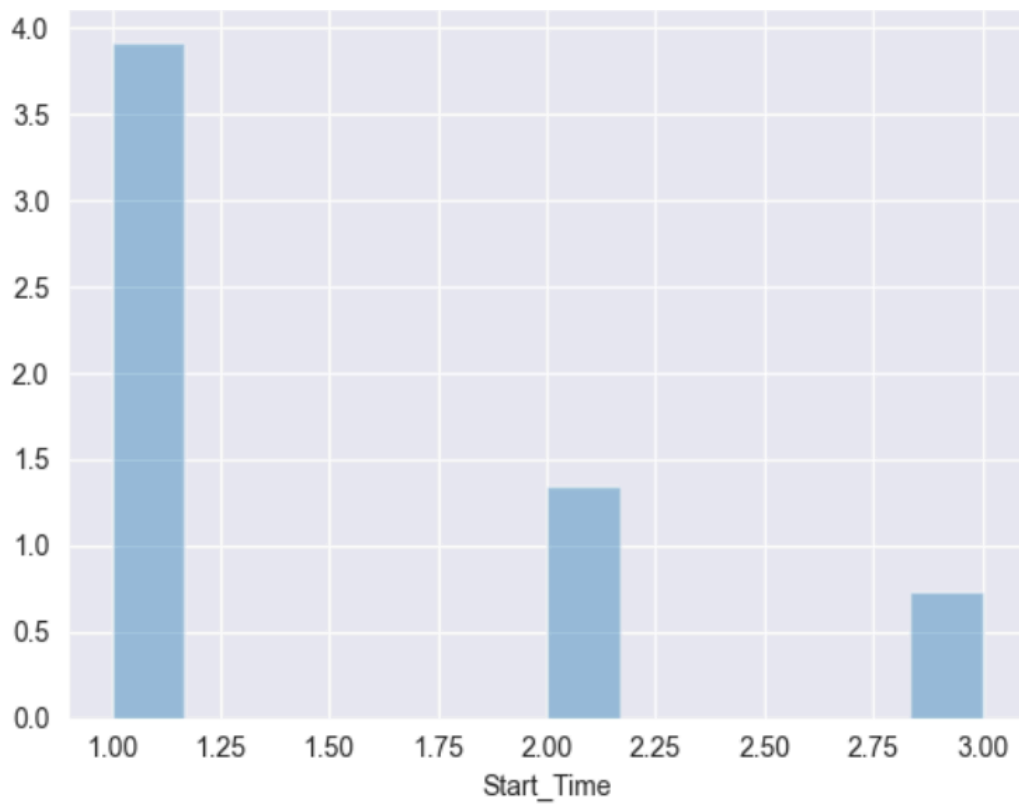
From the above graph we can see that most accidents occur on weekdays and less on weekends.



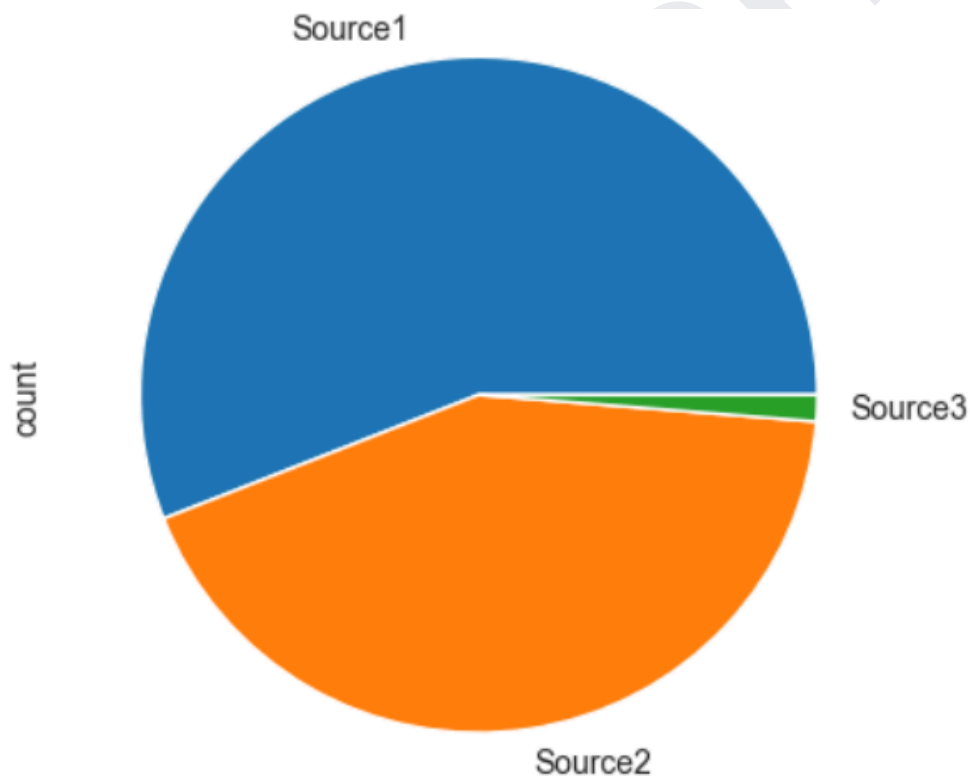
From the above graphs we can see that on Sundays the most accidents occur between 11am to 4pm, unlike weekdays.



From the above graph we can see that most of the accidents occur in December.



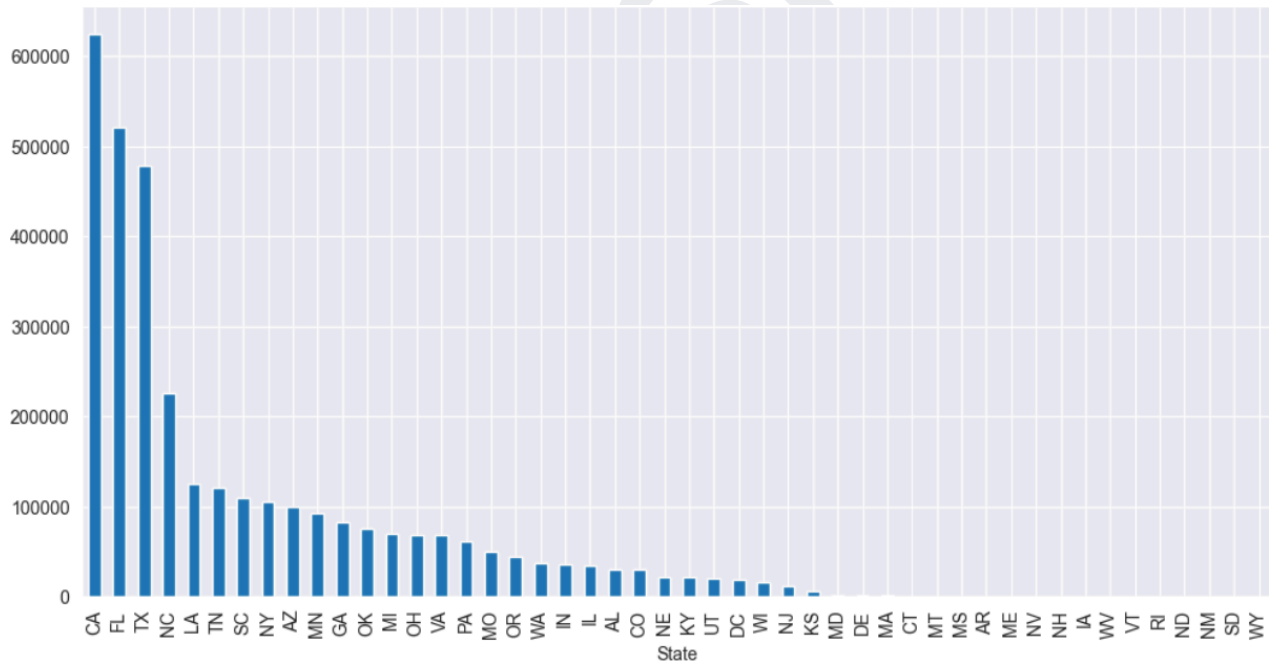
From the above graph we can see that data of the first 3 months are only available for 2023.



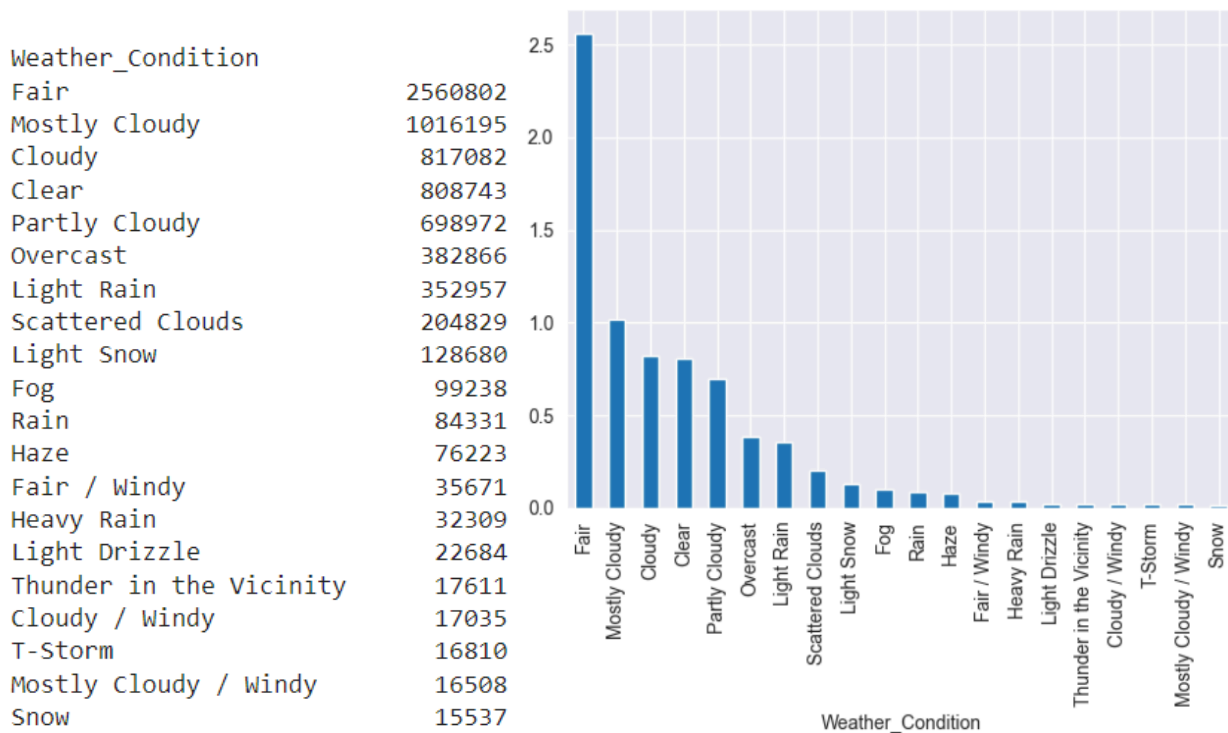
From the above graph we can see that most of the data are fetched from Source1 but the name of sources are Unclear.



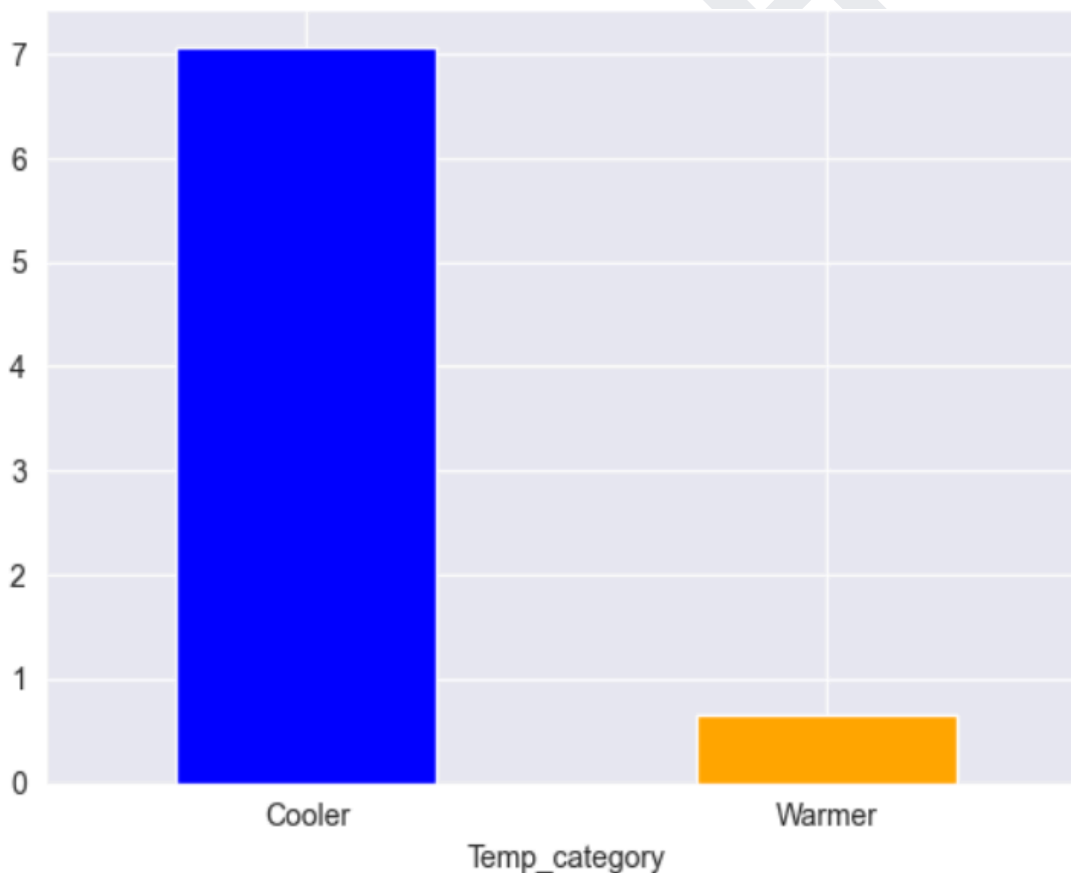
From the above graph we can see that most accidents occur on the East side of the US.



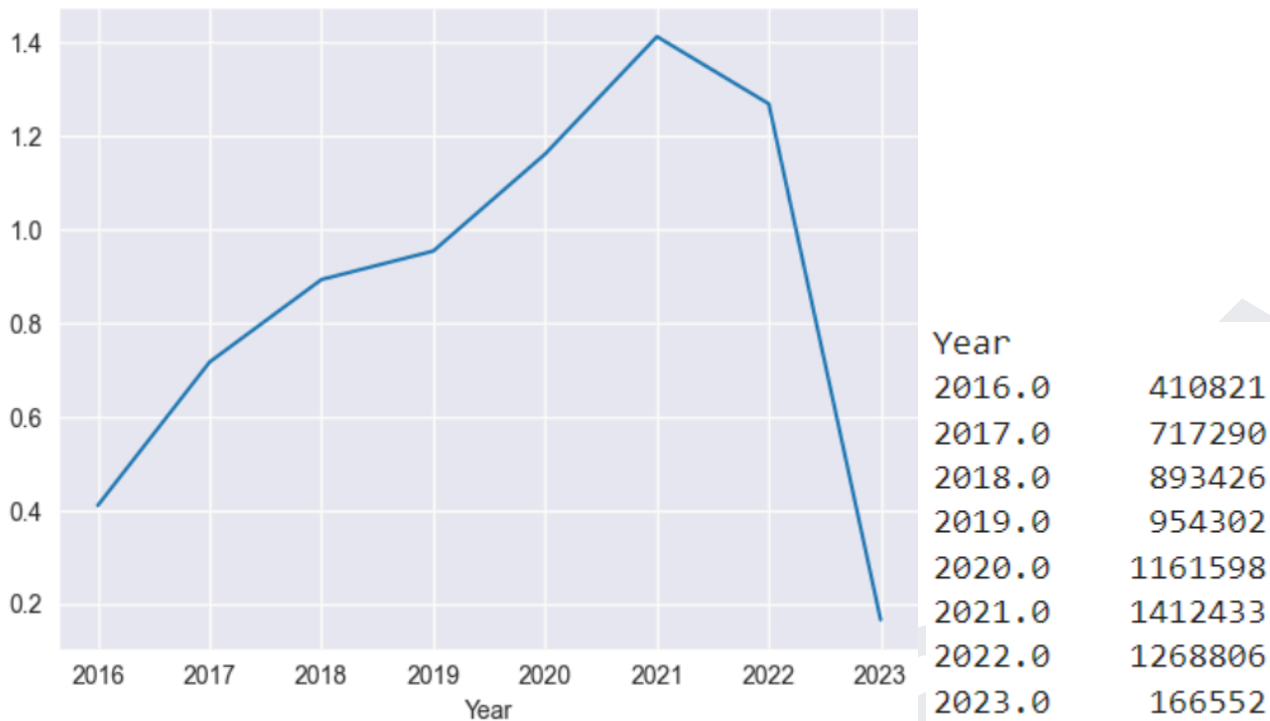
From the above graph we can see that most accidents occur in California, Florida and Texas.



From the above graph we can see that most accidents occur in Fair, Mostly Cloudy, Cloudy, Clear and Partly Cloudy Weather Conditions.



From the above graph we can see that most of the accidents occur in Cooler Areas or in Winter Season.



From the above graph we can see that the number of accidents are increasing year over year.

## Ask and Answer Questions

- Are there more accidents in warmer or colder areas?
  - Cooler Area.
- Which top 5 cities have the highest number of accidents?
  - Miami 186917, Houston 169609, Los Angeles 156491, Charlotte 138652, Dallas 130939
- Does New York show up in the data? If yes, why is the count lower if this is the most populated city?
  - Even though New York City is the most populated city in the US the data was unavailable.
- Among top 100 cities in number of accidents, which states do they belong to most?
  - California (CA).
- What time of the day are accidents most frequent?
  - 6am to 10pm and 3pm to 6pm.
- Which days of the week have the most accidents?
  - Weekdays (Most accidents occur on Fridays).
- Which months of the year have the most accidents?
  - Winter Months (Most accidents occurs in Decembers)
- What is the trend of accidents year over year? (Decreasing/Increasing)
  - Increasing.
- Is the distribution of accidents by hour the same on weekends as on weekdays?
  - No, on weekdays the peak occurs between 6am to 10am and 3pm to 6pm where on weekends the peak occurs between 11am to 4pm.



# **Summary and Conclusion**

## **Insights**

- No data for New York City.
- Miami has the highest number of accidents.
- Dataset contains data of 13679 unique cities.
- Less than 8% of cities have more than 1000 yearly accidents.
- Over more than 1000 cities have reported just one accident (need to investigate).
- Traffic information is unavailable.
- Highest percentage of accidents occurs between 6am and 10am.
- The higher number of accidents occurs on weekdays.
- The distribution of accidents by hours are not the same on weekdays and weekends.
- December experiences the peak in accident frequency.
- First 3 months data available for 2023.
- The source of the data is unclear or unknown.
- California leads in having most cities with the high frequency of accidents.
- While Miami records the highest number of accidents among individual cities, California has the highest number of cities with frequent accidents.
- The majority of accidents are concentrated in the Eastern United States.
- Accidents are most frequent in fair weather conditions.
- Even though the weather is fair, most accidents occur between 6 AM and 10 AM on weekdays, likely due to heavy traffic as people rush to get to work.
- Accidents are more frequent in cooler areas or during the winter season.
- The number of accidents has been increasing year over year.

## **Conclusion**

Miami has the highest number of accidents among individual cities, while California has the most cities with high accident frequencies. Most accidents occur between 6 AM and 10 AM on weekdays, especially in fair weather and cooler areas. Overall, accidents have been increasing year over year, with December showing the peak frequency.

## **Recommended Solution**

Implement Targeted Traffic Management :

Focus on high-accident areas, especially in cities like Miami and California. Enhance traffic control measures during peak hours (6 AM to 10 AM) and weekdays to manage congestion.

Conduct Safety

Campaigns and Outreach :

Launch targeted safety campaigns to educate drivers about the risks of accidents, particularly in high-accident areas, during peak times, and in cooler or winter conditions.

Upgrade Infrastructure :

Improve road infrastructure in high-accident cities and regions, including better signage, lighting, and road conditions. Prioritize upgrades in the Eastern United States and in areas with high accident frequencies.

Introduce Weather-Responsive Safety Measures :

Develop and enforce specific safety protocols for fair weather conditions, as well as for cooler and winter conditions. Adjust road maintenance and safety measures accordingly.

Investigate and Address Data Anomalies :

Examine the over 1,000 cities with only one reported accident to ensure data accuracy and completeness. Use findings to improve data collection and address any discrepancies or gaps.