Fatal Crashes in North Carolina for the Year 2021

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Introduction

1,659 persons were killed in car crashes in NC in 2021

When are the high-risk times that these fatal accidents occur?

- Hour of the day
- Day of the week
- Month of the year

Where are the accidents occurring?

- By County

Who would benefit?

- General public
- Traffic enforcement
- Civil planning
- Legislature
- Hospitals
- Insurance companies

The Data

Sources and Interpretation

Data Sources

- NHTSA – The National Highway Transportation Safety Administration
- FARS – Fatality Analysis Reporting System
  - FARS is a nationwide census providing NHTSA, Congress and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.
- Data goes as far back as 1975 and files are organized by year

Data Cleaning

- - Retrieved FARS data from nhtsa.gov
- - Removed extra columns from file
- - Narrowed search to just North Carolina
- - Dropped rows that contained an hour range as “Unknown Hours”
- - Create CSV file of fatalities for North Carolina only

```
filtered_df = ncstate_df[ncstate_df['Hour_Range'] == "Unknown Hours"]

# Display the first 15 rows of the filtered DataFrame
filtered_df.head(5)
```

County	Monthid	Month	Day	Day_of_Month	Day_of_Week	Weekday	Year	Hour	Hour_Range	Minute	Minute_Digit	Latitude	L
AY (43)	2	February	26	26	6	Friday	2021	99	Unknown Hours	99	Unknown Minutes	35.035628	
_FORD (81)	4	April	6	6	3	Tuesday	2021	99	Unknown Hours	99	Unknown Minutes	35.948942	
/ILKES (193)	6	June	5	5	7	Saturday	2021	99	Unknown Hours	99	Unknown Minutes	36.149217	

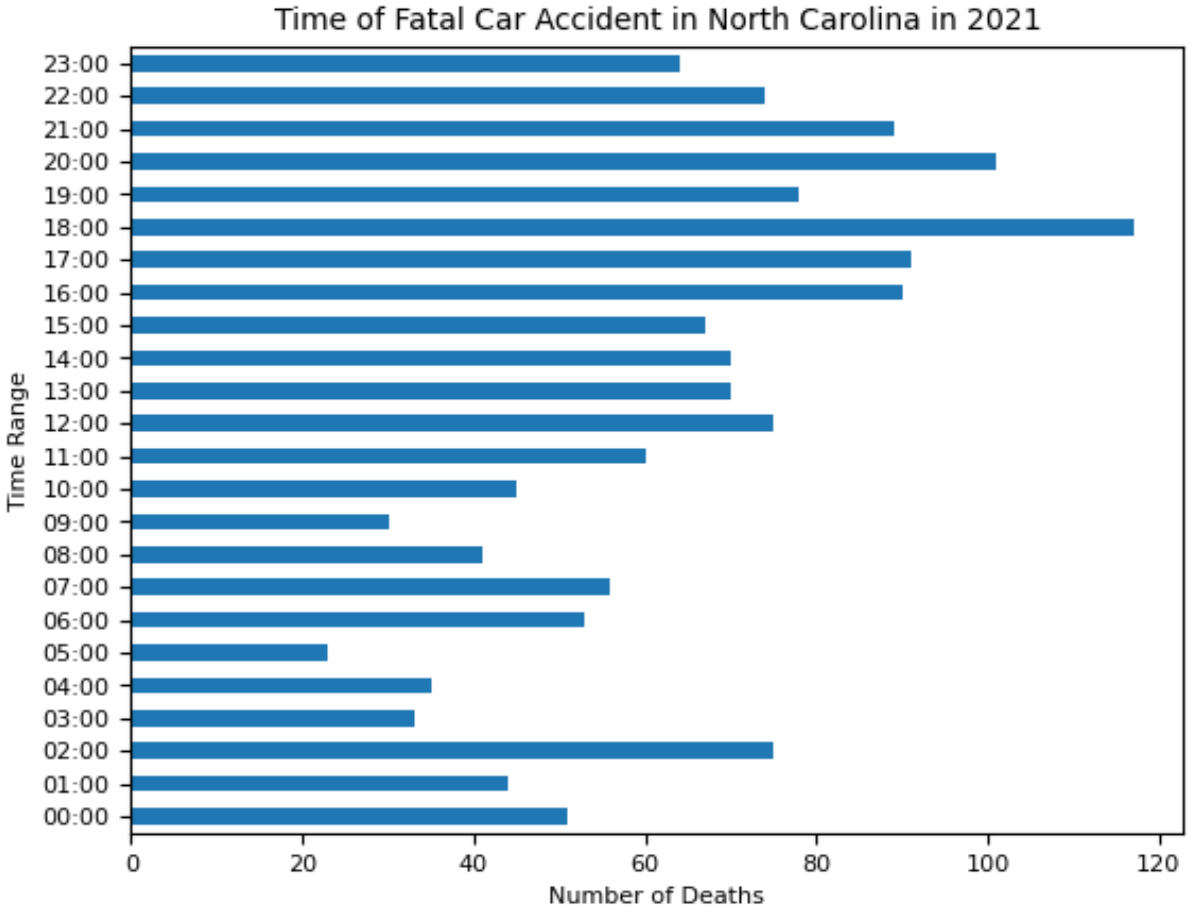
SQL Database

- Created table and imported the data into SQL
- Wrote SQL scripts used to generate graphs for the dashboard (Slemma)
- Built interactive reports using the SQL scripts generated

Data Analysis

Visualizations

Time



Method:

- Imported Matplotlib.pyplot
- Split ‘Hour Range’ Column to show the first hour, then formatted to military time
- Created new data frame with groupby and count

Results:

- The most fatal accidents occur at 6:00PM (117) with 8:00PM (101) coming in second
- The least amount of fatal accidents is at 5:00AM (23)

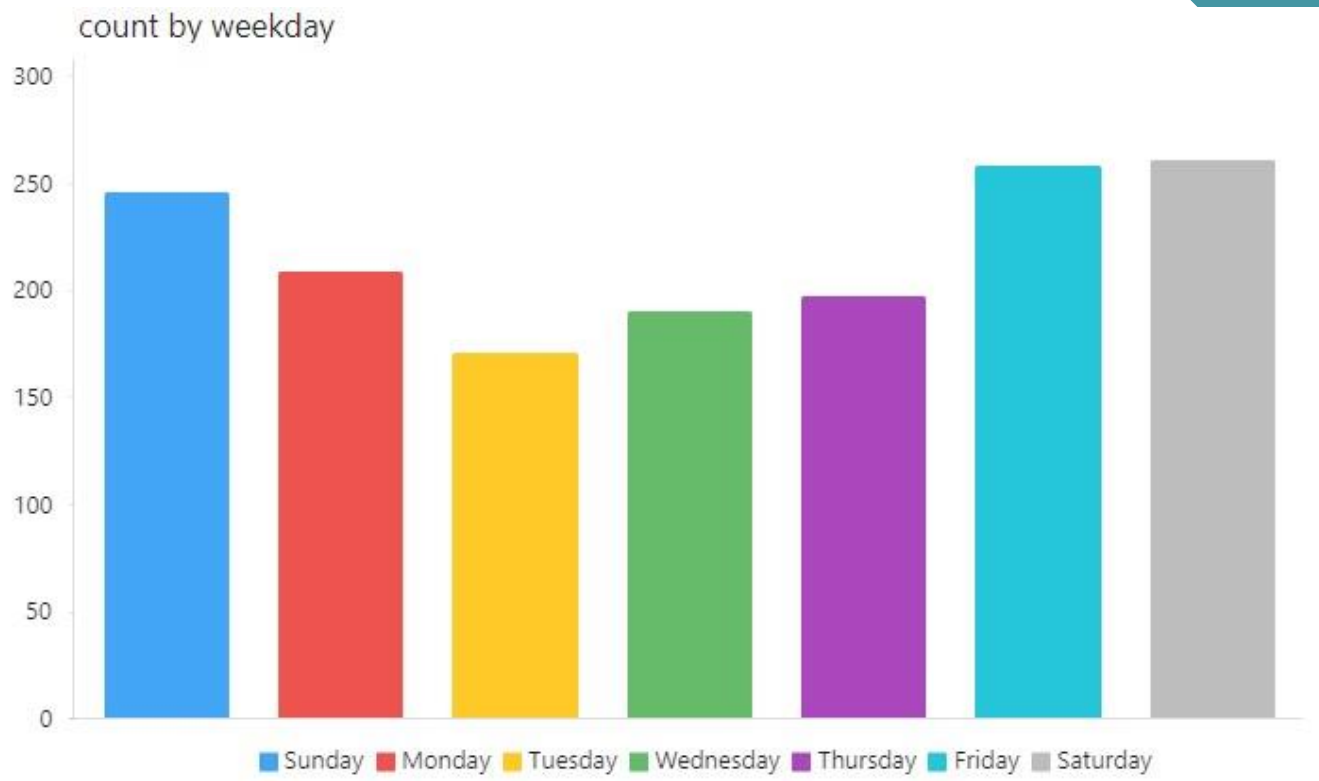
Days of the Week

Method:

-Imported csv file from sql script
-Grouped and ordered by weekday
-Imported data:
    -Matplotlib.pyplot
    -Visualization tool Slemmacount

Results:

- -The most fatal accidents occur on the weekends



Comparison of Years for Weekdays

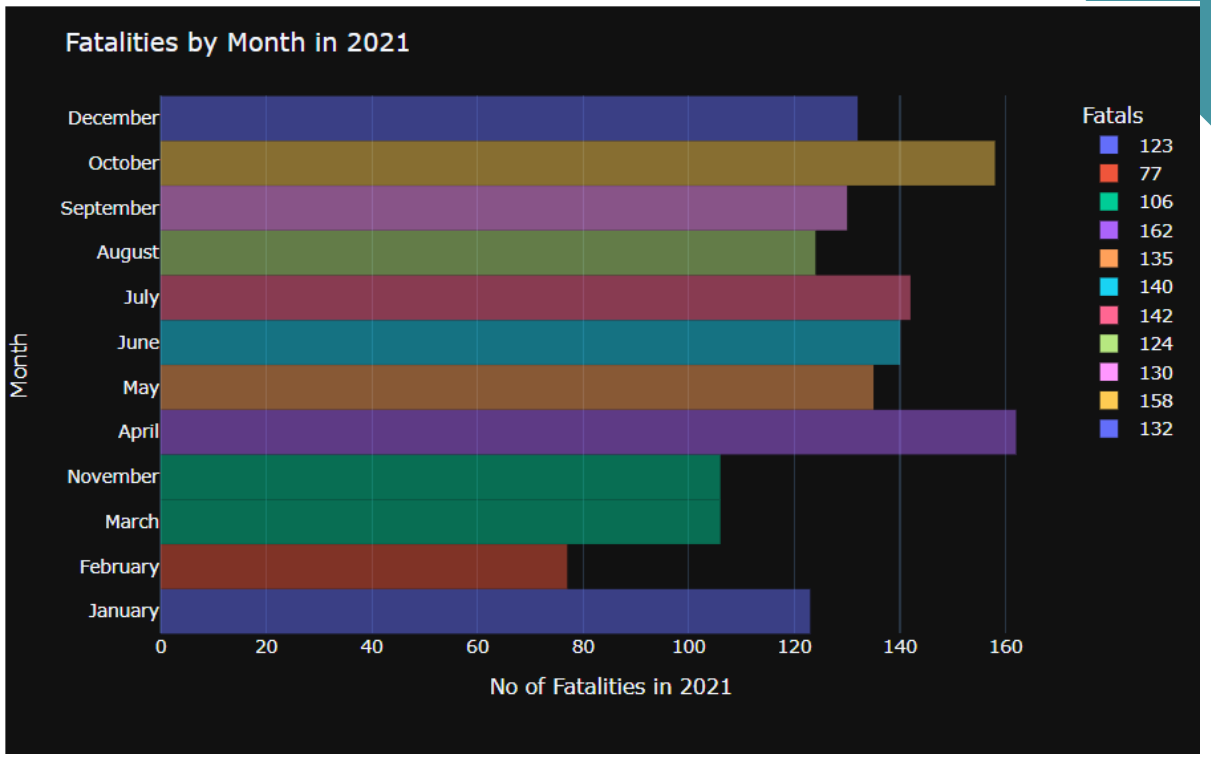
Months of the Year

Tool Used: plotly.express module

- High level data visualization package that allows you to create interactive plots with very little code
- provides functions to visualize a variety of types of data.
- Easy to use

Data Clean Up:

- Import the data
- Created new data frame with desired columns
- Changing the data types, rearranging the columns, extract the month names from Date
- Using groupby(), count() method to get the desired DataFrames
- Using the Data Frames visualize the data in different charts

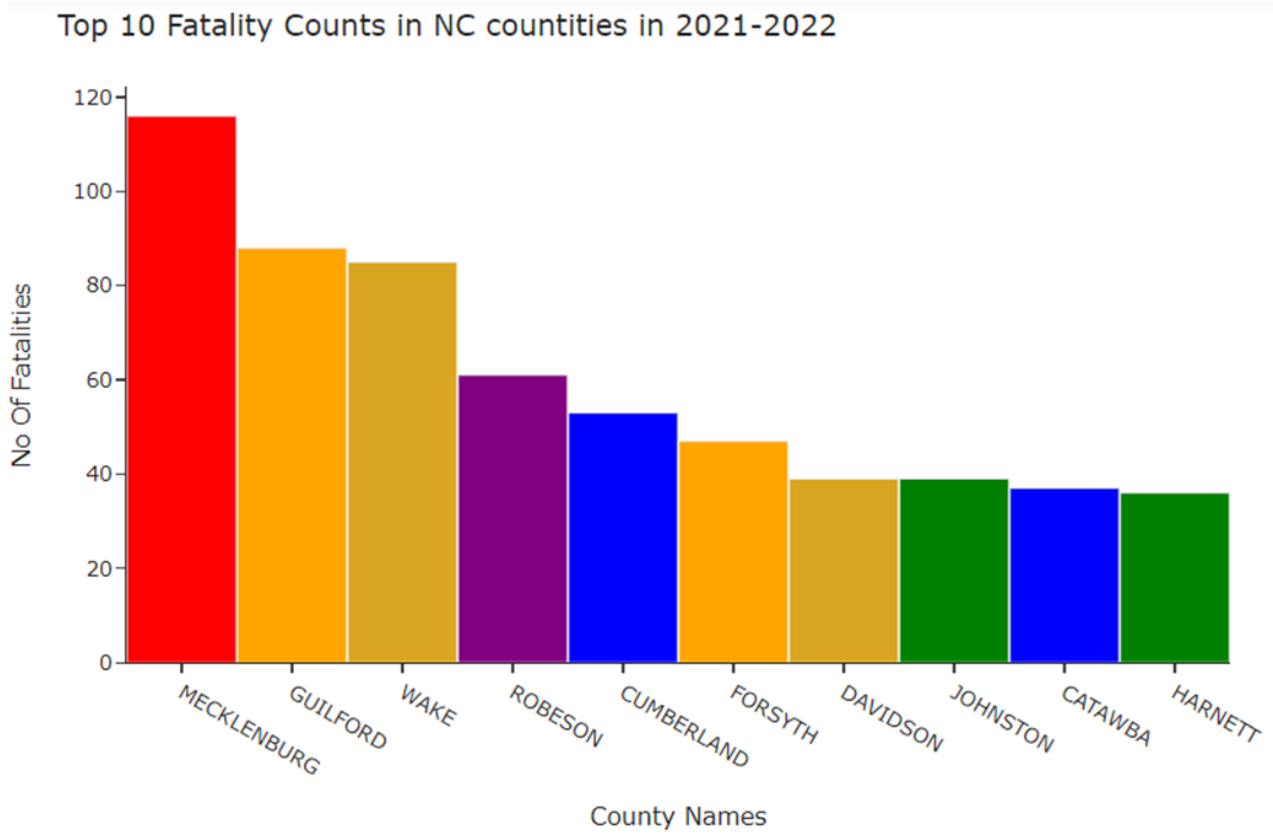


The highest being April - 162 and the lowest being February 77

Top 10 Counties

Results:

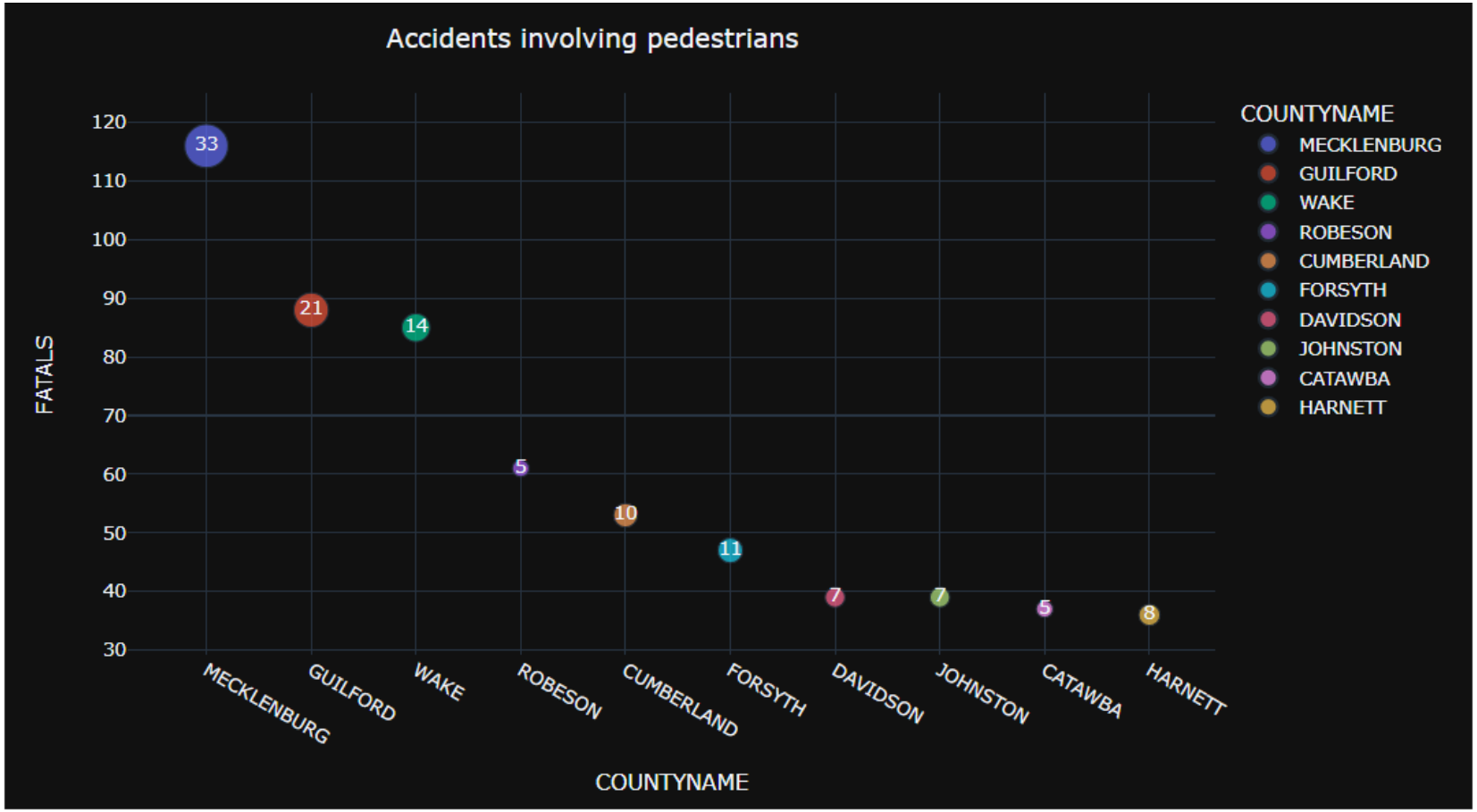
- Bar Chart using the counties and number of fatalities
- Highest - Mecklenburg – 116
- Lowest - Harnett – 36 (of the top 10)



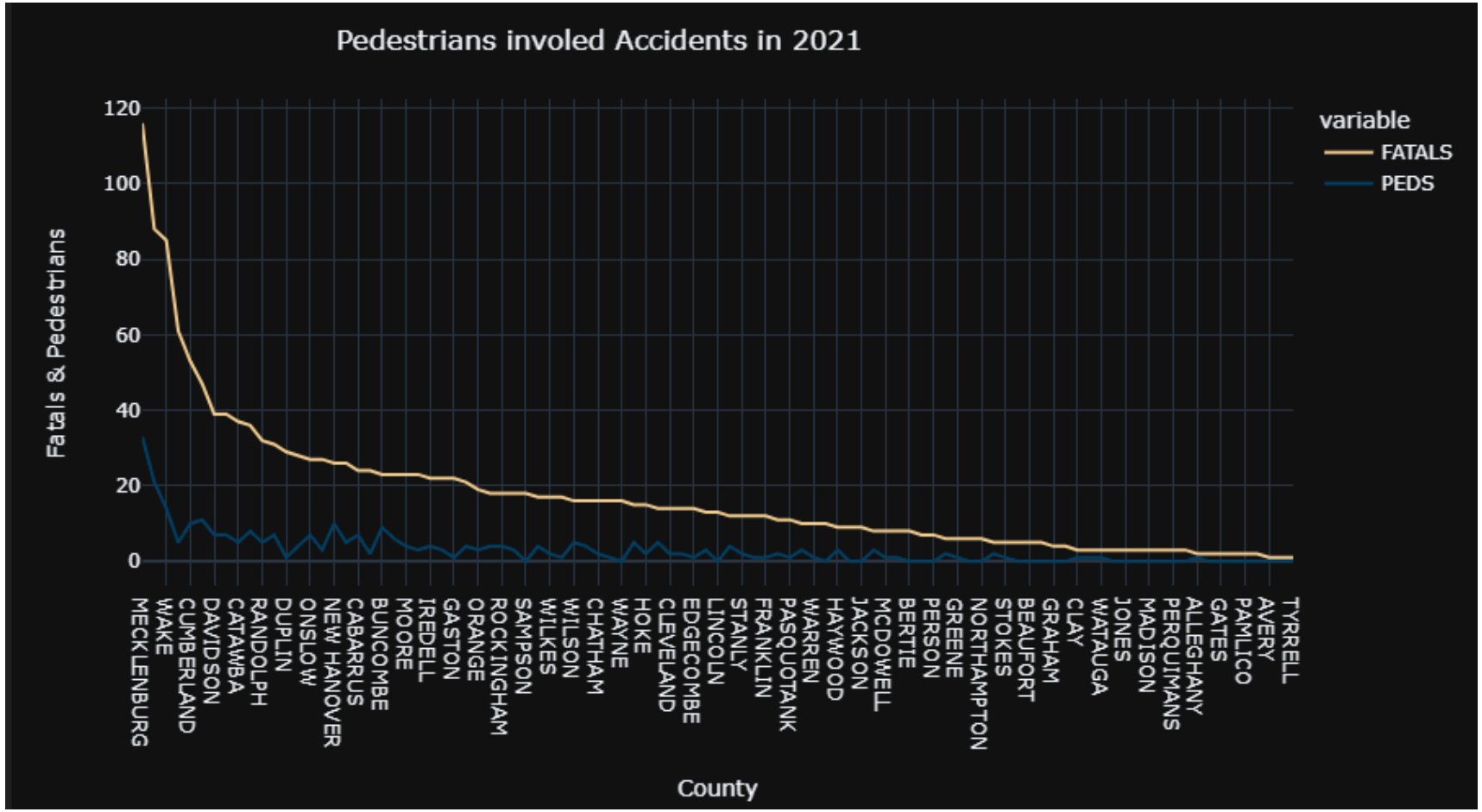
Pedestrians

Results:

- Bubble chart fatal involving pedestrians
- Bubble size represents the percentage of pedestrians involved
- Largest - Mecklenburg – 28%
- Smallest - Robeson – 8% (of the top 10)



Multiple Line Chart



Ethical Considerations

- Gathered by law enforcement
- Did not include identifying data of vehicles or persons
- Possible to find out who was in the accident by searching the date and location

Maps

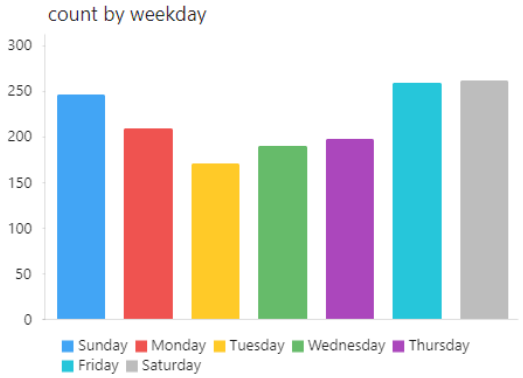
Folium

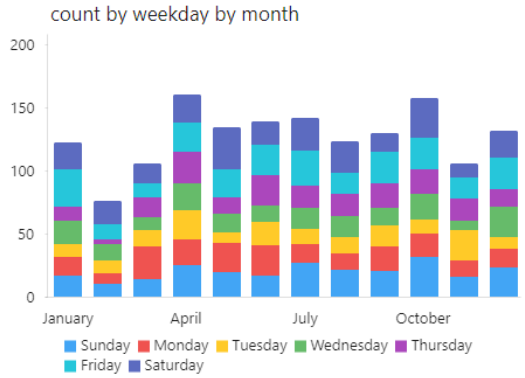
- A Python Library that helps create Leaflet maps
- Data manipulation in Python
- Visualize data in Leaflet Map

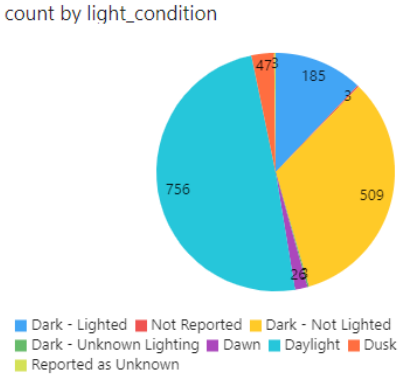
Conclusion

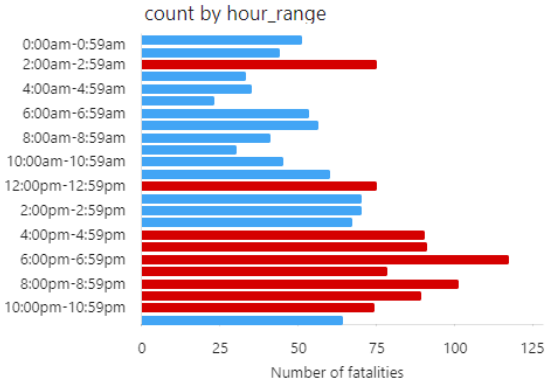
Findings:

- The most fatalities occurred in the evening hours, not in the morning hour commutes
- The most dangerous days of the week for motor vehicle fatalities was the weekend (Friday – Sunday)
- April and October highest fatality months, but February had the lowest fatalities


count by weekday
300
250
200
150
100
50
0
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday


count by weekday by month
200
150
100
50
0
January
April
July
October
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday


count by light_condition
473
185
3
509
26
756
Dark - Lighted
Not Reported
Dark - Not Lighted
Dark - Unknown Lighting
Dawn
Daylight
Dusk
Reported as Unknown


count by hour_range
0:00am-0:59am
2:00am-2:59am
4:00am-4:59am
6:00am-6:59am
8:00am-8:59am
10:00am-10:59am
12:00pm-12:59pm
2:00pm-2:59pm
4:00pm-4:59pm
6:00pm-6:59pm
8:00pm-8:59pm
10:00pm-10:59pm
0
25
50
75
100
125
Number of fatalities

Slemma Demo

Q&A

Thank you