Road Safety And Accident Patterns In India

Project Flow

1. Introduction of Project

- Overview
- Purpose
- Technical architecture

2. Define Problem / Problem Understanding

- Specify the business problem
- Business requirements
- Literature Survey
- Social or Business Impact

3. Data Collection

- Collect the dataset
- Connect Data with Qlik Sense

4. Data Preparation

- Prepare the Data for Visualization

5. Data Visualizations

- Number of Unique Visualizations

6. Dashboard

- Responsive and Design of Dashboard

7. Story

- Story Creation

8. Performance Testing

- Amount of Data Rendered to DB
- Utilization of Data Filters
- Number of Calculation Fields/Master Items

- Number of Visualizations/Graphs

9. Project Demonstration & Documentation

- Record explanation Video for project end-to-end solution
- Project Documentation - Step by step project development procedure

1. Introduction of project

The primary goal of this project is to use the power of Qlik Sense to create visuals and analyses of road growth in India as well as accident trends. Description of accidents , its ways, reasons affecting, factors involved, etc expressed in form of sheets, stories. Valuable insights can be provided through the use of interactive dashboards and advanced analytics that would enhance safety by reducing traffic accidents while increasing general road safety.

1.1. Overview

Situation 1: Locating Hotspots With the use of Qlik's analytics, areas or particular roads in India with a high accident frequency can be found.
Situation 2: Examination of Trends In order to find trends and reoccurring causes of accidents, the platform will examine past accident data
Situation 3 : Predictive Modeling Scenario Qlik will estimate possible accident situations using real-time data and predictive analytics.
The platform is designed to provide early warnings and suggest proactive ways to reduce accidents by taking into account several elements, including weather forecasts, traffic flow patterns, and historical accident trends. Authorities will be able to better allocate resources and put preventative safety measures in place because of this predictive capabilities. The overall goal of this initiative is to employ data analytics to save lives, increase road safety in India, and lower the number of accidents.

1.2. Purpose

The essence of this project is to:
Know accident patterns: The synthesis of statistics to show what demographics, places, and time realize more road accidents.
Find casual factors: Key drivers for accidents including driver behavior,

environmental conditions or road status.
Construct predictive models: So that in future, we can predict with precision where accidents are likely to occur and when terrible risks moments are expected based on what has happened earlier.
Boosting Strategic Planning: Policymakers, traffic authorities, and urban planners should be given insights that help in improving road safety.
Increase Public Awareness: Visualizations should help the public understand better the importance of road safety measures.

1.3. Technical architecture

Dataset

- Collect the dataset
- Connect Data with Qlik Sense

Data Preparation

- Prepare the Data for Visualization

Data Visualizations

- Number of Unique Visualizations

Dashboard

- Responsive and Design of Dashboard

Story

- Story Creation

2. Define Problem / Problem Understanding

Road safety is a significant concern in India due to the high incidence of traffic accidents. India has one of the highest rates of road accidents in the world. Contributing factors include rapid urbanization, increased vehicle use, diverse traffic, and poor road conditions. Despite efforts to enhance road safety, high accident rates persist, highlighting the need for a comprehensive, data-driven approach. This involves analyzing epidemiological data, driver behavior, traffic engineering, and policy impacts. Understanding these dimensions is crucial for developing effective interventions to reduce accidents and improve overall road safety in India.

2.1. Specify The Business Problem

The business problem is to reduce the high prevalence of road traffic accidents in India, which significantly affects human and economic resources. This can be viewed from a transportation company or government agency's perspective in several angles.
Many people lose their lives, get injured.Incurring huge costs due to this menace such as medical bills, loss of productivity among others.
Changes in transport patterns due to frequent accidents often cause delays, high maintenance costs and damage company image.
It is mandatory that organizations adhere to stricter safety measures thus avoiding legal suits emanating from accidents.

2.2. Business Requirements

To address high incidence of road accidents in India and to enhance road safety,the analysis will focus on following business requirements:-
1. Data analysis and integration
- gather detailed data including vehicle type, circumstances and environmental conditions.
- Integrate data from police reports hospital records and other relevant sources.
2. Data analysis and pattern identification
- Conduct exploratory dta analysis for insights and identify patterns and trends in accident data, focusing on high risk locations and affecting factors.
3. Interactive dashboards
- An interactive dashboards for real time visulalization for accident patterns and hotspot area ensuring strategic planning and operational improvements.
4. Monitoring and evaluation
- Establish monitoring systems of road safety and regularly assessment the impact and change the strategies as needed.
5. Public awareness
- Conduct public awareness campaigns and implement better safety protocols ensuring compliance with regulations.

2.3. LITERATURE SURVEY

A literature survey for analyzing road safety and accident patterns involves researching and reviewing previous studies, articles, reports, and statistics on the topic. This includes examining methods and techniques used for analyzing accident

data, as well as the findings and conclusions of these studies. Recommended sources include academic databases like PubMed, IEEE Xplore, Google Scholar, and institutional repositories. Additionally, government reports and publications can offer valuable insights into recent developments in the field.

2.4. SOCIAL IMPACT

Social Impact Analysis:

• Create visualizations to display the demographic distribution of accidents across the country.

• Compare the severity of accidents in different areas of traffic control.

• Explore any correlation between speeding, weather, and total accidents.

• Identify the leading causes of accidents.

• Examine the distribution of age groups and gender of the victims.

• Investigate the contribution of diverse types of vehicles to the total number of accidents.

3. DATASET COLLECTION

3.1. Downloading The Dataset

ROAD ACCIDENTS IN INDIA

https://www.kaggle.com/datasets/aryakittukrishnasai/road-accidents-in-india

About Dataset

State/UT-wise Pedestrians killed according to classification of age and sex during 2019
State/UT-wise Pedestrians killed in Accidents Classified by the type of impacting vehicles during 2019
State/UT-wise Accidents Classified according to Type of Traffic Control during 2019
State/UT-wise Accidents classified according to Load Condition of Involved Vehicle during 2019
State/UT-wise Two Wheelers killed in Accidents Classified by the type of impacting vehicles during 2019

State/UT-wise Male and Female Persons Killed in Road Accidents in terms of Road User categories during 2019

State/UT-wise Accidents Victims Classified according to Non-Use of Safety Device (Non Wearing of Helmet) during 2019 etc

3.2. Understand The Data

Data contains all the meta information regarding the columns described in the Excel files.

Description of the Dataset:
There are nine data files that have been converted to Excel worksheets(.xlsx) for ease of use with respect to Qlik Sense. The list of files is as follows:

- Pedestrians: State/UT-wise pedestrians involved in accidents according to classification of age and gender during 2019.
  Columns of the dataset:

1. State/UT
2. Less than 18 years – Male
3. Less than 18 years – Female
4. 18-25 Years – Male
5. 18-25 Years – Female
6. 25-35 Years – Male
7. 25-35 Years – Female
8. 35-45 Years – Male
9. 35-45 Years – Female
10. 45-60 Years – Male
11. 45-60 Years – Female
12. 60 and Above – Male
13. 60 and Above – Female
14. Age not known – Male
15. Age not known – Female

- Pedestrians killed: State/UT-wise pedestrians killed according to classification of age and gender during 2019.
  Columns of the dataset:

1. State/UT
2. Less than 18 years - Killed - Male
3. Less than 18 years - Killed - Female
4. 18-25 Years - Killed - Male
5. 18-25 Years - Killed - Female
6. 25-35 Years - Killed - Male

7. 25-35 Years - Killed - Female
8. 35-45 Years - Killed - Male
9. 35-45 Years - Killed - Female
10. 45-60 Years - Killed - Male
11. 45-60 Years - Killed - Female
12. 60 and Above - Killed - Male
13. 60 and Above - Killed - Female
14. Age not known - Killed – Male
15. Age not known - Killed – Female

- Pedestrians killed – Impacting vehicles: State/UT-wise Pedestrians killed in accidents classified by the type of impacting vehicles during 2019
  Columns of the dataset:

1. States/UTs
2. Bicycles
3. Two Wheelers
4. Auto Rickshaws
5. Cars, Taxis, Vans and LMV
6. Trucks/Lorries
7. Buses
8. Other Non-Motorized Vehicles (E-rickshaw etc.)
9. Others
10. Total

- Traffic Control Type: State/UT-wise accidents classified according to the type of traffic control during 2019
  Columns of the dataset:

1. States/UTs
2. Traffic Light Signal - Total number of Accidents
3. Traffic Light Signal - Persons Killed
4. Traffic Light Signal - Persons Injured - Grievously Injured
5. Traffic Light Signal - Persons Injured - Minor Injury
6. Traffic Light Signal - Persons Injured - Total Injured
7. Police Controlled - Total number of Accidents
8. Police Controlled - Persons Killed
9. Police Controlled - Persons Injured - Grievously Injured
10. Police Controlled - Persons Injured - Minor Injury
11. Police Controlled - Persons Injured - Total Injury
12. Stop Sign - Total number of Accidents
13. Stop Sign - Persons Killed
14. Stop Sign - Persons Injured - Grievously Injured

15. Stop Sign - Persons Injured - Minor Injury
16. Stop Sign - Persons Injured - Total Injured
17. Flashing Signal/Blinker - Total number of Accidents
18. Flashing Signal/Blinker - Persons Killed
19. Flashing Signal/Blinker - Persons Injured - Grievously Injured
20. Flashing Signal/Blinker - Persons Injured - Minor Injury
21. Flashing Signal/Blinker - Persons Injured - Total Injured
22. Uncontrolled - Total number of Accidents – Number
23. Uncontrolled - Total number of Accidents – Rank
24. Uncontrolled - Persons Killed – Number
25. Uncontrolled - Persons Killed – Rank
26. Uncontrolled - Persons Injured - Grievously Injured
27. Uncontrolled - Persons Injured - Minor Injury
28. Uncontrolled - Persons Injured - Total Injured
29. Others - Total number of Accidents
30. Others - Persons Killed
31. Others - Persons Injured - Grievously Injured
32. Others - Persons Injured - Minor Injury
33. Others - Persons Injured - Total Injured

- Weather: State/UT-wise accidents classified according to the type of weather and severity of the accidents during 2019

  Columns of the dataset:

1. States/UTs
2. Sunny/Clear - Total Accidents – Number
3. Sunny/Clear - Total Accidents – Rank
4. Sunny/Clear - Persons Killed – Number
5. Sunny/Clear - Persons Killed – Rank
6. Sunny/Clear - Persons Injured - Grievously Injured
7. Sunny/Clear - Persons Injured - Minor Injury
8. Sunny/Clear - Persons Injured - Total Injured
9. Rainy - Total Accidents
10. Rainy - Persons Killed
11. Rainy - Persons Injured - Grievously Injured
12. Rainy - Persons Injured - Minor Injury
13. Rainy - Persons Injured - Total Injured
14. Foggy and Misty - Total Accidents
15. Foggy and Misty - Persons Killed
16. Foggy and Misty - Persons Injured - Grievously Injured
17. Foggy and Misty - Persons Injured - Minor Injury
18. Foggy and Misty - Persons Injured - Total Injured

19. Hail/Sleet - Total Accidents
20. Hail/Sleet - Persons Killed
21. Hail/Sleet - Persons Injured - Grievously Injured
22. Hail/Sleet - Persons Injured - Minor Injury
23. Hail/Sleet - Persons Injured - Total Injured
24. Others - Total Accidents
25. Others - Persons Killed
26. Others - Persons Injured - Grievously Injured
27. Others - Persons Injured - Minor Injury
28. Others - Persons Injured - Total Injured

- Killed on Two Wheelers - Impacting vehicles: State/UT-wise Two Wheelers killed in accidents classified by the type of impacting vehicles during 2019

  Columns of the dataset:

1. States/UTs
2. Bicycles
3. Two Wheelers
4. Auto Rickshaws
5. Cars, Taxis, Vans and LMV
6. Trucks/Lorries
7. Buses
8. Other Non-Motorized Vehicles (E-rickshaw etc.)
9. Others
10. Total

- Road Users Killed – Gender: State/UT-wise male and female persons killed in road accidents in terms of road user categories during 2019

  Columns of the dataset:

1. States/UTs
2. Pedestrian – Male
3. Pedestrian – Female
4. Pedestrian – Total
5. Bicycles – Male
6. Bicycles – Female
7. Bicycles – Total
8. Two Wheelers – Male
9. Two Wheelers – Female
10. Two Wheelers – Total
11. Two Wheelers – Rank
12. Auto Rickshaws – Male
13. Auto Rickshaws – Female

14. Auto Rickshaws – Total
15. Cars, taxies Vans and LMV – Male
16. Cars, taxies Vans and LMV – Female
17. Cars, taxies Vans and LMV – Total
18. Trucks/Lorries – Male
19. Trucks/Lorries – Female
20. Trucks/Lorries – Total
21. Buses – Male
22. Buses – Female
23. Buses – Total
24. Other non-Motor vehicles(E-Rickshaw) – Male
25. Other non-Motor vehicles(E-Rickshaw) – Female
26. Other non-Motor vehicles(E-Rickshaw) – Total
27. Others – Male
28. Others – Female
29. Others - Total

- Causes: State/UT-wise Accident victims classified according to the causes of accidents during 2019

  Columns of the dataset:

1. States/UTs
2. Over-Speeding - Number of Accidents – Number
3. Over-Speeding - Number of Accidents – Rank
4. Over-Speeding - Persons Killed – Number
5. Over-Speeding - Persons Killed – Rank
6. Over-Speeding - Persons Injured - Grievously Injured
7. Over-Speeding - Persons Injured - Minor Injury
8. Over-Speeding - Persons Injured - Total Injured
9. Drunken Driving/ Consumption of alcohol and drug - Number of Accidents
10. Drunken Driving/ Consumption of alcohol and drug - Persons Killed
11. Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Grievously Injured
12. Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Minor Injury
13. Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Total Injured
14. Driving on Wrong side - Number of Accidents
15. Driving on Wrong side - Persons Killed
16. Driving on Wrong side - Persons Injured - Grievously Injured
17. Driving on Wrong side - Persons Injured - Minor Injury
18. Driving on Wrong side - Persons Injured - Total Injured

19. Jumping Red Light - Number of Accidents
20. Jumping Red Light - Persons Killed
21. Jumping Red Light - Persons Injured - Grievously Injured
22. Jumping Red Light - Persons Injured - Minor Injury
23. Jumping Red Light - Persons Injured - Total Injured
24. Use of Mobile Phone - Number of Accidents
25. Use of Mobile Phone - Persons Killed
26. Use of Mobile Phone - Persons Injured - Grievously Injured
27. Use of Mobile Phone - Persons Injured - Minor Injury
28. Use of Mobile Phone - Persons Injured - Total Injured
29. Others - Number of Accidents
30. Others - Persons Killed
31. Others - Persons Injured - Grievously Injured
32. Others - Persons Injured - Minor Injury
33. Others - Persons Injured - Total Injured

- Accidents – Severity and Vehicles: State/UT-wise vehicle type of victims and severity of accidents during 2019

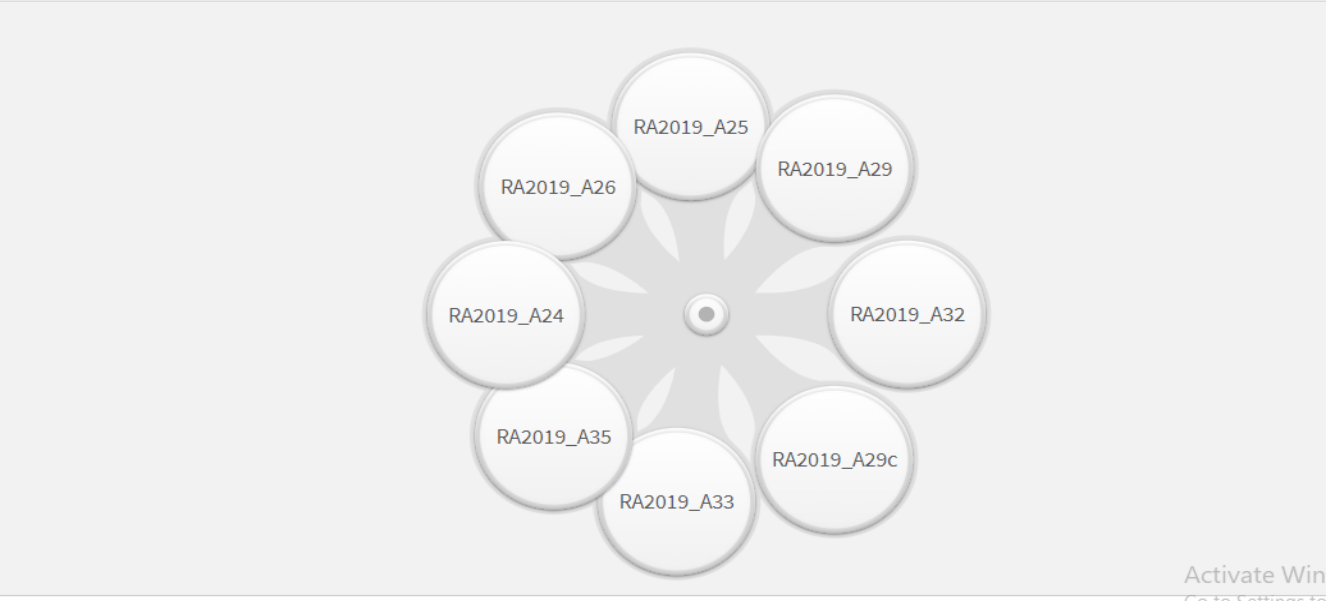
  Columns of the dataset:

1. States/UTs
2. Pedestrian - Number of Road Accidents
3. Pedestrian - Number of Persons – Killed
4. Pedestrian - Number of Persons - Grievously Injured
5. Pedestrian - Number of Persons - Minor Injured
6. Bicycles - Number of Road Accidents
7. Bicycles - Number of Persons – Killed
8. Bicycles - Number of Persons - Grievously Injured
9. Bicycles - Number of Persons - Minor Injured
10. Two Wheelers - Number of Road Accidents
11. Two Wheelers - Number of Persons – Killed
12. Two Wheelers - Number of Persons - Grievously Injured
13. Two Wheelers - Number of Persons - Minor Injured
14. Auto Rickshaws - Number of Road Accidents
15. Auto Rickshaws - Number of Persons – Killed
16. Auto Rickshaws - Number of Persons - Grievously Injured
17. Auto Rickshaws - Number of Persons - Minor Injured
18. Cars, Taxis, Vans and LMV - Number of Road Accidents
19. Cars, Taxis, Vans and LMV - Number of Persons – Killed
20. Cars, Taxis, Vans and LMV - Number of Persons - Grievously Injured
21. Cars, Taxis, Vans and LMV - Number of Persons - Minor Injured
22. Trucks/Lorries - Number of Road Accidents

23. Trucks/Lorries - Number of Persons – Killed
24. Trucks/Lorries - Number of Persons - Grievously Injured
25. Trucks/Lorries - Number of Persons - Minor Injured
26. Buses - Number of Road Accidents
27. Buses - Number of Persons – Killed
28. Buses - Number of Persons - Grievously Injured
29. Buses - Number of Persons - Minor Injured
30. Other non-motorized vehicle (E-rickshaw etc.) - Number of Road Accidents
31. Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons – Killed
32. Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons - Grievously Injured
33. Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons - Minor Injured
34. Others - Number of Road Accidents
35. Others - Number of Persons – Killed
36. Others - Number of Persons - Grievously Injured
37. Others - Number of Persons - Minor Injured
38. Total - Number of Road Accidents
39. Total - Number of Persons – Killed
40. Total - Number of Persons - Grievously Injured
41. Total - Number of Persons - Minor Injured

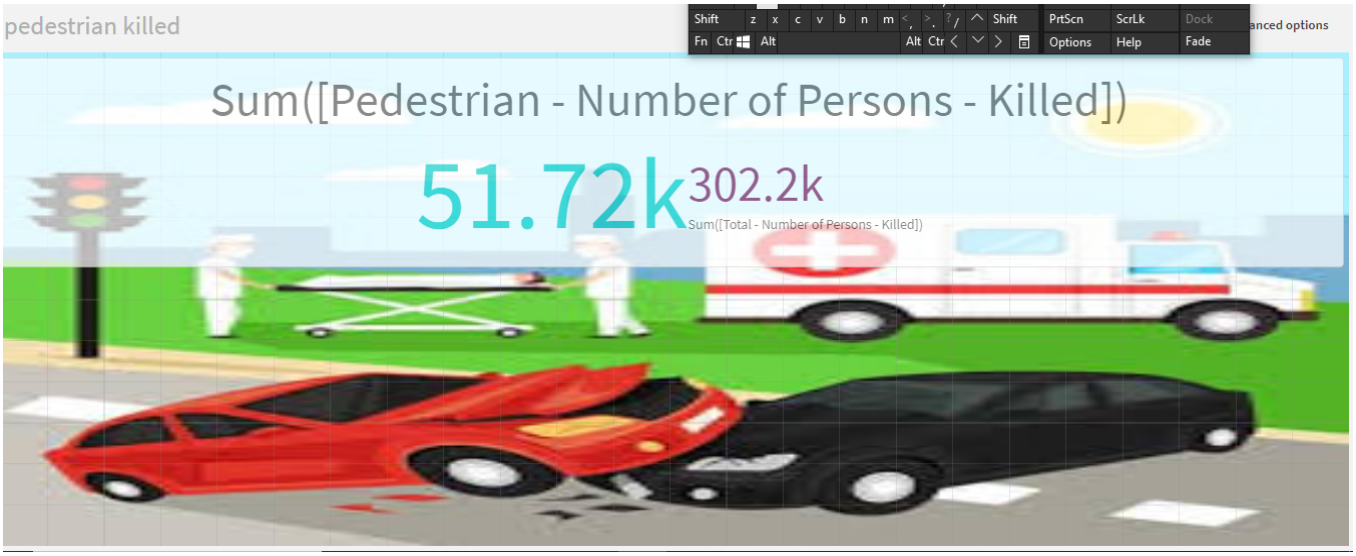
4. Data Preparation

PRE-PROCESSED DATA:

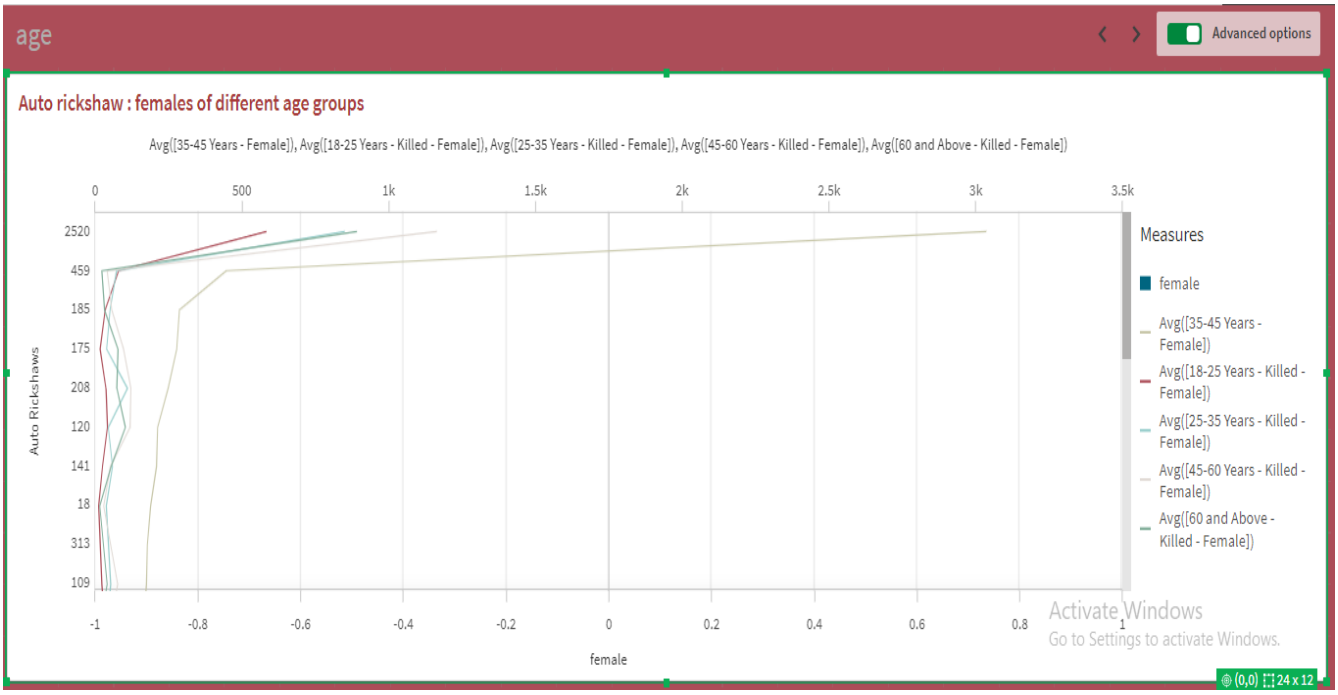


5. Data Visualization

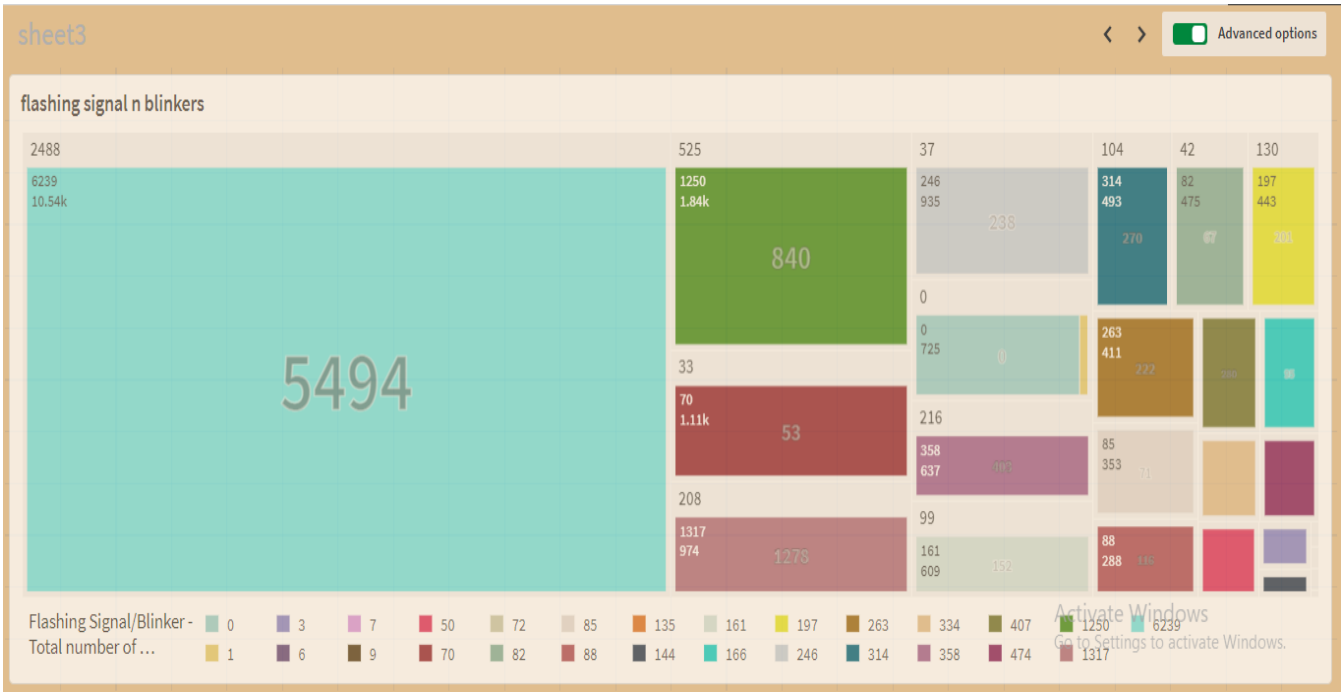
01. Pedestrian killed in Accidents :



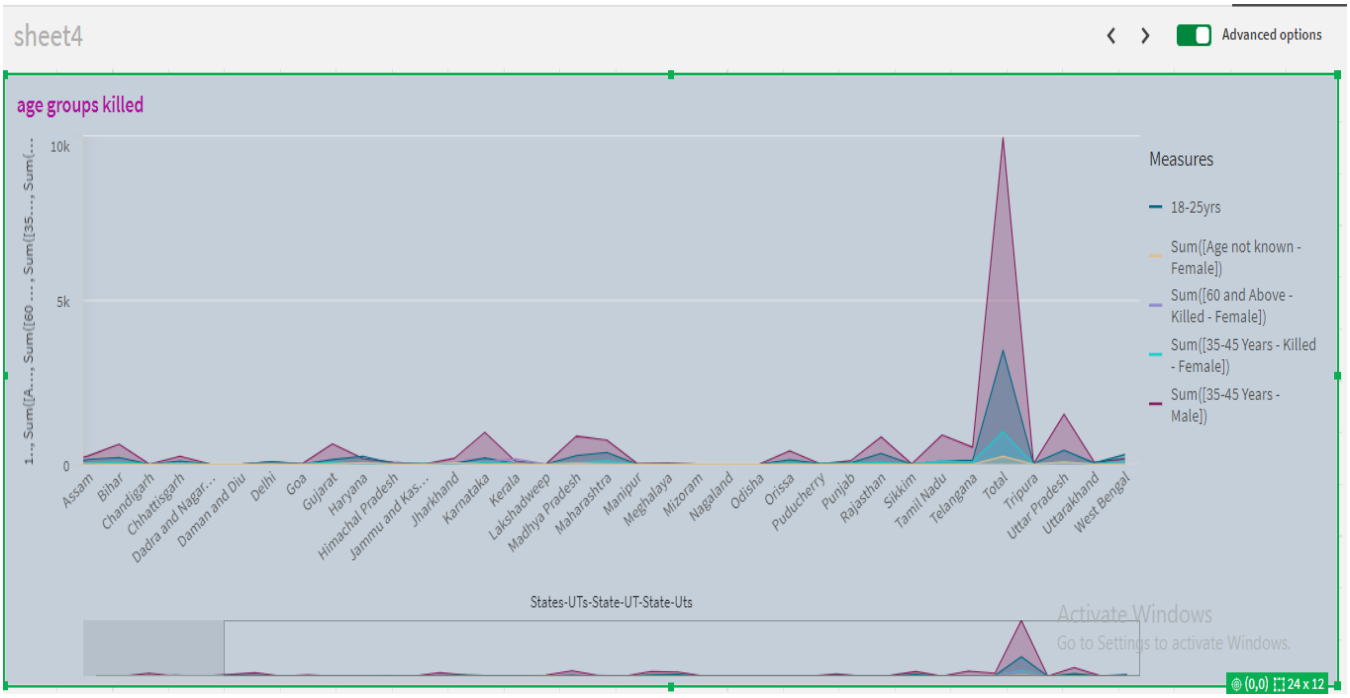
02. Accidents of females due to autorickshaw:



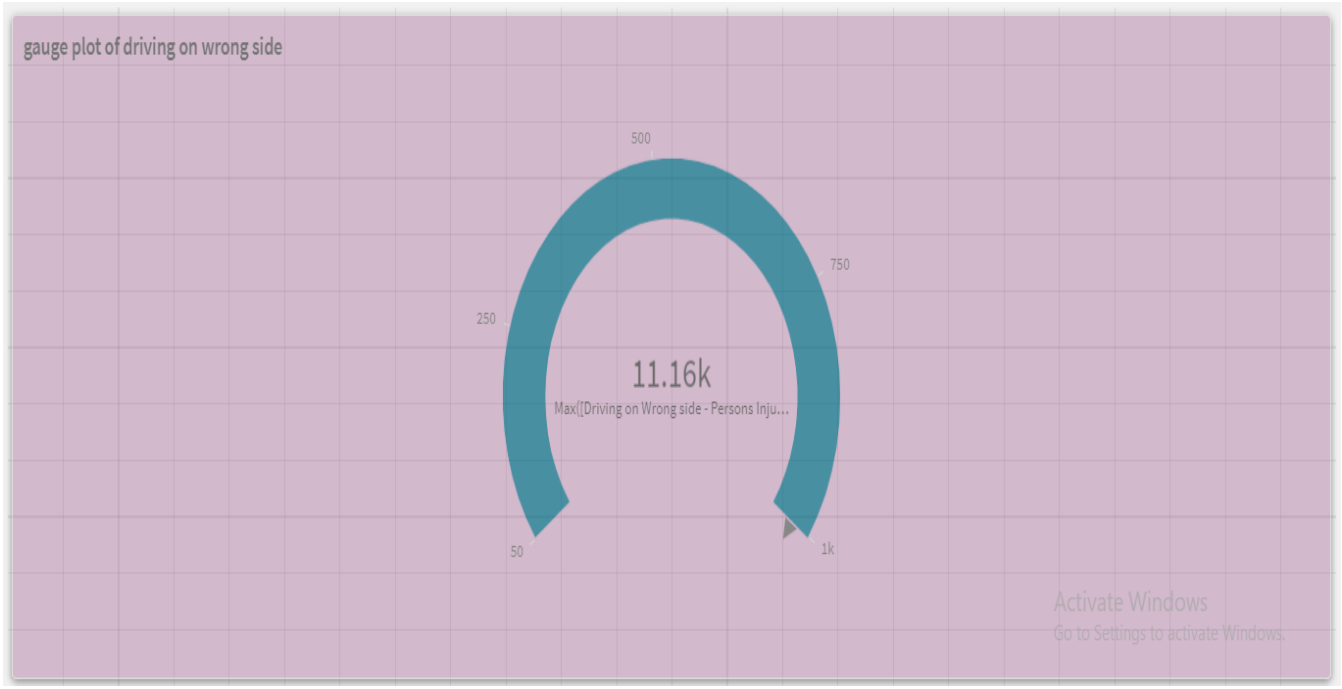
03. Accident due to flasing signal:



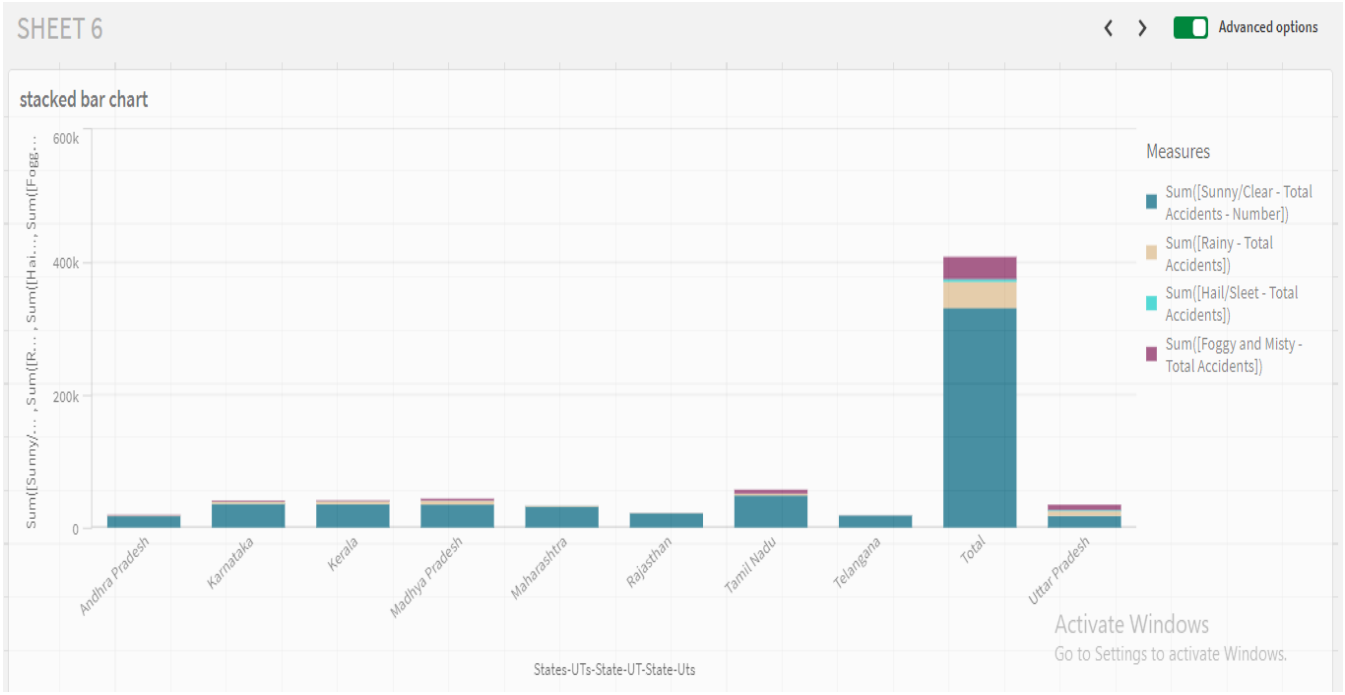
04. Different age group killed :



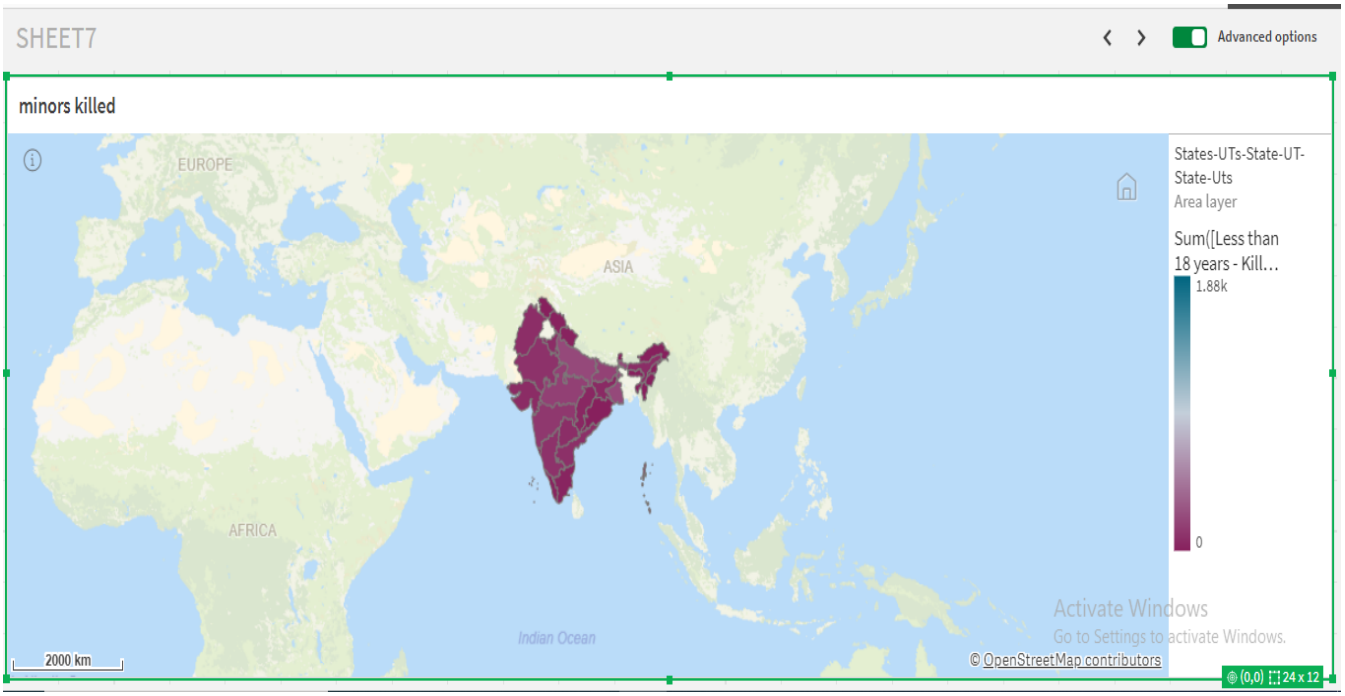
05. Accidents due to driving on wrong side:



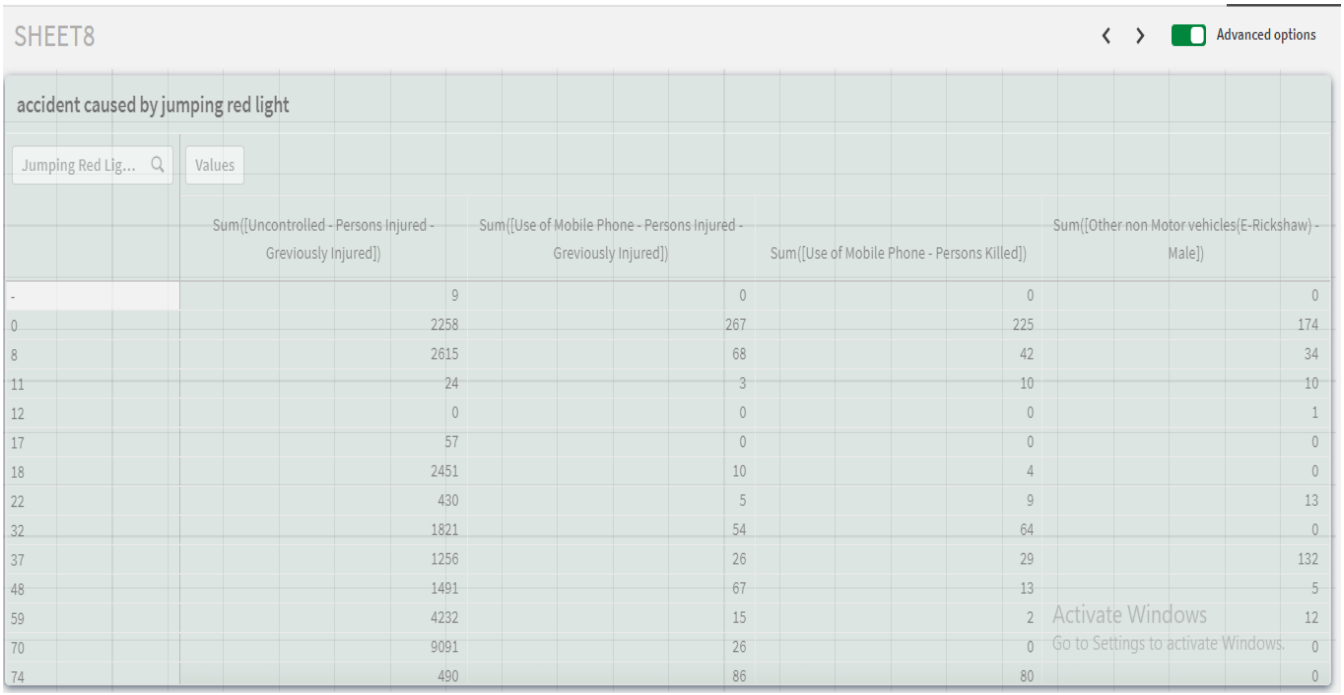
06. Accidents due to weather conditions:



07. State wise minors killed:

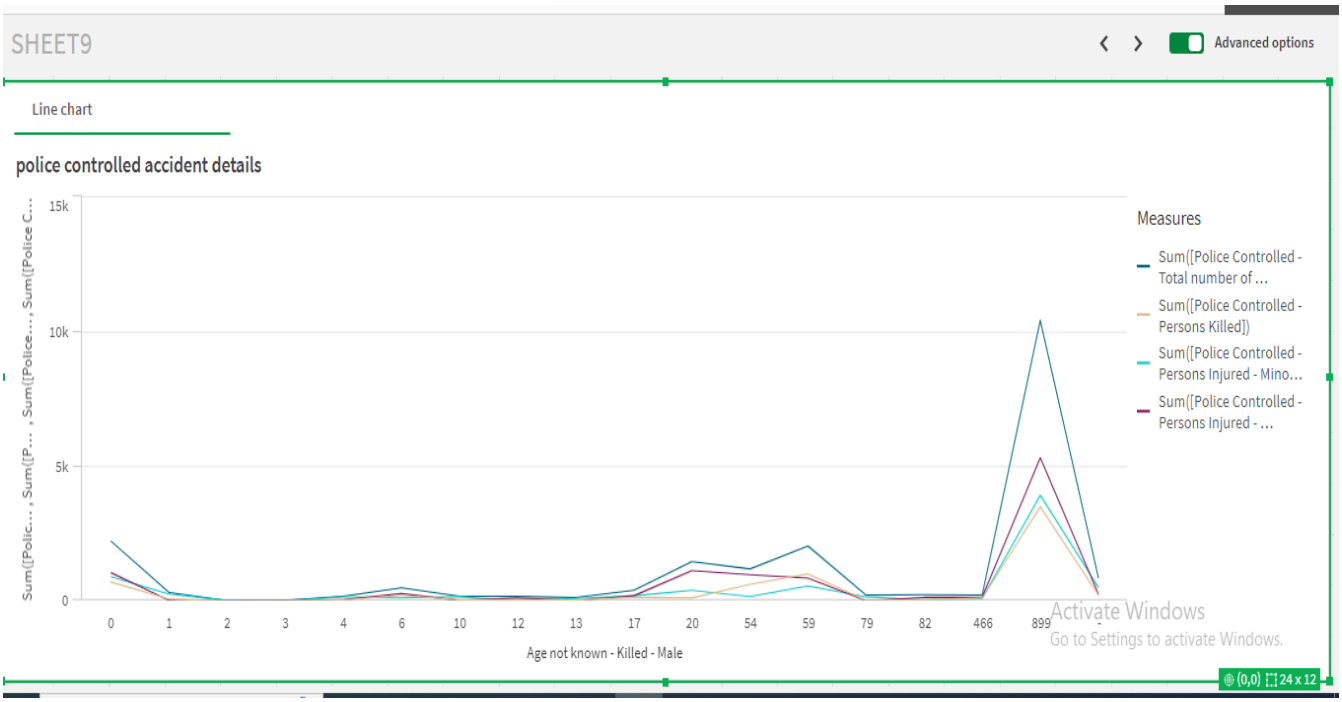


08. Accidents due to jumping of redlight:

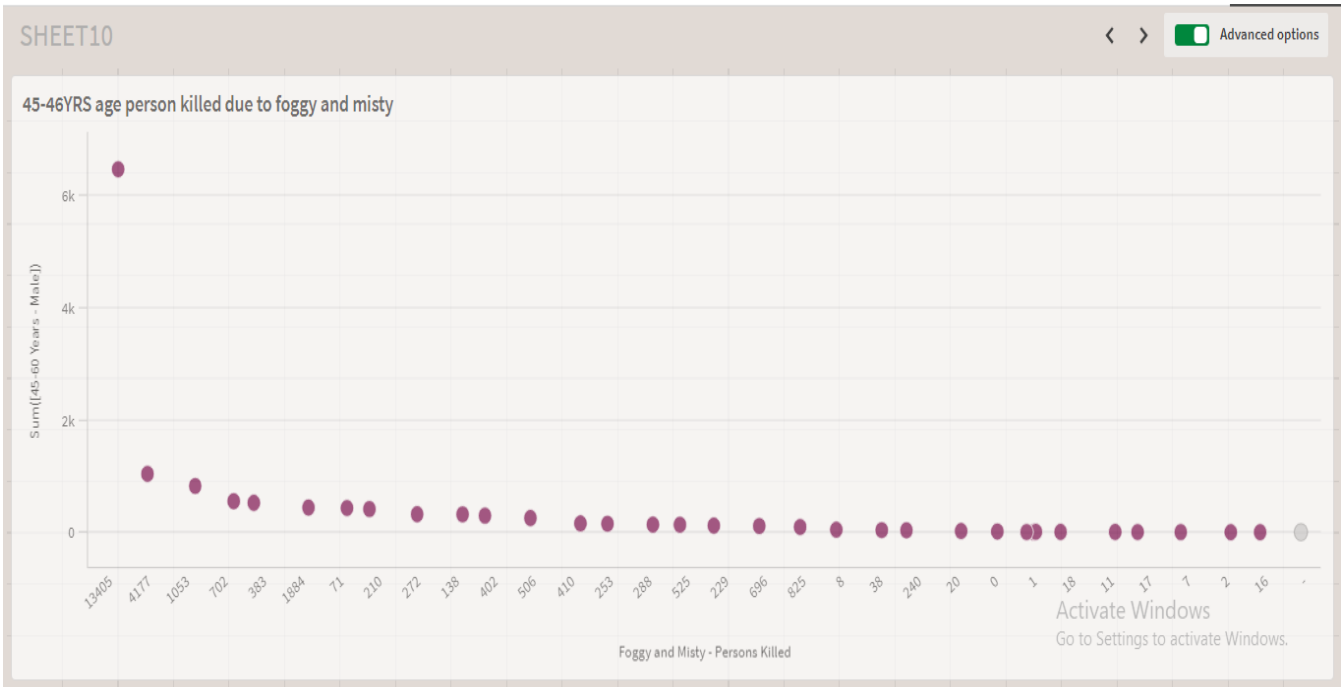


	Sum([Uncontrolled - Persons Injured - Greviously Injured])	Sum([Use of Mobile Phone - Persons Injured - Greviously Injured])	Sum([Use of Mobile Phone - Persons Killed])	Sum([Other non Motor vehicles(E-Rickshaw) - Male])
-	9	0	0	0
0	2258	267	225	174
8	2615	68	42	34
11	24	3	10	10
12	0	0	0	1
17	57	0	0	0
18	2451	10	4	0
22	430	5	9	13
32	1821	54	64	0
37	1256	26	29	132
48	1491	67	13	5
59	4232	15	2	12
70	9091	26	0	0
74	490	86	80	0

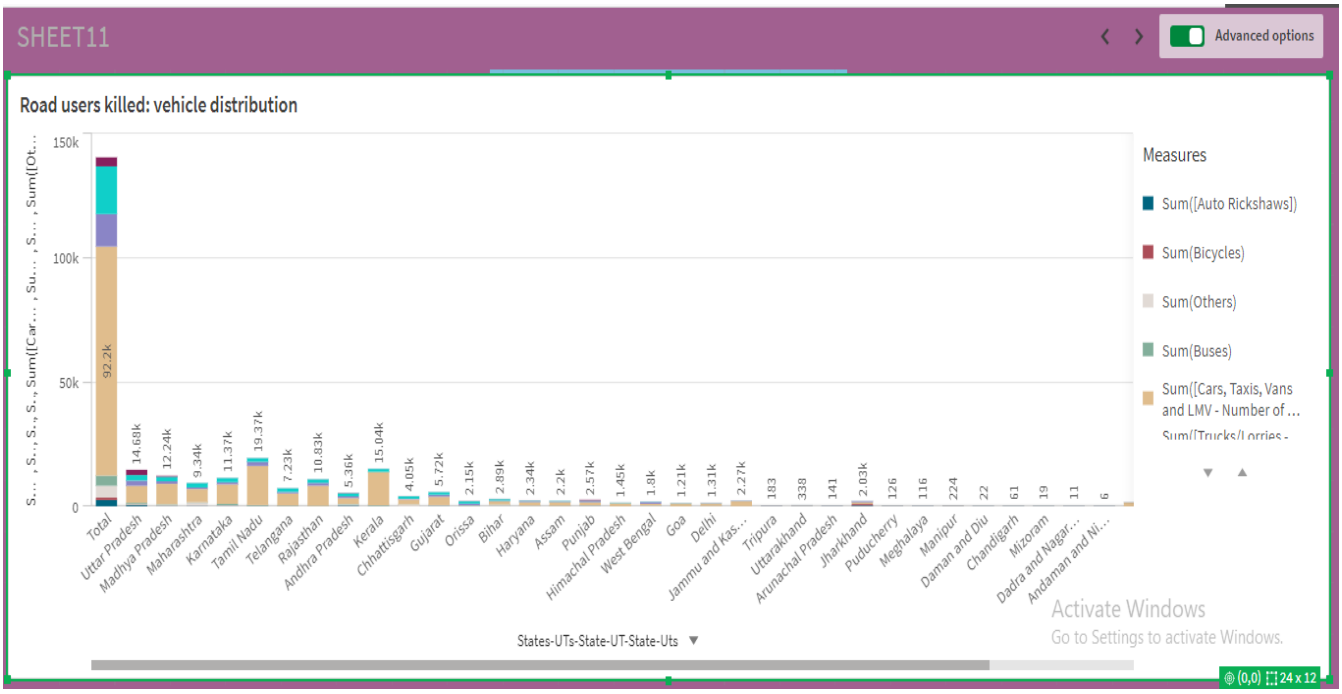
09. Police controlled ：



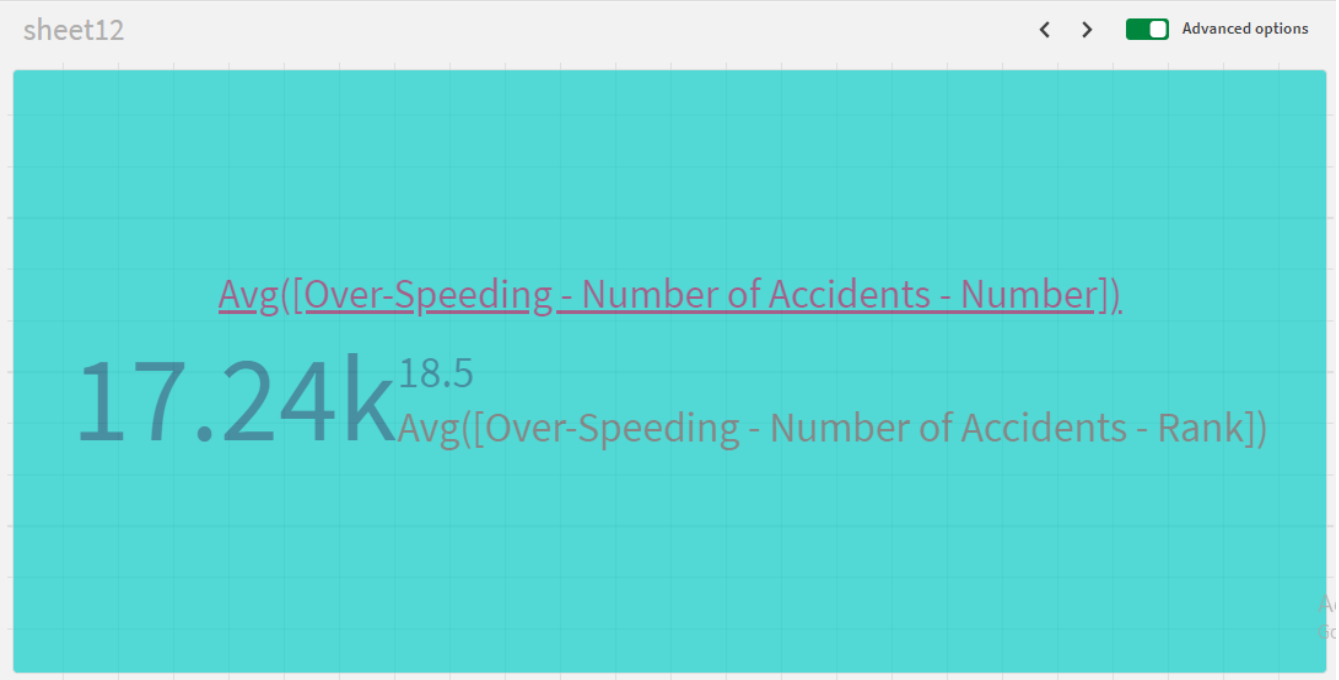
10. persons killed due to foggy n misty weather:



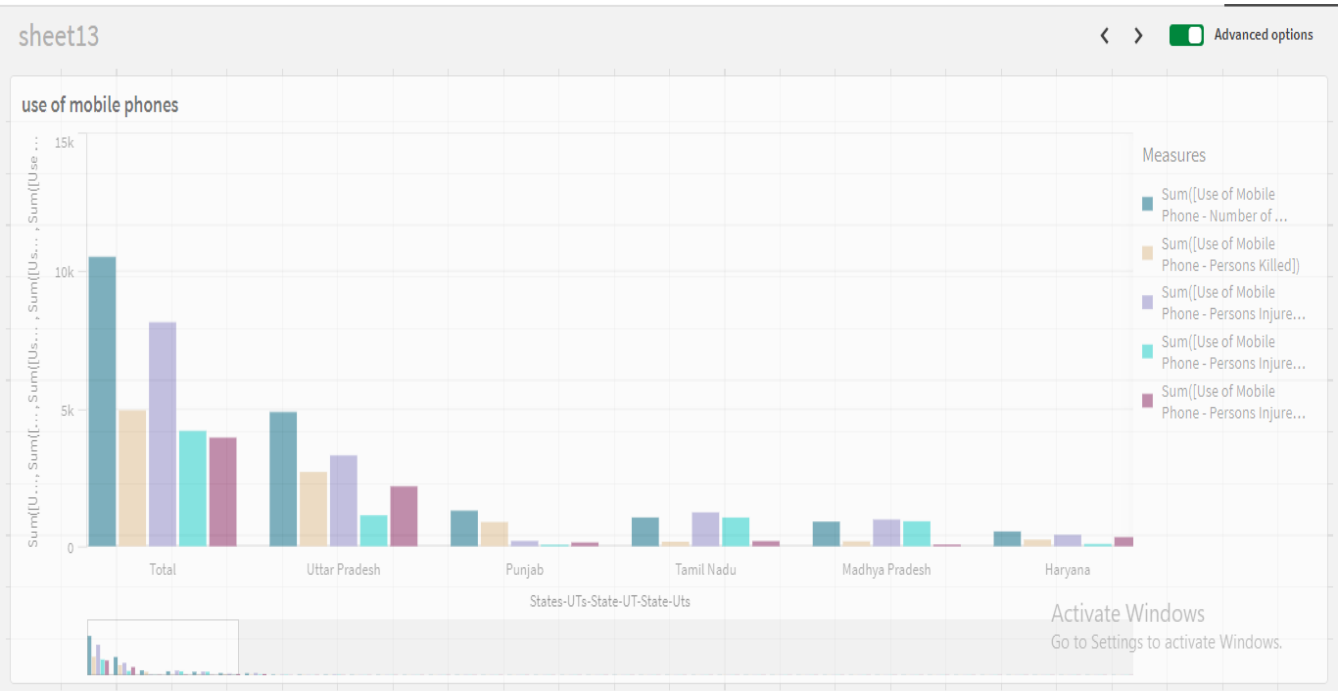
11. Accidents vehicle distribution:



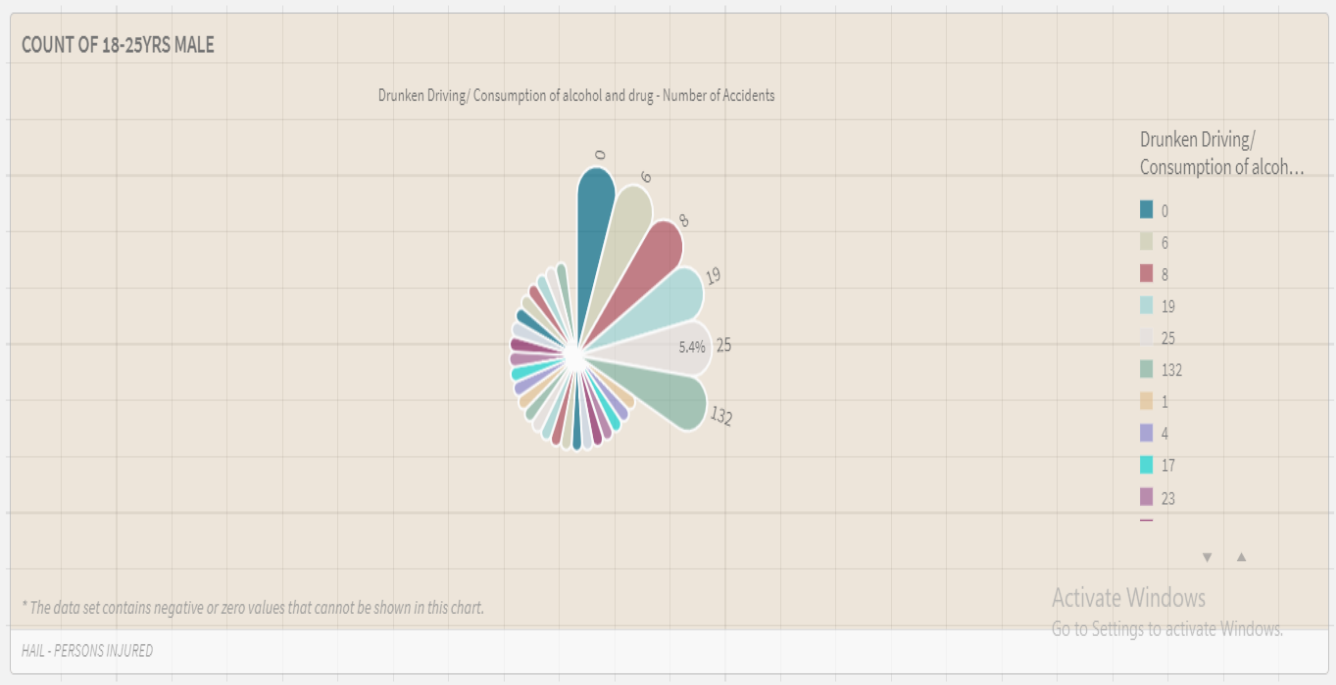
12. Accidents due to overspeeding:



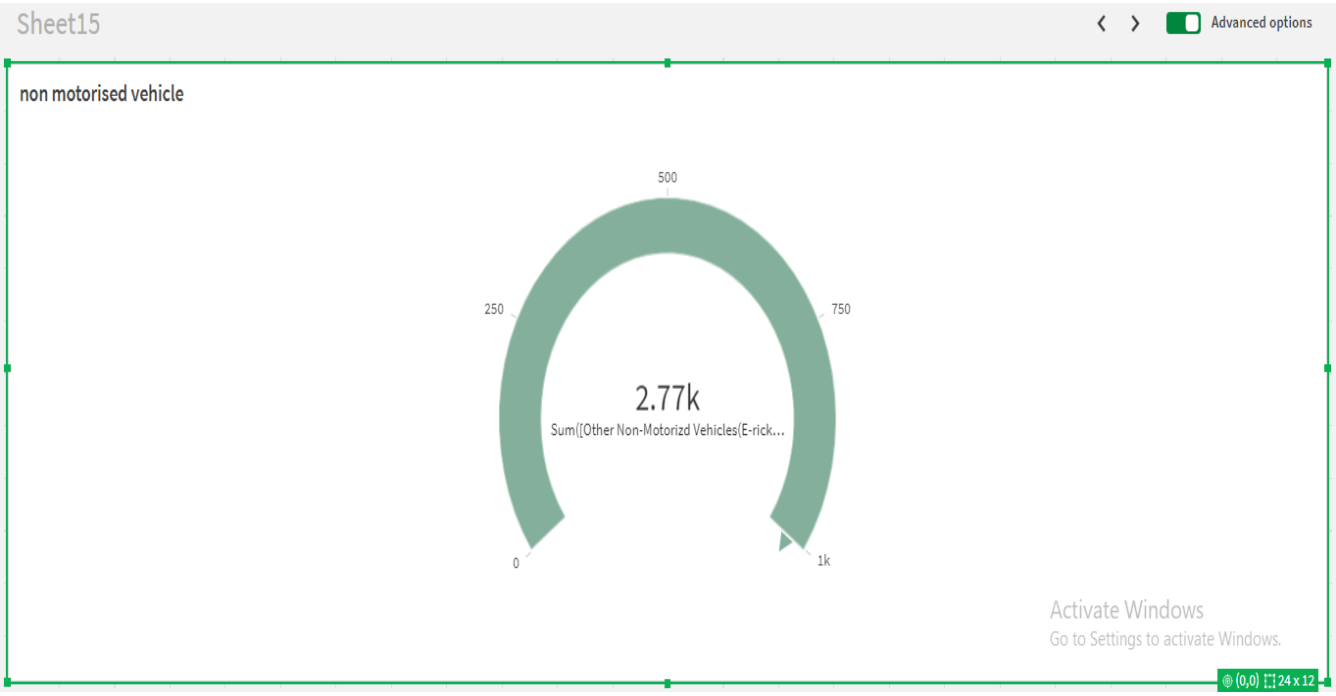
13. Accident due to use of mobile phones:



14. Accident due to druken driving:

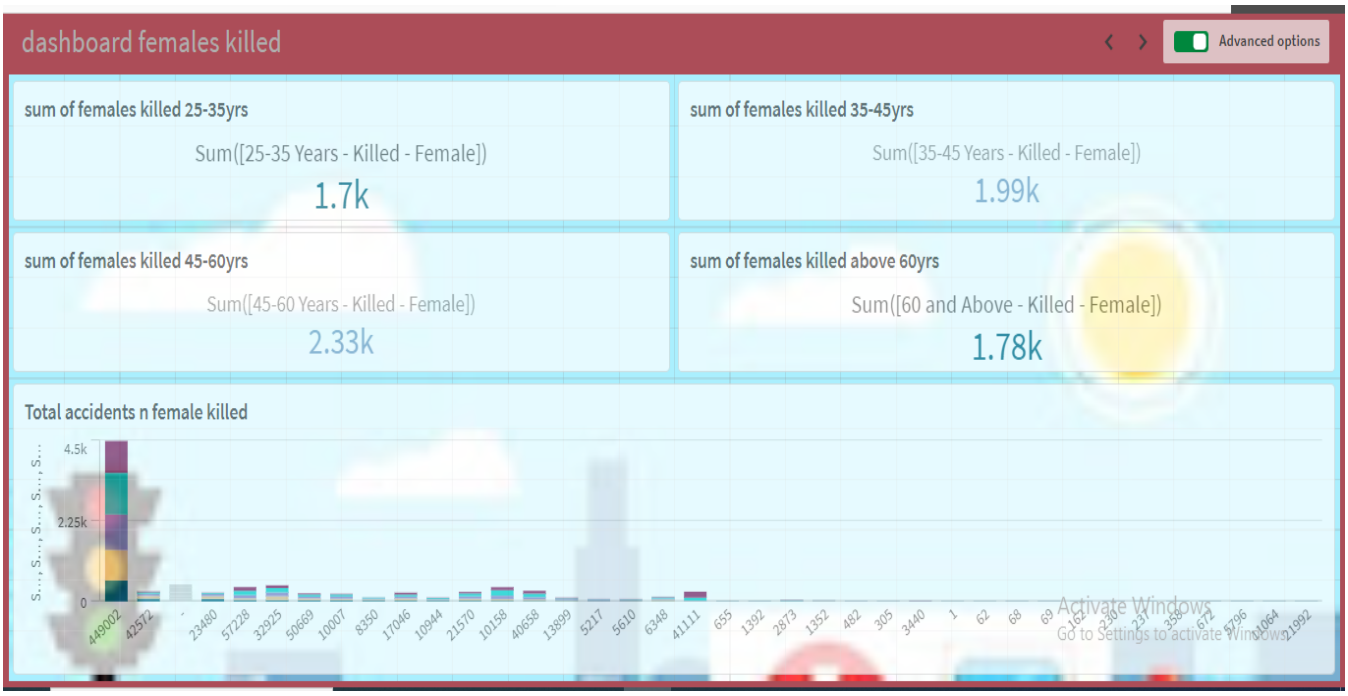


15. Accident of non motorized vehicle:

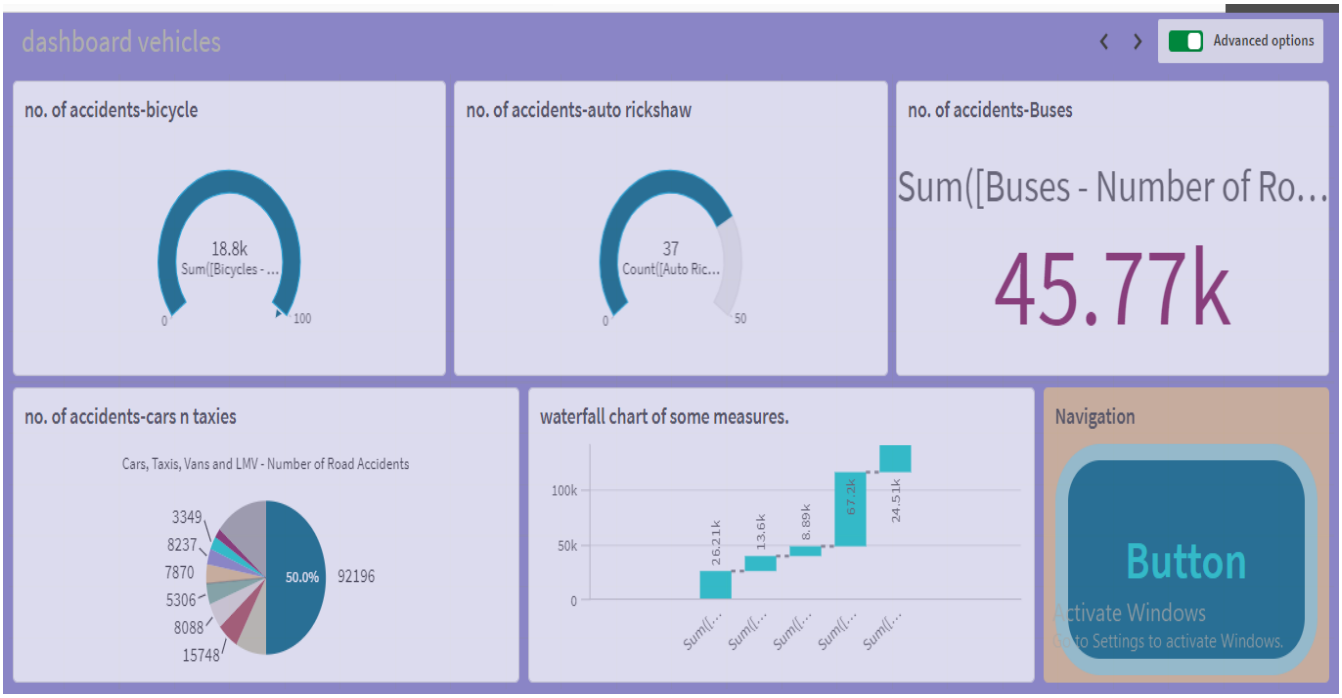


6. DASHBOARDS

01. Dashboard of females killed:



02. Dashboard of vehicles involved:



03. Dashboard of injured persons:

7. STORY TELLING

01.

story of different age females killed in accidents and some visulizing detailed about that.

SUM OF FEMALES KILLED

sum of females killed 25-35yrs

Sum([25-35 Years - Killed - Female])

1.7k

sum of females killed 35-45yrs

Sum([35-45 Years - Killed - Female])

1.99k

sum of females killed 45-60yrs

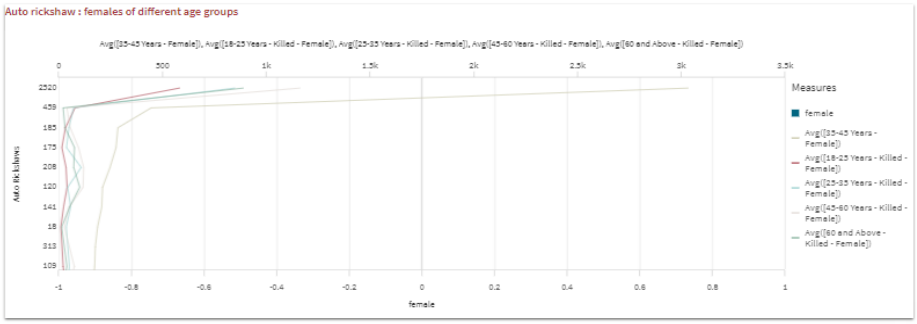
Sum([45-60 Years - Killed - Female])

2.33k

sum of females killed above 60yrs

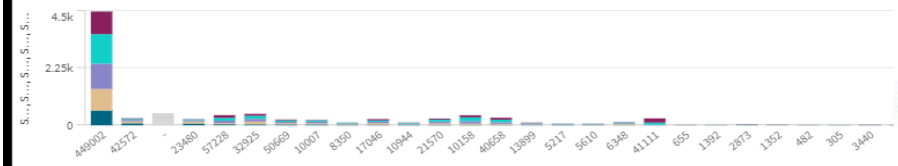
Sum([60 and Above - Killed - Female])

1.78k



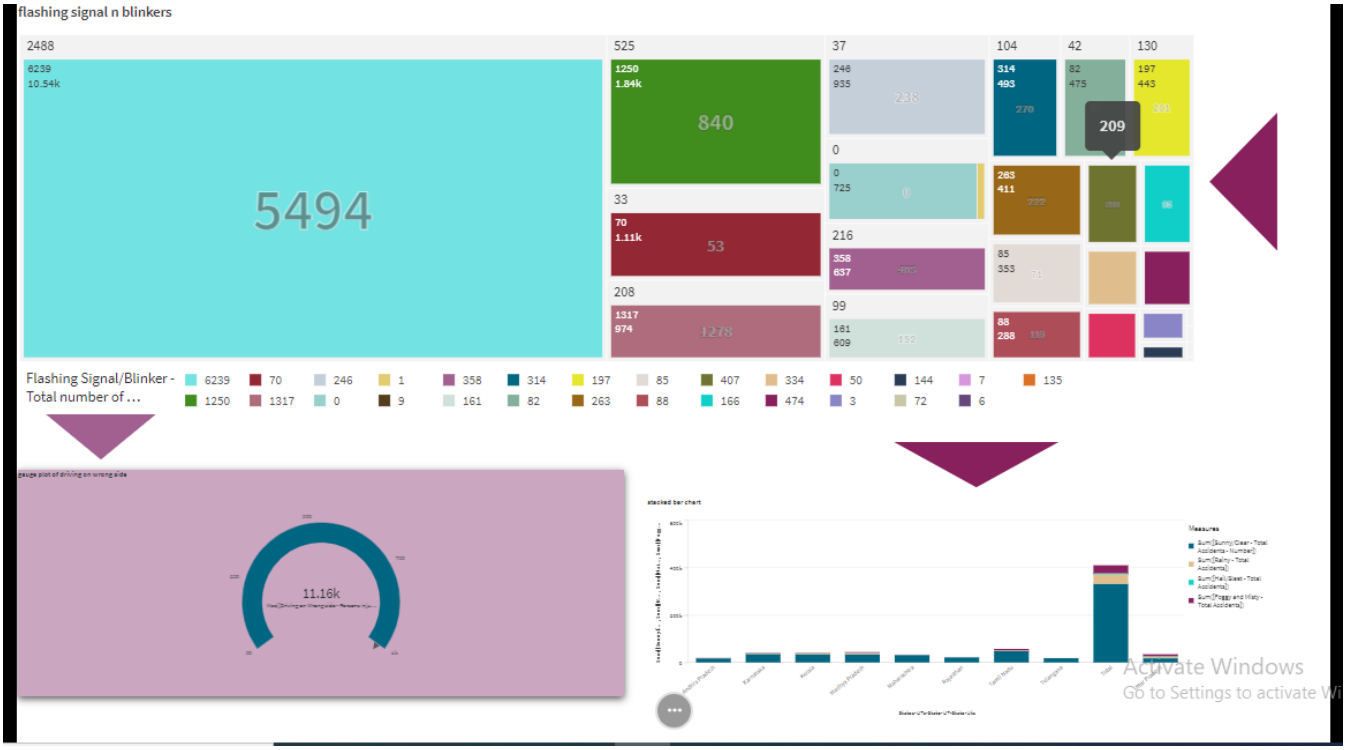
HERE IS THE SUM OF FEMALES KILLED IN ACCIDENTS OF DIFFERENT AGES . AND TOTAL FEMALES INJURED OR KILLED BY AUTO RICKSHAWS ACCIDENT.

Total accidents n female killed



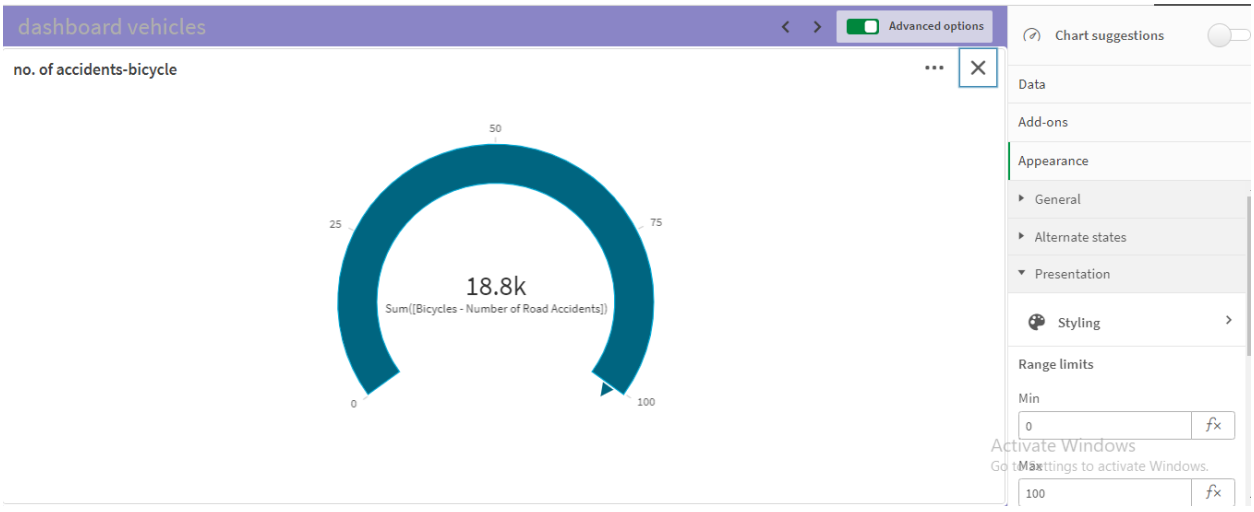
FOLLOW TRAFFIC RULES . BE SAFE AND AWARE . NOTHING PRECIOUS THAN ONE'S LIFE.

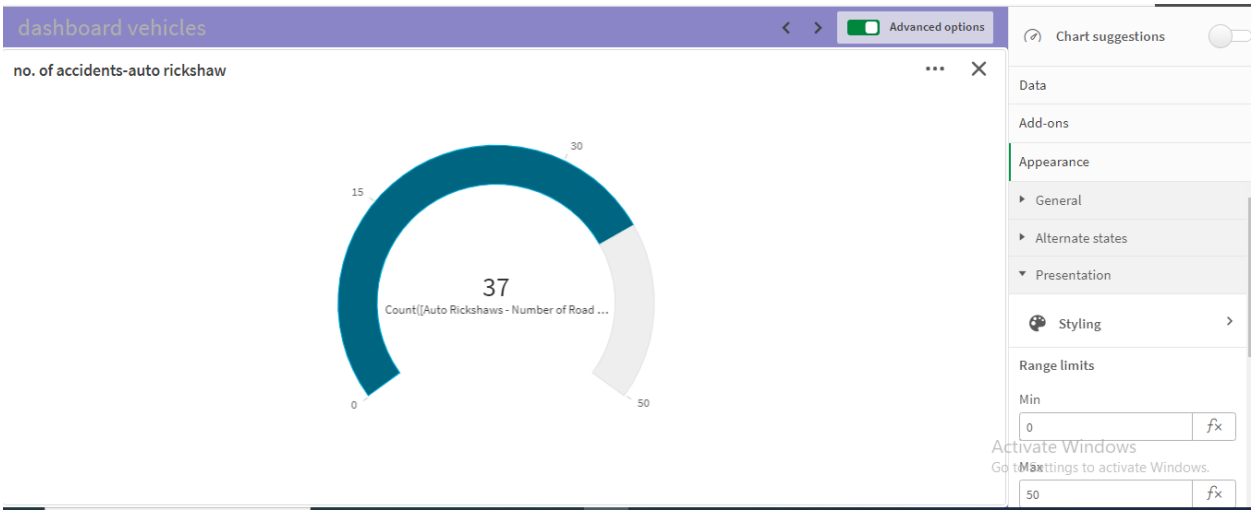
02. Story of flashing signal:

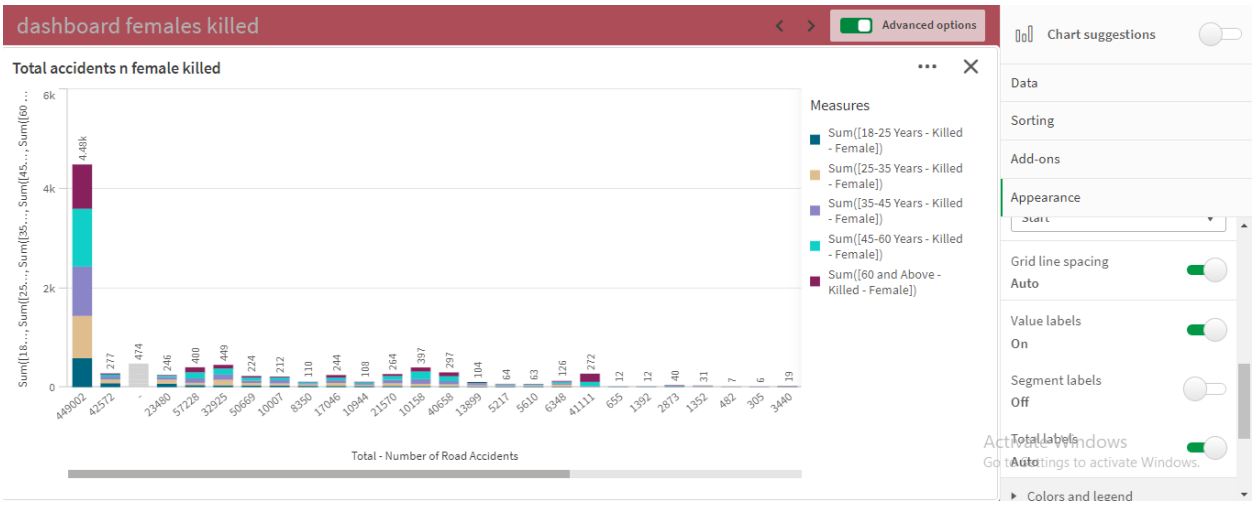


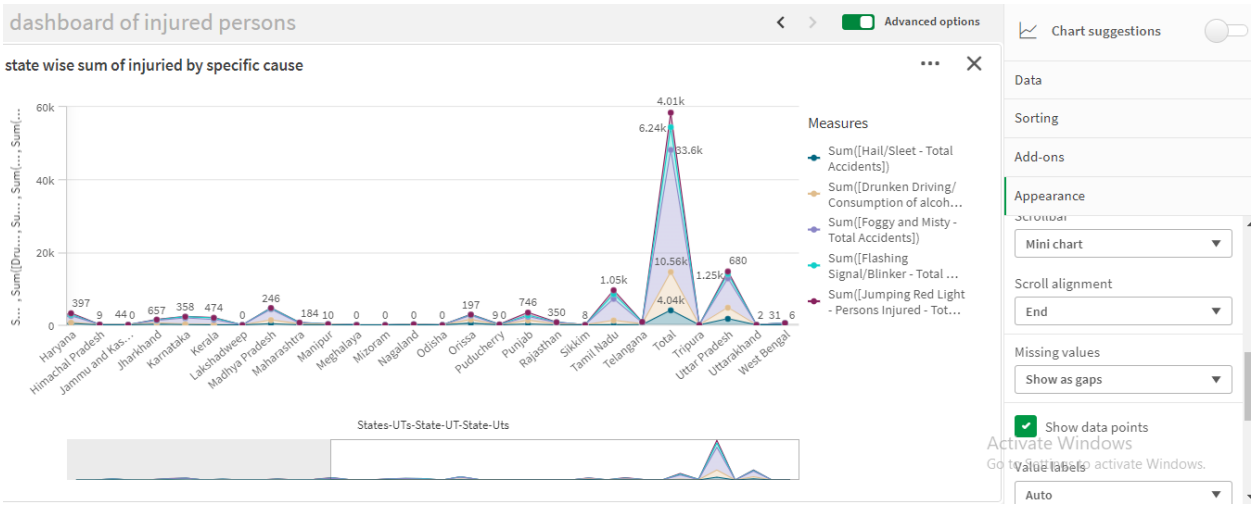
8. Performance Testing

- **Utilization of Data Filters**

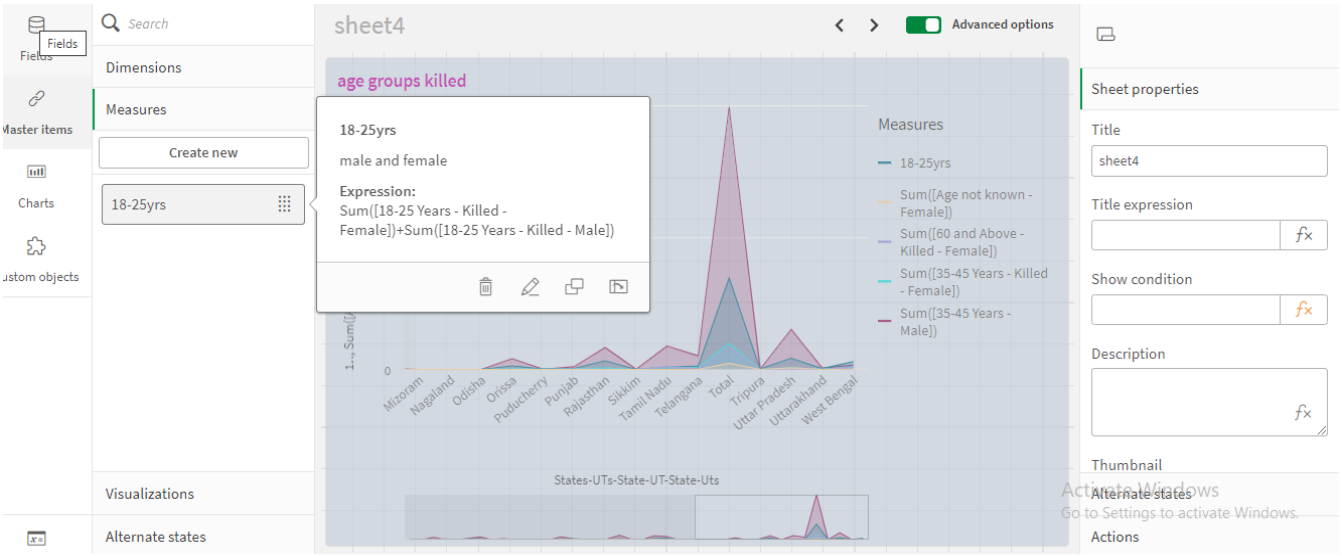








- **USE OF MASTER ITEMS/ FIELDS**



- **Number of Visualizations/Graphs**

01. Pedestrian killed in Accidents :KPI
02. Accidents of females due to autorickshaw:combo chart
03. Accident due to flasing signal:Tree map
04. Different age group killed :Line chart
05. Accidents due to driving on wrong side: gauge
06. Accidents due to weather conditions:stack bar
07. State wise minors killed:Map
08. Accidents due to jumping of redlight:Pivot table
09. Police controlled :Line chart
10. persons killed due to foggy n misty weather:distribution
11. Accidents vehicle distribution:stacked
12. Accidents due to overspeeding:KPI
13. Accident due to use of mobile phones:Bar chart
14. Accident due to druken driving: Pie chart
15. Accident of non motorized vehicle:gauge