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SMART INTERNZ

ROAD ACCIDENTS DASHBOARD

PROJECT REPORT

By

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1. Introduction

1.1 Overview

The "Road Accident Analysis Dashboard" offers an interactive exploration of road accidents in the UK from 2019 to 2022. Utilizing a dataset with 642,797 records and 14 columns. The columns include information about the accident, such as the date, time, location, severity, and number of casualties, road type, weather condition etc.

The dashboard was created using the following steps:

1.Gather requirements. This involved understanding the needs of the stakeholders and what they wanted to see in the dashboard.

2.Clean the data. This involved removing errors, inconsistencies, and duplicates from the data.

3.Process the data. This involved adding some customized columns to the data, such as columns for the year and month of the accident.

4.Visualize the data. This involved creating different charts and visualizations to represent the data.

5.Create the dashboard. This involved putting all of the components together into a dashboard that was easy to use and navigate.

The dashboard and Tableau story is completely interactive and dynamic. The data can be filtered by current year, previous year, and accident severity. The dashboard displays key road accident insights such as the total number of accidents, total casualties, casualties by location, casualties by vehicle type, casualties by weather conditions, and so on.

Some of the key performance indicators (KPIs) tracked by the dashboard include:

- Total accidents in the current year and previous year, along with year-over-year growth.
- Total casualties based on accident severity.
- Different types of casualties with respect to the current year and previous year, along with year-over-year growth.

1.2 Purpose

The project aims to create a dashboard that can be used to track road accidents in the UK. The dashboard is interactive and dynamic, allowing users to filter the data by current year, previous year, and accident severity. The dashboard displays key road accident insights such as the total number of accidents, total casualties, casualties by location, casualties by vehicle type, and casualties by weather conditions.

The dashboard can be used by road safety officials, policymakers, and the general public to improve road safety in the UK. It can be used to identify areas where road safety improvements are needed and to track the effectiveness of road safety initiatives. For example, the dashboard can be used to identify areas where there are a high number of accidents, or where accidents

are becoming more frequent. This information can then be used to target road safety initiatives in these areas

The dashboard can also be used to track the effectiveness of road safety initiatives. For example, if an initiative is implemented to reduce the number of accidents involving young drivers, the dashboard can be used to track whether the number of accidents involving young drivers has actually decreased. Overall, the dashboard is a valuable tool that can be used to improve road safety in the UK. It provides a wealth of information that can be used to make informed decisions about road safety policies and initiatives.

2. Literature Survey

2.1 Existing Problem

The Road Accident Analysis Dashboard addresses several existing problems related to road safety in the UK. These problems include:

- Inadequate Infrastructure: The dashboard allows users to identify areas with poor road conditions that contribute to accidents. By pinpointing these locations, authorities can prioritize road repairs and improvements to enhance safety and prevent accidents.
- Unsafe Driving Behavior: The dashboard helps identify areas with a high number of accidents caused by speeding, drunk driving, and distracted driving. This information enables targeted road safety initiatives and enforcement efforts in these areas, promoting safer driving behavior and reducing accidents.
- Lack of Awareness: The dashboard serves as a tool to raise awareness among road users about various road safety issues. For instance, it can highlight the impact of different weather conditions on driving safety, fostering a better understanding and encouraging drivers to adjust their behavior accordingly.
- Poor Weather Conditions: By tracking accidents in different weather conditions, the dashboard provides insights into the risks associated with specific weather events. This information can be used to issue warnings or advisories to drivers, promoting caution and reducing accidents during adverse weather conditions.
- Evaluation of Road Safety Initiatives: The dashboard enables the tracking and evaluation of the effectiveness of road safety initiatives. For instance, if a campaign is launched to reduce speeding-related accidents, the dashboard can track whether the number of accidents caused by speeding has actually decreased, allowing policymakers to assess the impact of their interventions.

Overall, the Road Accident Analysis Dashboard addresses these existing road safety problems by providing data-driven insights that inform decision-making, prioritize interventions, raise awareness, and evaluate the effectiveness of road safety initiatives. By leveraging the dashboard's capabilities, stakeholders can work towards improving road safety in the UK and reducing the occurrence of accidents.

2.2 Proposed Solution

The proposed solution is to create a dashboard that can be used to track road accidents in the UK. The dashboard will be interactive and dynamic, allowing users to filter the data by current year, previous year, and accident severity. The dashboard will display key road accident insights such as the total number of accidents, total casualties, casualties by location, casualties by vehicle type, and casualties by weather conditions.

The dashboard will be used by road safety officials, policymakers, and the general public to improve road safety in the UK. It will be used to identify areas where road safety improvements are needed and to track the effectiveness of road safety initiatives. For example, the dashboard can be used to identify areas where there are a high number of accidents, or where accidents are becoming more frequent. This information can then be used to target road safety initiatives in these areas.

The dashboard will also be used to track the effectiveness of road safety initiatives. For example, if an initiative is implemented to reduce the number of accidents involving young drivers, the dashboard can be used to track whether the number of accidents involving young drivers has actually decreased.

Overall, the dashboard is a valuable tool that can be used to improve road safety in the UK. It provides a wealth of information that can be used to make informed decisions about road safety policies and initiatives.

Here are some of the specific features of the dashboard:

- Interactive and dynamic: The dashboard will be interactive and dynamic, allowing users to filter the data by current year, previous year, and accident severity. This will allow users to drill down into the data and explore specific trends and patterns.
- Key road accident insights: The dashboard will display key road accident insights such as the total number of accidents, total casualties, casualties by location, casualties by vehicle type, and casualties by weather conditions. This information will be presented in a clear and concise way, making it easy for users to understand.
- Targeted road safety initiatives: The dashboard will be used to identify areas where road safety improvements are needed. This information can then be used to target road safety initiatives in these areas.
- Effectiveness of road safety initiatives: The dashboard will be used to track the effectiveness of road safety initiatives. This information can be used to improve the design and implementation of future road safety initiatives.
- Raise awareness of road safety issues: The dashboard can also be used to raise awareness of road safety issues among road users. This can be done by using the

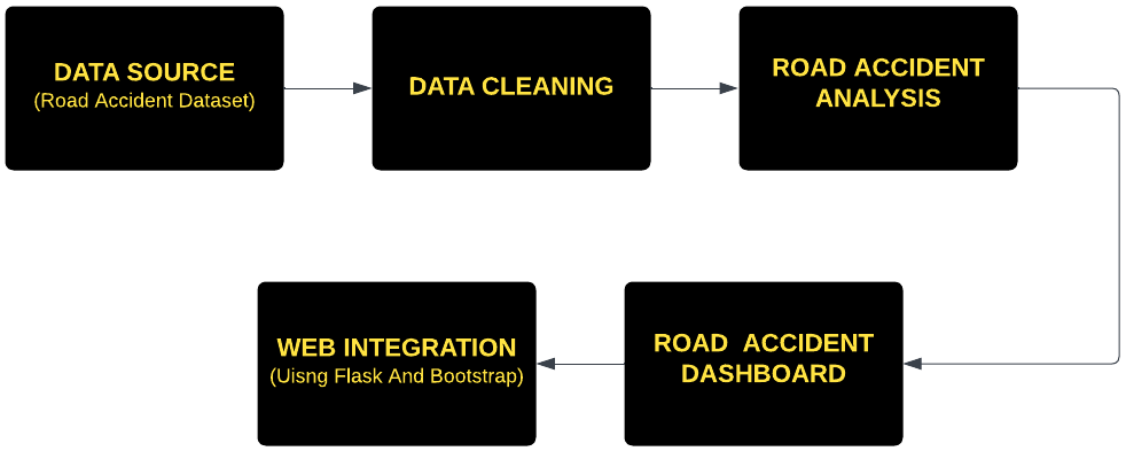
dashboard to show how different weather conditions can affect driving safety, or how unsafe driving behaviors can lead to accidents.

The dashboard will be developed using Tableau, a powerful data visualization tool. Tableau is a user-friendly tool that allows users to create interactive and dynamic dashboards. The dashboard will be hosted on a Tableau server, which will allow users to access it from anywhere in the world.

The dashboard will be made available to road safety officials, policymakers, and the general public. It will be free to use and will not require any special software or hardware. The dashboard will be updated on a regular basis to ensure that it contains the most up-to-date data.

3. Theoretical Analysis

3.1 Block Diagram



Detailed explanation of each block:

- Data Source: This is the dataset of road accidents in the UK. The dataset is downloaded from Kaggle. The dataset contains information about the accident, such as the date, time, location, severity, and number of casualties.
- Data Cleaning: This step involves removing errors, inconsistencies, and duplicates from the data. This is important to ensure that the data is accurate and reliable.
- Road accident Analysis: This step involves creating visualizations and insights from the data. This is done using a tool called Tableau. The goal of the data analysis step is to identify trends and patterns in the data that can be used to improve road safety.
- Road Accident Dashboard: This is the final product that will be used by road safety officials, policymakers, and the general public. The dashboard will display key road accident insights such as the total number of accidents, total casualties, casualties by location, casualties by vehicle type, and casualties by weather conditions. The dashboard will also be interactive and dynamic, allowing users to filter the data by current year, previous year, and accident severity.

- Web Integration (using Flask and Bootstrap): This step involves creating a web application that allows users to interact with the dashboard. The web application will be created using Flask, a Python framework for creating web applications. Bootstrap, a CSS framework, will be used to style the web application.
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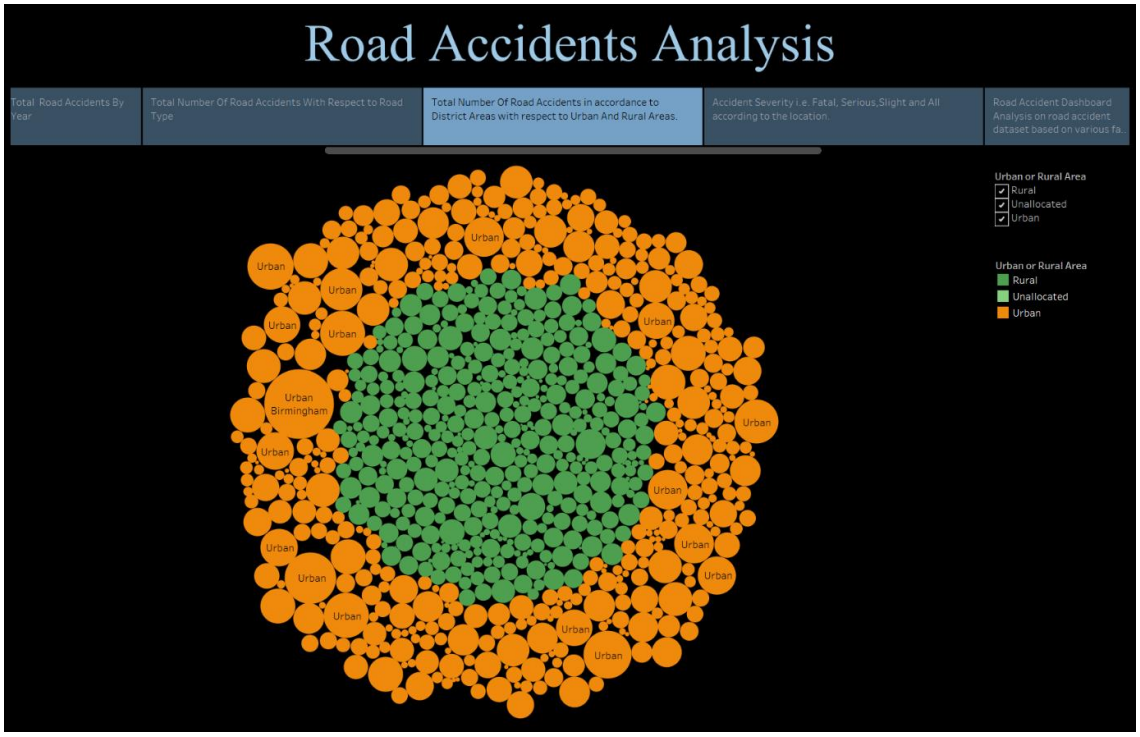
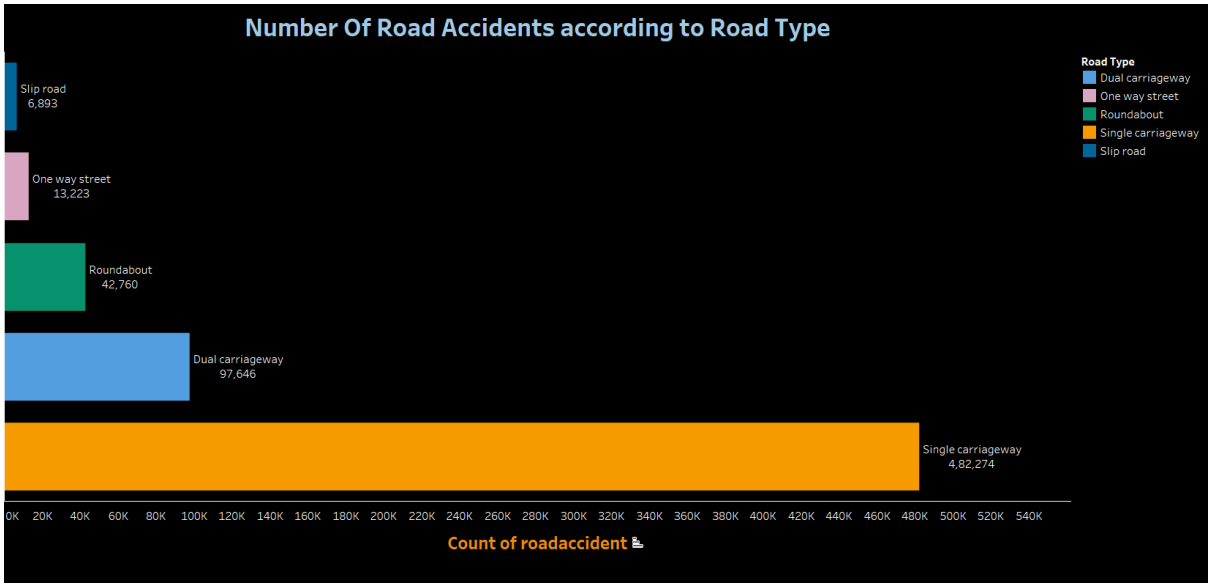
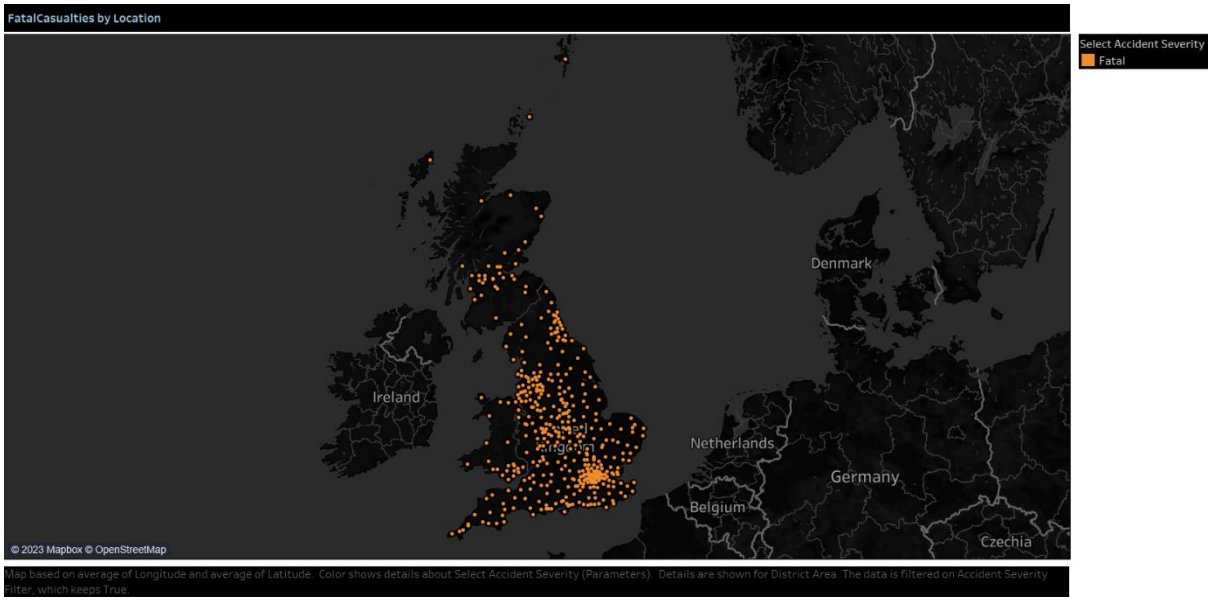
3.2 Software design

Road accident Dashboard:

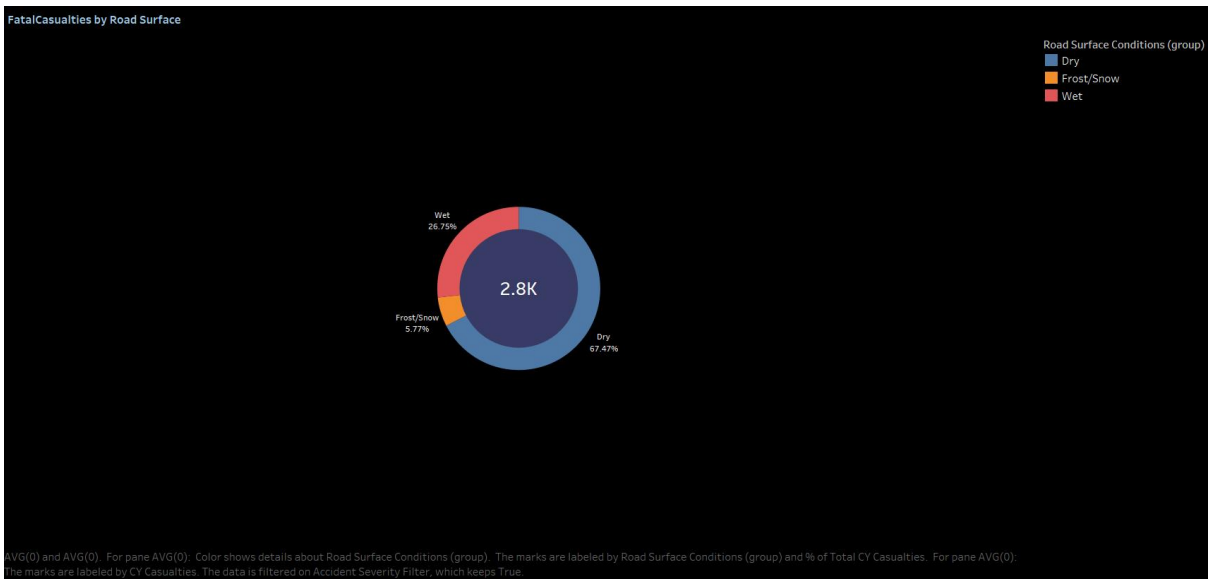
Road Accident Story :







Map based on average of Longitude and average of Latitude. Color shows details about Select Accident Severity (Parameters). Details are shown for District Area. The data is filtered on Accident Severity Filter, which keeps True.



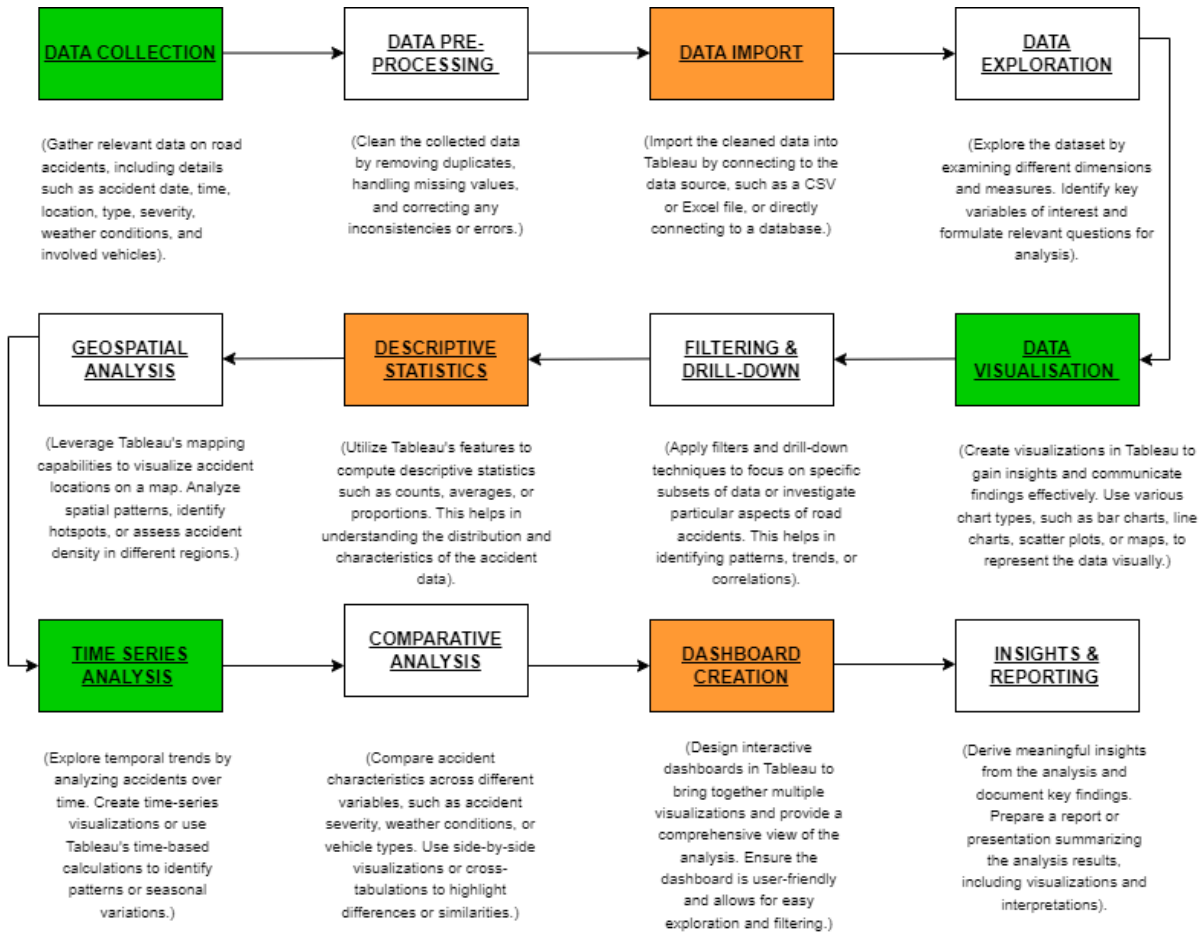
AVG(0) and AVG(0). For pane AVG(0): Color shows details about Road Surface Conditions (group). The marks are labeled by Road Surface Conditions (group) and % of Total CY Casualties. For pane AVG(0): The marks are labeled by CY Casualties. The data is filtered on Accident Severity Filter, which keeps True.

4. Experimental Investigations

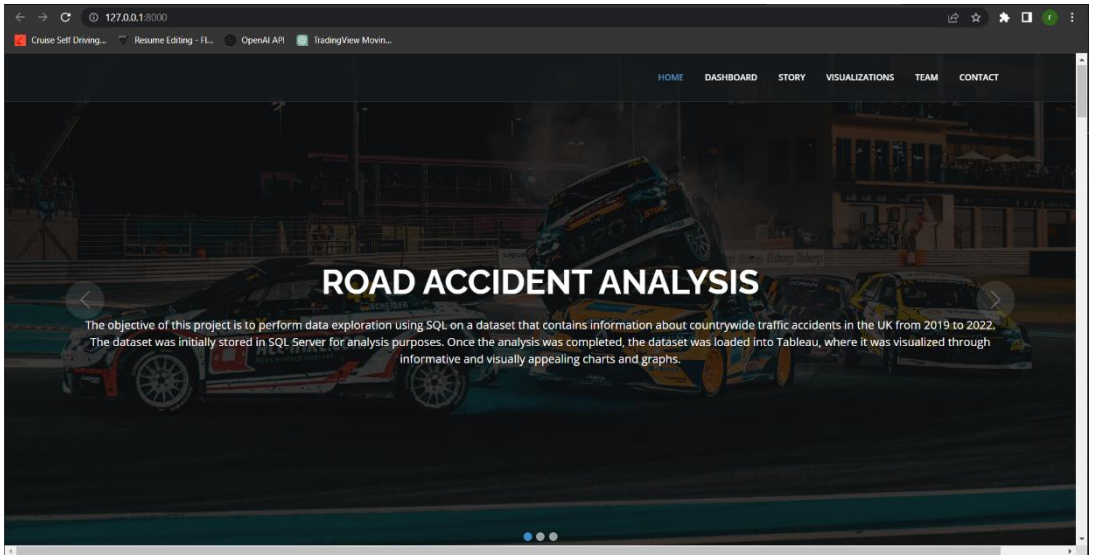
Here are some experimental investigations that can be conducted to improve the dashboard in short:

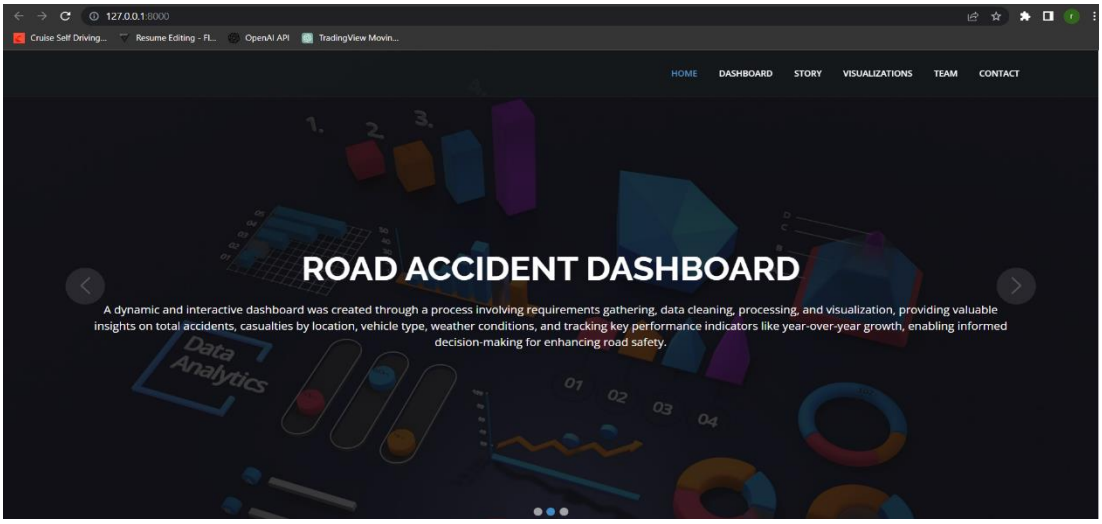
- Visualization techniques: The dashboard can be improved by using different data visualization techniques to make the data more understandable and engaging for users.
- Dashboard layout: The dashboard can be improved by using a user-friendly layout that makes it easy for users to find the information they are looking for.
- Dashboard features: The dashboard can be improved by adding or removing features that are not used by users or that are not effective in improving road safety.
- Impact on road safety: The dashboard can be improved by tracking the number of accidents in areas where the dashboard is used to assess its effectiveness in improving road safety.

5. Flowchart



6. Result


127.0.0.1:8000
Cruise Self Driving...
Resume Editing - Fl...
OpenAI API
TradingView Movin...
HOME
DASHBOARD
STORY
VISUALIZATIONS
TEAM
CONTACT
ROAD ACCIDENT ANALYSIS
The objective of this project is to perform data exploration using SQL on a dataset that contains information about countrywide traffic accidents in the UK from 2019 to 2022. The dataset was initially stored in SQL Server for analysis purposes. Once the analysis was completed, the dataset was loaded into Tableau, where it was visualized through informative and visually appealing charts and graphs.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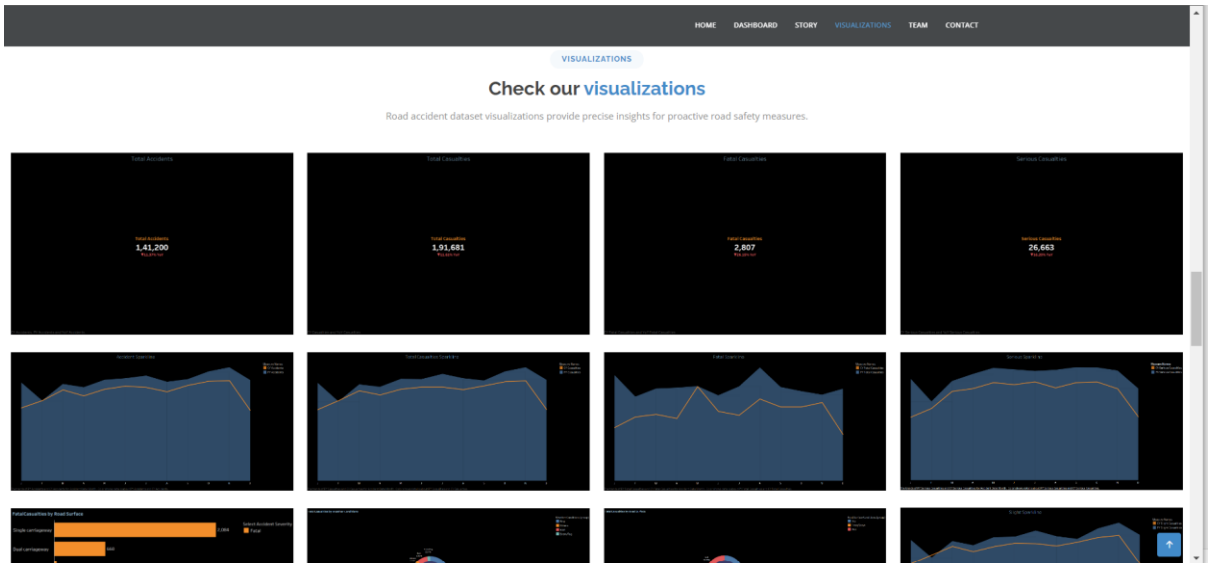
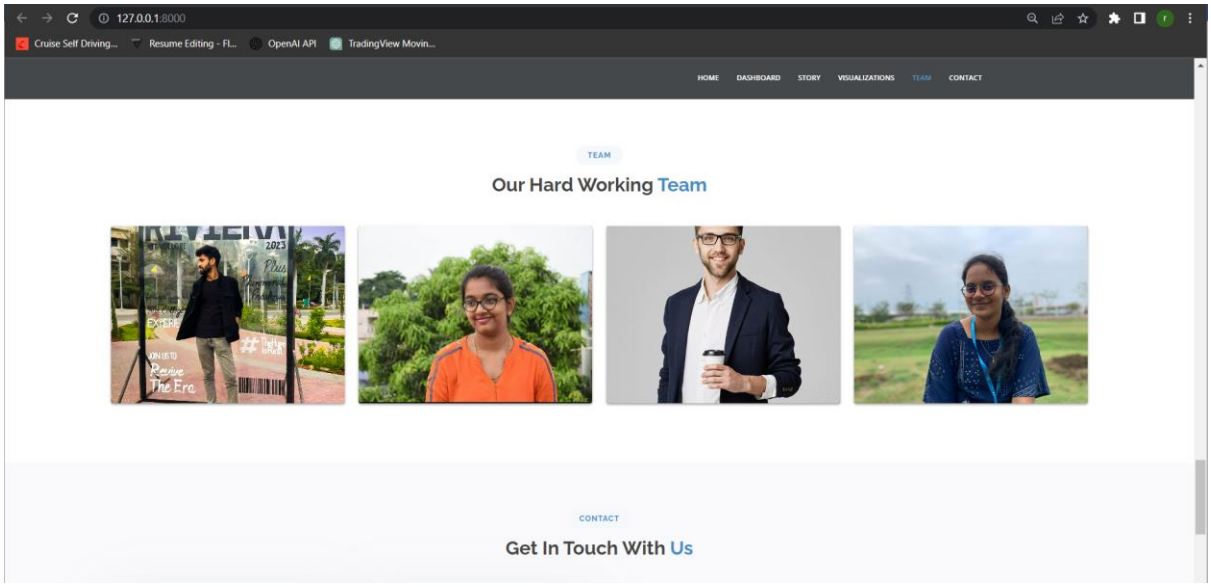
Resume Editing - Fl...
OpenAI API
TradingView Movin...
HOME
DASHBOARD
STORY
VISUALIZATIONS
TEAM
CONTACT
ROAD ACCIDENT DASHBOARD
A dynamic and interactive dashboard was created through a process involving requirements gathering, data cleaning, processing, and visualization, providing valuable insights on total accidents, casualties by location, vehicle type, weather conditions, and tracking key performance indicators like year-over-year growth, enabling informed decision-making for enhancing road safety.


127.0.0.1:8000
Cruise Self Driving...
Resume Editing - Fl...
OpenAI API
TradingView Movin...
ROAD ACCIDENT DASHBOARD
Total Accidents
141,200
Total Casualties
191,681
Fatal Casualties
2,807
Serious Casualties
26,663
Slight Casualties
162,211
Fatal Casualties by Vehicle Type
7
47
2,315
176
33
229
FatalCasualties by Weather Conditions
FatalCasualties by Road Surface
FatalCasualties by Location
2.8K
Single carriageway
Dual carriageway
Roundabout
Slip road
One way street
Ireland


127.0.0.1:8000
Cruise Self Driving...
Resume Editing - Fl...
OpenAI API
TradingView Movin...
HOME
DASHBOARD
STORY
VISUALIZATIONS
TEAM
CONTACT
Road Accidents Analysis
Total Road Accidents By Day
Total Road Accidents By Month
Total Road Accidents By Year
Total Number Of Road Accidents With Respect To Type
Count of roadaccident


HOME
DASHBOARD
STORY
VISUALIZATIONS
TEAM
CONTACT
VISUALIZATIONS
Check our visualizations
Road accident dataset visualizations provide precise insights for proactive road safety measures.
Total Accidents
1,41,200
Total Casualties
1,91,681
Fatal Casualties
2,807
Serious Casualties
26,663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Our Hard Working Team
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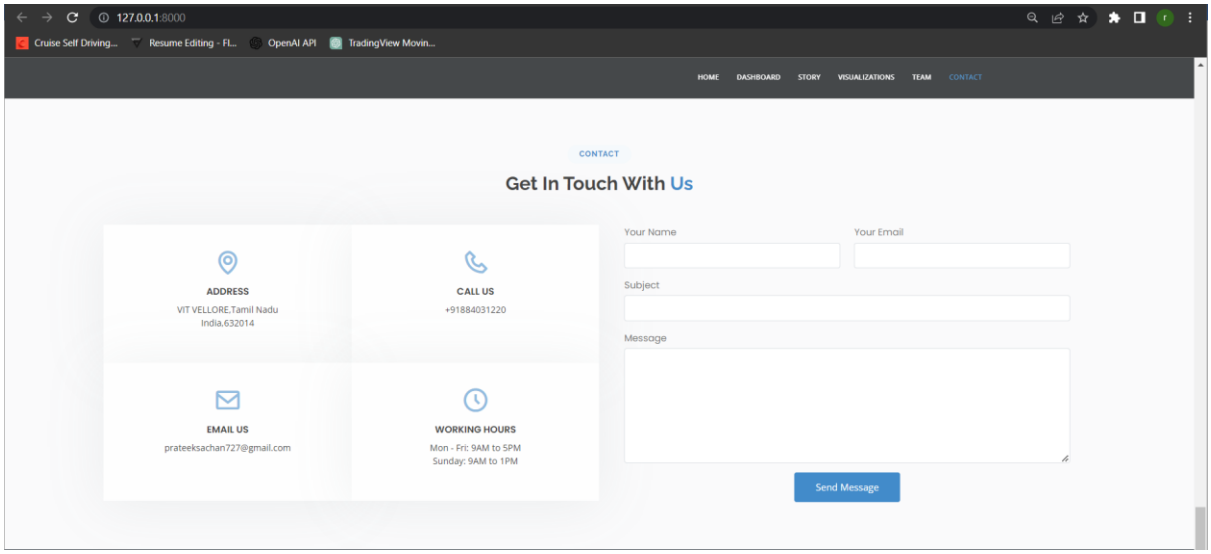
Get In Touch With Us



7. Advantages & Disadvantages

Some of the advantages and disadvantages of the dashboard :

Advantages:

- Data-driven: The dashboard is data-driven, which means that it is based on real data. This makes the dashboard a reliable source of information for road safety officials, policymakers, and the general public.
- Interactive: The dashboard is interactive, which means that users can interact with the data and explore different trends and patterns. This makes the dashboard a valuable tool for understanding road safety issues.
- Dynamic: The dashboard is dynamic, which means that it can be updated with new data on a regular basis. This ensures that the dashboard is always up-to-date and provides users with the most accurate information.
- Scalable: The dashboard is scalable, which means that it can be used to track road accidents in large or small areas. This makes the dashboard a versatile tool that can be used by a variety of organizations.
- Accessible: The dashboard is accessible to road safety officials, policymakers, and the general public. This makes the dashboard a valuable tool for raising awareness of road safety issues and promoting road safety initiatives.

Disadvantages:

- Cost: The dashboard can be costly to develop and maintain. However, the cost of the dashboard can be offset by the benefits that it provides, such as improved road safety.
- Data quality: The dashboard is only as good as the data that it is based on. If the data is inaccurate or incomplete, the dashboard will not be able to provide accurate or reliable information.
- User expertise: The dashboard requires some level of user expertise to use effectively. Users need to be able to understand data visualization techniques and be able to interpret the data that is presented in the dashboard.

- ❖ Time commitment: The dashboard can be time-consuming to use. Users need to be willing to spend time exploring the data and understanding the trends and patterns that are presented in the dashboard.

Overall, the dashboard has a number of advantages that make it a valuable tool for improving road safety. However, there are also some disadvantages that need to be considered before implementing the dashboard.

8. Applications

some of the applications of the dashboard :

- Road safety officials: Identify areas where road safety improvements are needed and track the effectiveness of road safety initiatives.
- Policymakers: Make informed decisions about road safety policies and identify areas where funding for road safety initiatives are needed.
- General public: Learn about road safety issues and make informed decisions about their own driving behavior.
- Researchers: Conduct research on road safety issues and identify data gaps.
- Media: Report on road safety issues and raise awareness of road safety issues.

The dashboard can be used by a variety of stakeholders to improve road safety.

9. Conclusion

In conclusion, the road accident tableau report provides valuable insights into accident patterns, trends, and risk factors. Through Tableau's data visualization capabilities, we have identified the occurrence of accidents by year and month, enabling a comprehensive understanding of temporal dynamics. This information facilitates targeted interventions during specific months or seasons with higher accident rates. Additionally, the report highlights the impact of road type, region, and district on accident occurrences. Interactive visualizations help identify high-risk areas, informing infrastructure improvements and preventive measures in specific regions and districts. These findings enhance our understanding of the factors contributing to road accidents and support evidence-based decision-making for road safety strategies.

The report's insights and recommendations offer guidance to policymakers, traffic authorities, and stakeholders in implementing effective road safety measures. Leveraging the power of Tableau's data visualization, decision-makers can identify trends, allocate resources efficiently, and implement targeted interventions to reduce accidents. By considering temporal variations and the influence of road characteristics, stakeholders can create safer road environments and protect the well-being of road users. Ultimately, the findings contribute to improving road safety, preventing accidents, and fostering a safer transportation system for all.

10. Future Scope

Some of the future scopes of the dashboard:

- Incorporate more data sources: The dashboard can be expanded to incorporate more data sources, such as weather data, traffic data, and social media data. This would allow the dashboard to provide a more comprehensive view of road safety and to identify trends and patterns that would not be possible to identify with a single data source.
- Develop more sophisticated data visualization techniques: The dashboard can be improved by developing more sophisticated data visualization techniques. This would make the data more understandable and engaging for users and would help them to identify trends and patterns in the data more easily.
- Make the dashboard more interactive: The dashboard can be made more interactive by allowing users to drill down into the data and explore different trends and patterns. This would allow users to get a deeper understanding of road safety issues and to make more informed decisions about their own driving behavior.
- Make the dashboard more accessible: The dashboard can be made more accessible by translating it into different languages and by making it available on mobile devices. This would allow more people to use the dashboard and to benefit from the insights that it provides.
- Use the dashboard to promote road safety initiatives: The dashboard can be used to promote road safety initiatives by highlighting the effectiveness of these initiatives and by showing how they can help to reduce the number of accidents. This would help to raise awareness of road safety issues and to encourage people to take steps to drive more safely.

Overall, the dashboard has a lot of potential to improve road safety. By expanding the data sources that it uses, developing more sophisticated data visualization techniques, and making it more interactive and accessible, the dashboard can become an even more valuable tool for road safety officials, policymakers, and the general public.

11. Bibliography

1. Malik, Faheem. (2017). Road Accidents and Prevention. INTERNATIONAL JOURNAL OF ENGINEERING DEVELOPMENT AND RESEARCH. 5. 40-46.

2. S. Sonal and S. Suman, "A Framework for Analysis of Road Accidents," 2018 International Conference on Emerging Trends and Innovations In Engineering And Technological Research (ICETIETR), Ernakulam, India, 2018, pp. 1-5, doi: 10.1109/ICETIETR.2018.8529088.

3. Shakil Ahmed, Md Akbar Hossain, Sayan Kumar Ray, Md Mafijul Islam Bhuiyan, Saifur Rahman Sabuj, A study on road accident prediction and contributing factors using explainable machine learning models: analysis and performance,Transportation Research Interdisciplinary Perspectives,Volume 19,2023,100814,ISSN 2590-1982.

4. Mohammed, Ali & Ambak, Kamarudin & Mosa, Ahmed & Syamsunur, Deprizon. (2019). A Review of the Traffic Accidents and Related Practices Worldwide. The Open Transportation Journal. 13. 65-83. 10.2174/1874447801913010065.

5. Arun Chand, S. Jayesh, A.B. Bhasi,Road traffic accidents: An overview of data sources, analysis techniques and contributing factors,Materials Today: Proceedings,Volume 47, Part 15,2021,Pages 5135-5141,ISSN 2214-7853.

Appendix

➢ Source Code

https://github.com/prateek08s/Road-Accident-Analytics

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