

Report On Road Safety Analysis By Smartinternz

1. INTRODUCTION:-

- **Overview:** Vehicular accidents are a major concern worldwide, resulting in countless deaths, injuries, and economic losses. This project aims to analyze road accident data to gain insights into the factors contributing to these incidents. By understanding the patterns and trends associated with accidents, we can develop strategies to improve road safety and prevent future tragedies. Traffic accidents are a global threat, causing devastating consequences. Data visualization offers a powerful tool to analyze these accidents and gain insights that can improve road safety. This project delves into the world of road accidents using data visualization techniques.
- **Purpose:** The purpose of data visualization in road safety and accident analysis is to transform complex datasets into clear and understandable formats. By using charts, graphs, and interactive elements, data visualization helps us uncover hidden patterns and trends in accident data. This allows us to identify high-risk factors like specific locations, times of day, or driver behaviors. These insights can then be effectively communicated to a broad audience, raising awareness about road safety issues and informing decision-makers on how to allocate resources and implement targeted interventions to create a safer driving environment.
- **Technical Architecture:** The technical architecture for a road safety and accident analysis project can be layered, with each layer building upon the previous one. The Data Acquisition layer focuses on gathering data from various sources. This could involve connecting to government databases containing accident reports, partnering with traffic authorities for real-time accident information, or even integrating with public datasets on weather conditions or road infrastructure. The Data Storage layer handles the process of receiving and storing the collected data. It might involve setting up data pipelines to transfer information from various sources into a central storage system, potentially a cloud-based data warehouse. Data cleaning and pre-processing steps might also be included here to ensure data quality and consistency.
- **Visualization and Reporting:** This layer focuses on transforming the analyzed data into clear and insightful visualizations. Interactive dashboards or reports can be created using specialized software to effectively communicate findings to stakeholders. This layer might also involve tailoring visualizations for different audiences, such as policymakers or the general public.

2. PROBLEM UNDERSTANDING:-

- **Problem Statement:** Despite ongoing efforts to improve road safety, traffic accidents remain a significant public health concern worldwide. These accidents cause devastating consequences, leading to numerous fatalities, injuries, and immense economic burdens. The current challenge lies in effectively identifying and mitigating the factors contributing to these accidents. This Road Safety Analysis project aims to bridge this gap by leveraging data analysis and visualization techniques. By transforming raw data into actionable insights, we can create a data-driven approach to improving road safety.
- **Business Requirements:** The Road Safety Analysis project requires several key functionalities to achieve its goals. The project needs the ability to gather comprehensive accident data from reliable sources. This might involve establishing connections with government databases, traffic authorities, or public datasets. The project requires tools and techniques to analyze the collected data. Statistical software for identifying trends and correlations, data visualization tools for creating impactful visuals, and potentially even machine learning capabilities for complex analysis are necessary. The project needs a system to generate clear and concise reports and visualizations. Interactive dashboards or reports tailored for different audiences (policymakers, public) are essential for effectively communicating the findings and raising awareness.
- **Literature Survey:** A thorough literature survey is a vital first step for your Road Safety Analysis Project. This survey will delve into existing research on road accidents to gain valuable context and insights. The survey will examine existing theories that explain driver behavior and accident causation. This could involve exploring theories like social cognitive theory, which focuses on social influences and personal beliefs on behavior, or risk homeostasis theory, which suggests drivers adjust their behavior to maintain a perceived level of risk. Understanding these frameworks will provide a foundation for interpreting your own analysis. By examining past research, theoretical foundations, and current practices, the literature survey will lay the groundwork for your own road safety analysis project. It will help you identify potential areas of focus and ensure your research builds upon existing knowledge to make a meaningful contribution to the field. The literature survey will explore current policies and programs aimed at improving road safety. This could involve researching successful initiatives in your chosen region or globally, encompassing areas like distracted driving campaigns, infrastructure improvements, or technological advancements in vehicles and traffic management systems.

3. DATA COLLECTION:-

- **Collect the Data:** Obtaining high-quality data is essential for a successful road safety analysis project. Many government transportation departments or traffic police agencies maintain databases containing accident reports. The data should be specific enough to pinpoint the location of the accident. Ideally, it would include address information, intersection details, or highway mile marker for precise geospatial analysis. Date and time data allow for analysis of trends across different days, weeks, or times of day. This can help identify patterns related to factors like rush hour commutes or nighttime driving. The weather conditions like rain, snow, or fog that might impact visibility or road conditions. By collecting and analyzing this comprehensive data, you can gain valuable insights into the factors contributing to road accidents in your chosen area. This data can then be used to develop targeted interventions and improve overall road safety.
- **Connect the Data for Visualization:** There are several ways to connect your data to Qlik Sense for visualization, depending on the source of your data. The first one is Uploading Files that is CSV, TXT, Excel, XLSX etc. After connecting your data, you can utilize Qlik Sense's data transformation features to clean, reshape, and manipulate the data to prepare it for visualization. For complex analyses, you can create data models within Qlik Sense to establish relationships between different data sets (e.g., connecting accident data with geographical location data).
- **Process to Connect the Datasets:-**
 - In Qlik Sense, navigate to the "Data" tab in the top menu.
 - Click on "Add data" and choose "From file."
 - Browse and select your data file (e.g., CSV file containing road accident data).
 - Qlik Sense will launch a data preview window. You can define data types for each column and choose relevant delimiters (e.g., commas or tabs) if applicable.
 - Once satisfied, click "Load" to import the data into Qlik Sense.

4. DATA PREPARATION:-

- **Prepare the Data for Visualization:** Before implementing the actual visualization of the datasets its very important to clean the data. Data cleaning, also known as data cleansing, is a crucial step in the machine learning (ML) pipeline. It involves identifying and correcting errors, inconsistencies, and missing data from your dataset to ensure the quality and reliability of your machine learning models.

5. Data Visualizations:-

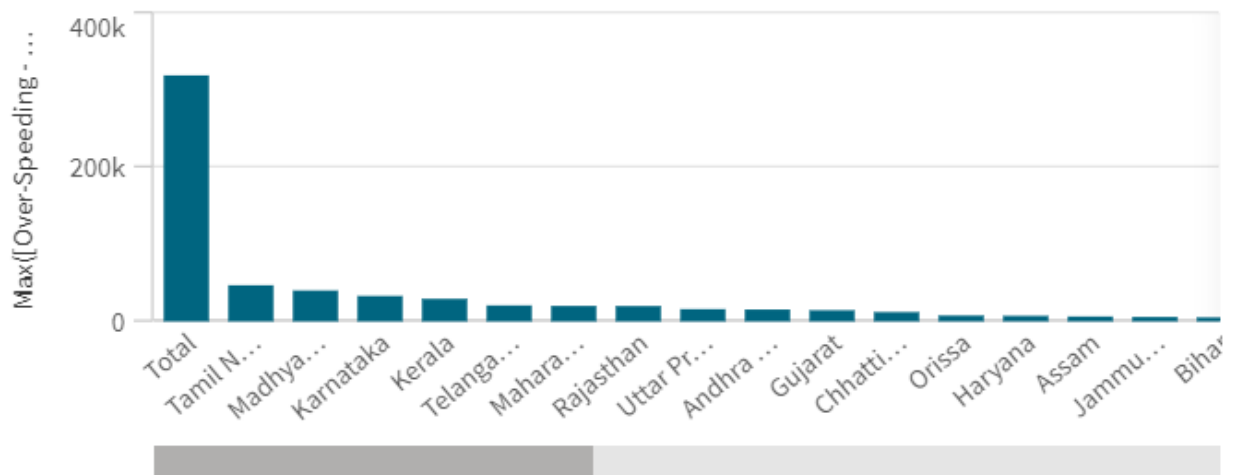
2 Wheelers Accident For Alcohol



Drunken Driving/ Consumption of alcohol and drug - Number of Accidents

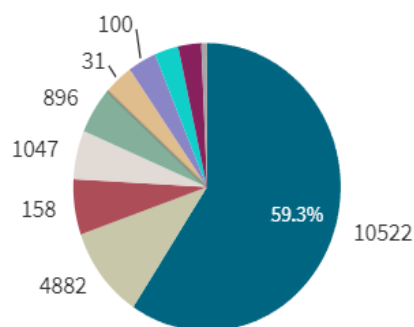


Accidents Due To Over-Speeding

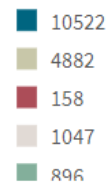


Accidents Due To Use Of Mobile Phone

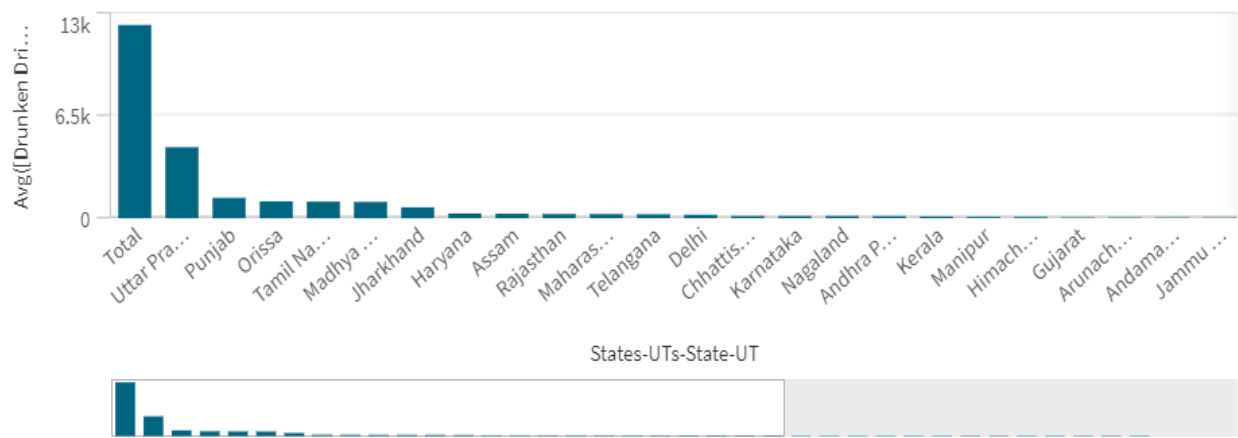
Use of Mobile Phone - Number of Accidents



Use of Mobile Phone - Number of Accidents



State-wise Accident Due To Alcohol



Total Accidents

Sum([Total - Number of Road A...]

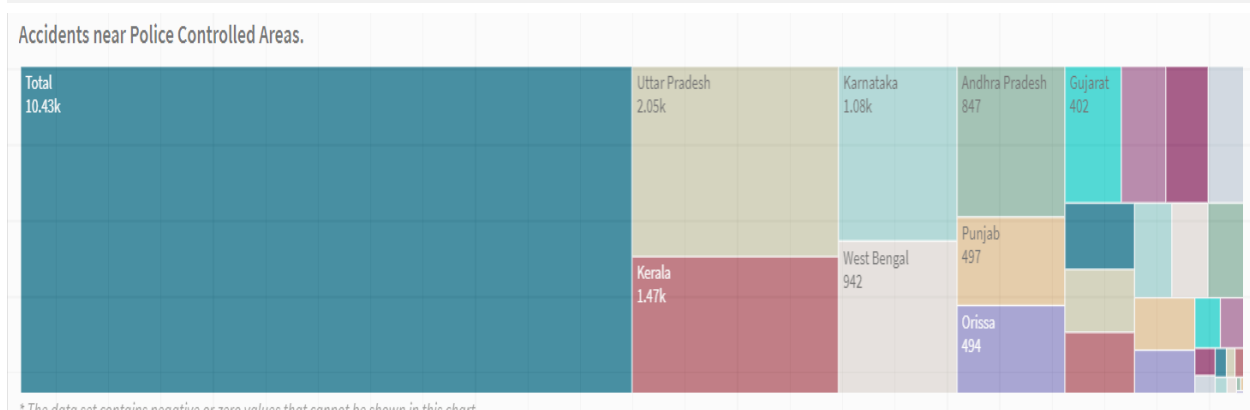
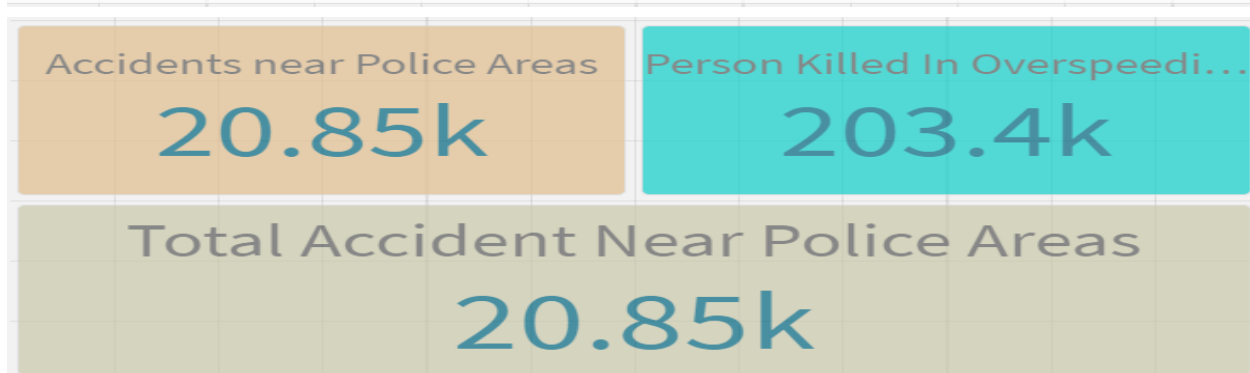
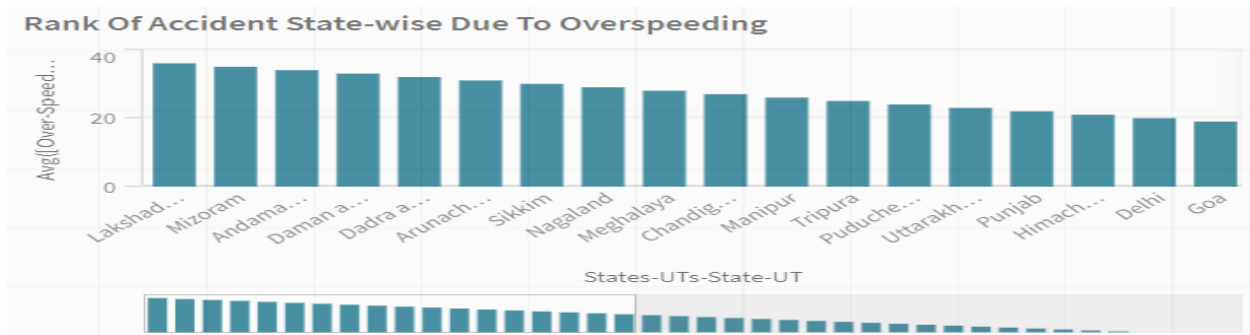
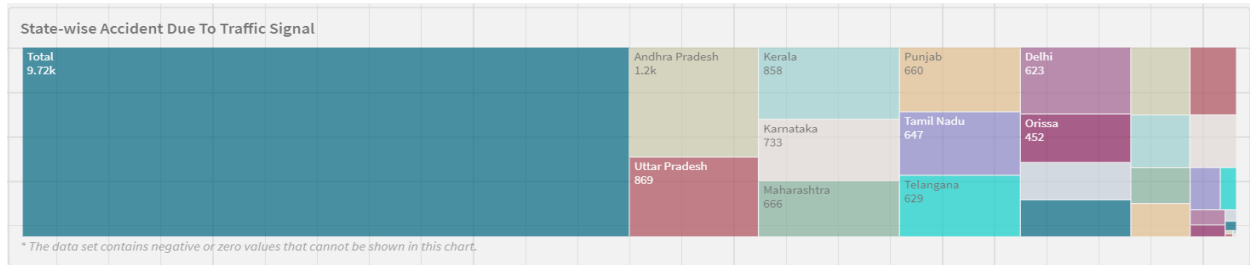
898k

Total Person Killed in Accident

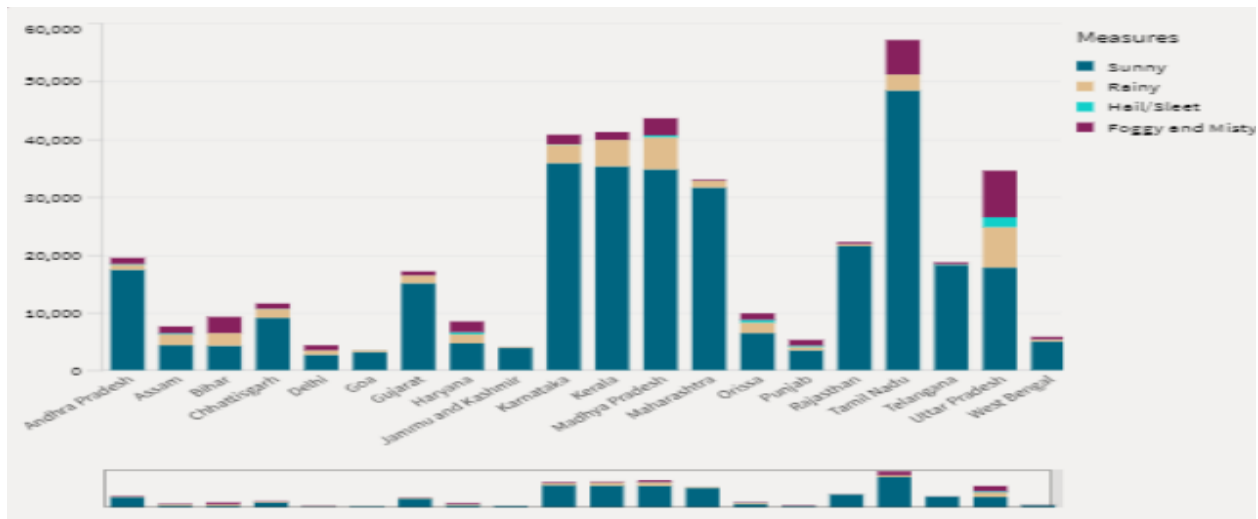
Sum([Total - Number of Persons - Killed])

302.2k

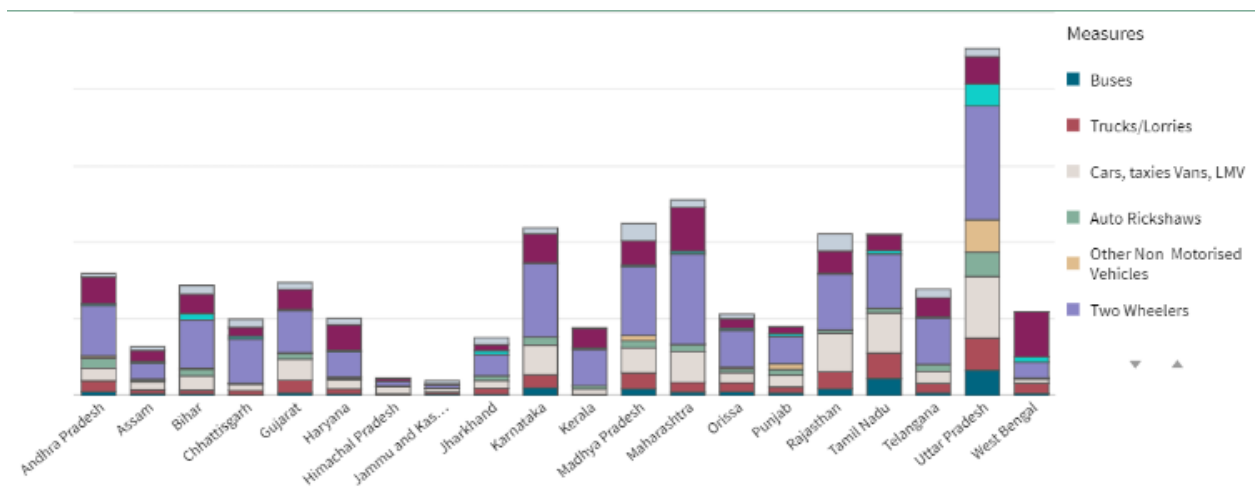
6. Responsive and Design Of Dashboard:-



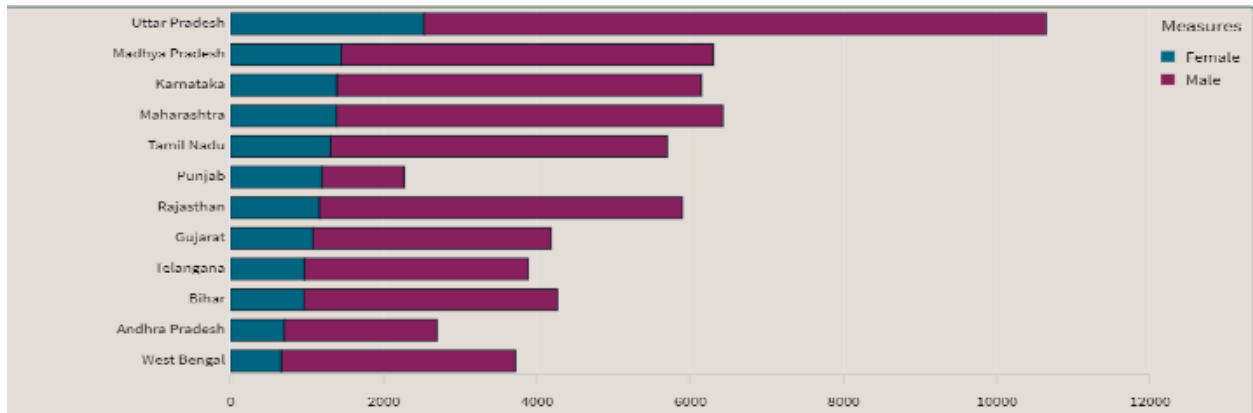
7. Storytelling and Report Creation:-



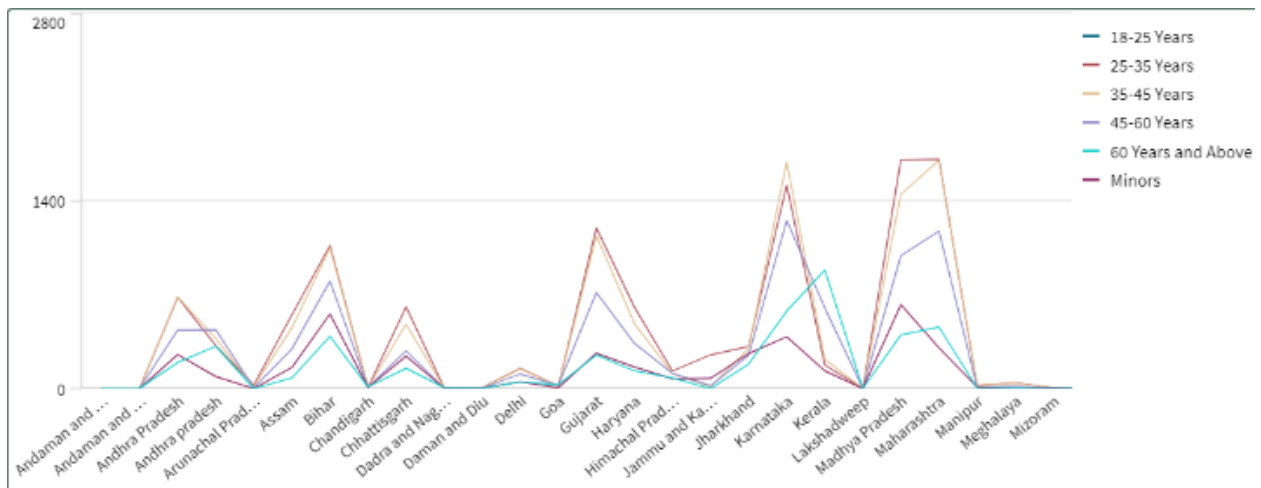
The above dashboard describes the relation between the accidents and the weather. We can clearly see that in sunny the accident is more as compared to other weather. So it is very important to manage the accident protocols in the sunny weather. The Sunny weather is more dangerous for the riders than any other seasons.



The given dashboard show the relation between different vehicles and there accidents. The above picture show that in buses the accident is more as compared to other vehicles. The buses are facing more accidents as compared to other vehicles due to the recklessly driving and drunken driving of the driver. So it is very important to aware the driver not to drive so harsh in the bad climate conditions and roads at any point.



The given dashboard shows the accident of 2 genders statewise. It shows that males faces more accidents than females due to no of riders and male reslessly driving. So its very important to aware the mens to drive slowly in the bad conditions and roads.



8. FUTURE SCOPE OF THE PROJECT:-

- The project of road accident analysis data visualization has a promising future scope, with the potential to significantly improve road safety through a data-driven approach. Incorporating real-time traffic data: Integrate live traffic information like speed, congestion, and weather conditions to identify accident hotspots and predict high-risk situations. Including vehicle data: Include data from connected vehicles to understand driver behavior, identify aggressive maneuvers, and analyze the role of vehicle technology in accidents. By incorporating new data sources like real-time weather information, traffic flow monitoring, and even driver behavior through connected vehicles, future models could predict accidents with even greater accuracy. This would allow for targeted interventions, like dynamic speed limit adjustments or warnings to drivers about hazardous conditions ahead. Expanding the scope beyond traditional vehicles, future projects could analyze accidents involving cyclists, pedestrians, and e-scooters. This would provide a more holistic understanding of road safety challenges and inform the development of infrastructure and regulations for all users. By feeding accident data into advanced AI algorithms, future road design could be optimized to minimize accidents. This could involve identifying high-risk areas and implementing preventative measures like improved signage, better lighting, or even altering road layouts.
- Analysis can be used to identify demographics most susceptible to accidents. This information can be used for targeted public awareness campaigns and educational programs to promote safe driving habits and defensive maneuvers amongst high-risk groups. Real-time accident analysis could be integrated with emergency response systems, allowing for faster dispatch of help and potentially saving lives through quicker medical intervention. Overall, the future of road accident analysis is brimming with potential. By leveraging new technologies and data sources, this field has the power to make our roads significantly safer for everyone.

9. CONCLUSION:-

- In conclusion, this road safety accident analysis project has shed light on the complex factors contributing to accidents on our roadways. By meticulously examining the data, we have gained valuable insights into the causes, patterns, and contributing elements of these incidents. This knowledge is a powerful tool that can be used to prevent future tragedies. Moving forward, it is crucial to leverage these findings to implement targeted interventions. This may involve strengthening traffic law enforcement, improving road infrastructure in high-risk areas, and launching public awareness campaigns focused on high-risk demographics or specific driving behaviors identified in the analysis. Furthermore, collaboration is key. By sharing data and best practices with other regions and countries tackling similar challenges, we can collectively develop a more comprehensive approach to road safety. Ultimately, the success of this project is measured not just by the data it generates, but by the lives it saves. By continuously refining our analysis and applying the knowledge it provides, we can work towards a future where our roads are safer for everyone – drivers, passengers, pedestrians, and cyclists alike.
- Analyze the societal and economic costs of road accidents. This could include medical expenses, lost productivity, and the impact on families who have lost loved ones. Quantifying this impact can add weight to the importance of road safety initiatives. Explore the role of emerging vehicle safety technologies like Automatic Emergency Braking (AEB), lane departure warnings, and blind spot detection systems. Analyze how these technologies are impacting accident rates and incorporate data on their effectiveness into your future predictions. Advocate for standardized data collection practices for road accidents across different regions. This would allow for more comprehensive analysis on a global scale and enable better identification of common risk factors.

