**Assignment 1: Project Scope Analysis**

**Safe LA: Enhancing Traffic Safety Through Data-Driven Insights**

**Team 8**

Alexandra Gladkova

Christina Saju

Hao Lun Rong

Kushwanth Sai Kolli

Ladan Asempour

**Capstone Project**

**BIA-5450-0LA**

**Samer Al-Obaidi**

**Group Member Contribution**

|  |  |
| --- | --- |
| **Topic** | **Contributor** |
| Project Discussion and Importance | Alexandra Gladkova |
| Process Flow Diagram | Hao Lun Rong |
| Business Problem and Requirements | Kushwanth Sai Kolli |
| Stakeholders | Alexandra Gladkova |
| Analytics Questions | Ladan Asempour |
| Scope statement | Christina Saju |

**Project Discussion and Importance**

Fostering a safer and more efficient urban environment is detrimental to the everyday functions of our society. Whether you are commuting to and from work, passing through the city on the way to your dream destination or rushing to an emergency, you should not have to sacrifice your safety and the safety of others due to negligent urban planning decisions.

Car-related accidents comprised a notable part of serious injuries, hospitalizations and fatalities in Los Angeles in 2023-2024. Despite any previous efforts the city continues to experience hundreds of deadly collisions annually. We believe one of the secrets to lowering these numbers lies in detailed analysis, careful urban planning and policymaking processes.

Focusing on public safety, we aim to reduce traffic collisions and fatalities and create safer roads for all through the following actions:

* Improving traffic flow through optimized signal timing and targeted interventions enhancing overall efficiency, benefiting commuters and reducing congestion.
* Using data-driven insights on high-risk areas and factors contributing to collisions to support informed decision-making and provide recommendations to policymakers, supporting effective planning of urban spaces and allocation of resources where they are most needed.
* Collaborating with stakeholders on implementation of suggested adjustments.

Reducing traffic incidents will not only save lives but also reduce the economic costs to the city of LA and relieve the burden on hospitals and vital healthcare centres.

Lastly, a well-planned safe road network can encourage involvement of more sustainable eco-friendly modes of transportation, such as biking and electric public transportation.

Together, these efforts contribute to a smarter, safer, and more sustainable transportation system.

**Process Flow Diagram**

**Project Proposal:** Enhance public safety in LA by analyzing traffic collision data. Generate insights supplemented with visualizations for use by the primary stakeholders.

**Deliverables:** Comprehensive Reports, Data Visualizations, Actionable Insights

**Data Acquisition:** LA Traffic Collision Dataset collected from data.gov features information regarding date, time, location, crime codes, and victims’ characteristics

**Data Cleaning and Preprocessing:**

- Handling missing values

- Identifying necessary Features

 - Data Transformation and Feature Engineering

- Identifying and Handling Outliers

- Finalizing the dataset

**Data Exploration:**

- Analyze Trends in datasets

 - Assess what factors most frequently lead to a collision

- Explore Proposed questions in the analysis

**Reporting:**

- Create various visualizations (plots, tables, heatmaps, etc) that display the trends in the dataset.

- Create a dashboard with key visualizations to present to stakeholders

**Solutions:**

- Present findings of the analysis to stakeholders, enabling them to make data driven decisions to enhance traffic safety management.

**Business Problem Statement**

The City of Los Angeles faces a significant challenge in ensuring road safety due to frequent traffic collisions. These incidents pose serious risks to public safety, often resulting in injuries and fatalities. Additionally, traffic congestion caused by these collisions leads to delays, economic losses, and inefficiencies in urban mobility. Law enforcement and city planners struggle with resource allocation, making it difficult to implement proactive safety measures. Without a data-driven approach, identifying high-risk areas and predicting future collision trends remains a challenge. A systematic solution is necessary to analyze collision data, detect patterns that will aid in recommending targeted interventions to reduce accident rates and improve overall traffic safety.

**Business Requirements**

The solution must ensure data accuracy by cleaning collision records to improve the reliability of insights. It should incorporate predictive capabilities using statistical and machine learning models to forecast high-risk collision areas and times. Additionally, the solution must provide actionable insights by analyzing trends that can aid in enhancing traffic safety and resource management.

To measure success, the solution should contribute to improved traffic flow by helping authorities implement measures that decrease congestion caused by accidents. Furthermore, the solution should facilitate stakeholder engagement by equipping law enforcement, policymakers, and urban planners with data-driven insights to enhance decision-making.

Resource allocation must be optimized by prioritizing high-risk locations, ensuring interventions focus on areas with the highest density of collisions. Additionally, the solution should analyze time-based risk factors, identifying peak accident periods to inform preventive actions. By meeting these criteria, the solution will contribute to a safer, more efficient, and well-managed urban traffic system in Los Angeles.

**Stakeholders**

**Primary Stakeholders**

**City of Los Angeles Department of Transportation (LADOT)** is responsible for managing the city’s transportation systems, such as traffic signals, road design, and traffic safety programs. LADOT can utilize our findings to optimize these processes and ultimately improve road safety in LA. We will need to collaborate closely with LADOT to gain access to data and their current policies for recommendation development. LADOT will play a crucial role in the implementation stage of the project.

**Law Enforcement (LAPD) and Traffic Monitoring Agencies** will provide accident reporting, real-time traffic management and allocate patrols where help is needed. This project is beneficial to law enforcement as it will provide data analysis to help identify and develop specific safety measures for areas with heightened incident risk. We will obtain our collision and incident reports directly from LAPD and can consult them on safety measure implementation.

**Secondary Stakeholders**

**Local Government Policymakers**, such as city council members and other government officials responsible for creating policies and budgets related to urban development and public safety. By utilizing our data-backed recommendations, these officials can further advocate for policy changes in public safety.

**Urban Planners and Civil Engineers** who design the city infrastructure, such as roads, traffic lights, pedestrian walkways, etc. can use our data to analyze incident-prone areas and implement the necessary design changes. Their decisions regarding traffic solutions will play a key role in recommendation development.

**Public Transit Authorities** such as Metro, bus and train services will leverage our project to enhance safety in their respective transit systems and contribute to overall traffic improvement.

**Tertiary Stakeholders**

**Residents and Commuters**, those who are impacted by traffic-related decisions on a daily basis, pedestrians, drivers, cyclists will benefit from ridk reduction and improvements in overall quality of life as a result of a safer and more efficient commute. These stakeholders can provide us with valuable feedback on current traffic conditions and other concerns.

**Insurance Companies** can benefit from reduction in number and cost of collision related claims and assist us in deepening our analysis by sharing claim related data.

**Analytics Questions**

*Which locations have the highest density of collisions?*

* Types of Analytics: Descriptive
* Decision: By identifying the areas where most collisions happen, we can take action to make those locations safer.

*What time of day and days of the week have the most collisions?*

* Types of Analytics: Descriptive
* Decision: If we know when accidents are more likely to happen, we can be more prepared by placing more officers on the road at those times.

*What types of traffic collisions (e.g., vehicle vs. vehicle, vehicle vs. pedestrian, vehicle vs. property) occur most frequently?*

* Types of Analytics: Descriptive
* Decision: If certain types of collisions happen more often, we can take steps to address them. This can include improving road design, adding better signage, or adjusting traffic laws to make those areas safer.

*Are certain demographics more frequently involved in traffic collisions?*

* Types of Analytics: Descriptive
* Decision: If certain groups (by age, sex, and descent) are involved in more collisions, we could take specific actions:

Age: If younger drivers are more involved, improve driver education.

Sex: If males are more involved, focus on risky behavior awareness.

Descent: If certain ethnic groups are more affected, provide cultural-specific outreach programs or language-supportive safety materials.

*What are the predicted high-risk areas and times for future collisions?*

* Types of Analytics: Predictive
* Decision: By predicting where and when accidents are most likely, we can mitigate the risks and act before they happen.

**Scope Statement**

The project aims to identify collision-prone areas and times/seasons that can enable enhanced targeted interventions in those regions. It requires traffic collision data from 2023 onwards which we have downloaded from a publicly available website.

This project report will include analysis of collision data to obtain demographics of people having a higher chance of getting into a traffic collision incident, identification of high-risk areas as well as times-of-day and seasons when probability of a collision is very high.

The limitations are a strict focus on traffic incidents within Los Angeles city limits. It excludes the development of new traffic management software and will not involve user research or the collection of data beyond publicly available information. This project will analyze publicly available data on traffic collisions and their patterns to produce reliable and up-to-date results.

This project will give the primary stakeholders the necessary tools to make data-driven recommendations to improve traffic safety and reduce traffic incidents. This project has the potential to greatly increase road safety for all city residents by helping employ demonstrably effective methods, along with substantially improved traffic signal timing in high-risk areas.