**Project Proposal: Analyzing and Predicting Vehicle Accidents in Arizona Using Machine Learning**

**Group 1:** Safe Streets Squad

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**Project Overview**

The goal of this project is to analyze traffic accident data in the Metro Phoenix area to identify high-risk intersections and potential causes of accidents. We will use machine learning to predict future accidents and create visualizations to compare the accident rates and severity in different cities. The final deliverables will include an interactive map, comparative analysis, and comprehensive documentation.

**Key Questions**

What are the primary factors influencing traffic accidents in Metro Phoenix, and how do seasonal weather patterns, particularly the monsoon season, affect accident frequency and severity?

**Sub-Questions:**

* Which areas in Metro Phoenix are most prone to accidents?
* Which city experiences the highest volume of accidents?
* Which city has the most severe accidents in terms of traffic impact?
* How does weather, particularly during the monsoon season, affect the volume of accidents?

**Project Timeline and Responsibilities**

**Phase 1: Ideation and Planning**

· Project Ideation (Team)

· Proposal (Tiffany)

**Phase 2: Data Handling**

· Data Fetching/API Integration (Team)

· Data Cleaning (Walter & Tiffany)

· Data Analysis (Team)

**Phase 3: Development**

· Database Setup (Tiffany)

· Visualizations (Kenway, Ritika, Tiffany)

* Tableau Map
* Zipcode Comparison (bar chart count for each zip)
* County (num count for each county, compared to population)
* Weather condition count
* July and August (Monsoon season)

· Building the Machine Learning Model (Walter, Tiffany, Kenway)

· Testing the Model (Walter)

**Phase 4: Documentation and Presentation**

· Creating Documentation (Team)

· Creating the Presentation (Tiffany)

**Deliverables**

1. Comparative Analysis:

· Top 5 cities with the highest accident rates by volume (visualized using Matplotlib)

· Top 5 cities with the highest accident severity rates (visualized using Matplotlib)

2. Interactive Map:

· Display accident-prone areas using Tableau

3. Documentation:

· Comprehensive documentation covering data sources, analysis methods, model details, and user guide for the visualizations

4. Presentation:

· A detailed presentation summarizing findings, methods, and future work

**Tools and Technologies**

· Database: PostgreSQL

· Data Visualization: Matplotlib and Plotly for comparative analysis, Tableau for interactive mapping

· Programming Languages: Python for data analysis, machine learning, and visualization

· Machine Learning: Algorithms and techniques for predicting future accidents

**Conclusion**

This project aims to provide valuable insights into traffic safety in the Metro Phoenix area by leveraging machine learning and data visualization techniques. The findings will help in identifying high-risk areas and potential causes of accidents, which can be crucial for city planners and policymakers to improve road safety.