Phase-1 Submission

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Institution: PPG Institute of Technology

Department: B.Tech Information Technology

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1.Problem Statement

Road accidents pose a serious public safety risk, causing injuries, fatalities, and economic loss. Traditional analysis methods fall short in handling large data and detecting complex patterns. This project uses AI to improve road safety by identifying trends, accident-prone areas, and predicting accident risks for effective prevention.

2.Objectives of the Project

- *Analyze historical traffic accident data to discover patterns and correlations.*
- *Predict accident occurrence and severity based on multiple factors.*
- *Build a user-friendly dashboard for visualization of accident trends and predictions.*
- *Aid urban planning and law enforcement with data-driven decision support tools.*

3.Scope of the Project

- *Analyze time, location, weather, and traffic data in relation to accident frequency and severity.*
- *Build machine learning models for prediction.*
- *Limitations include static dataset usage, restricted geographic scope, and model interpretability challenges.*
- *Focus on scalable and interpretable models for real-world applications.*

4.Data Sources

- ***Source:*** *Kaggle (e.g., US Accidents Dataset), local open government data portals, weather APIs.*
- ***Nature:*** *Public, static datasets initially; potential for dynamic API integration later.*
- ***Size:*** *Large datasets (~1M+ records) with multiple features.*

5.High-Level Methodology

- ***Data Collection:*** *Gather datasets from Kaggle and relevant APIs (e.g., weather).*
- ***Data Cleaning:*** *Handle null values, remove duplicates, unify data formats.*
- ***Exploratory Data Analysis (EDA):*** *Use charts, heatmaps, and maps to analyze accident trends.*
- ***Feature Engineering:*** *Generate features such as rush hour, weather severity, accident hotspot zones.*
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6.Tools and Technologies

- ***Programming Language:*** *Python*
- ***Notebook/IDE:*** *Google Colab / Jupyter Notebook*
- ***Libraries:*** *pandas, numpy, matplotlib, seaborn, plotly, scikit-learn, XGBoost, TensorFlow (if needed)*
- ***Deployment Tools:*** *Streamlit, Flask (optional)*

7. Data source link

The Software for Road Safety market is expected to reach USD XXX million by 2033, driven by rising accidents and demand for AI and IoT-based solutions. Key trends include cloud adoption, big data, and mobile apps. Challenges involve high costs, data privacy, and system integration. Major players include TRL, TES, VIA, and Agile Assets.

Google dataset :
https://datasetsearch.research.google.com/search?src=0&query=Enhancing%20road%20safety%20&docid=L2cvMTF3ZzJ3MGNqMg%3D%3D&filters=WyJbXCJpc19hY2Nlc3NpYmxlX2Zvcl9mcmVlXCJdIl0%3D&property=aXNfYWNjZXNzaWJsZV9mb3JfZnJlZQ%3D%3D

8.Team Members and Roles

Team Member Name	Role	Description
Vijaya Varma R	*Project Lead, Model Development & Evaluation*	*Coordinated the entire project and ensured timely progress of each phase.*
Naveenraj P	*Data Collection & Cleaning*	*Gathered datasets from Kaggle and other open data sources.*
Sri Hari Krishna R	*Exploratory Data Analysis & Visualization*	*Conducted in-depth exploratory data analysis to identify patterns and correlations .*
Sanjeev R	*Feature Engineering & Model Tuning*	*Generated derived features such as rush hour indicators and weather severity levels.*
Sneha Jenifer J	*Dashboard Design, Deployment & Documentation*	*Designed an interactive dashboard for visualizing trends and predictions..*