PROJECT TITLE:Enhancing Road Safety with AI-Driven Traffic Accident Analysis and Prediction

PHASE 2

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GITHUB REPOSITORY LINK : http://https://github.com/your-username/ai-traffic-accident-prediction.

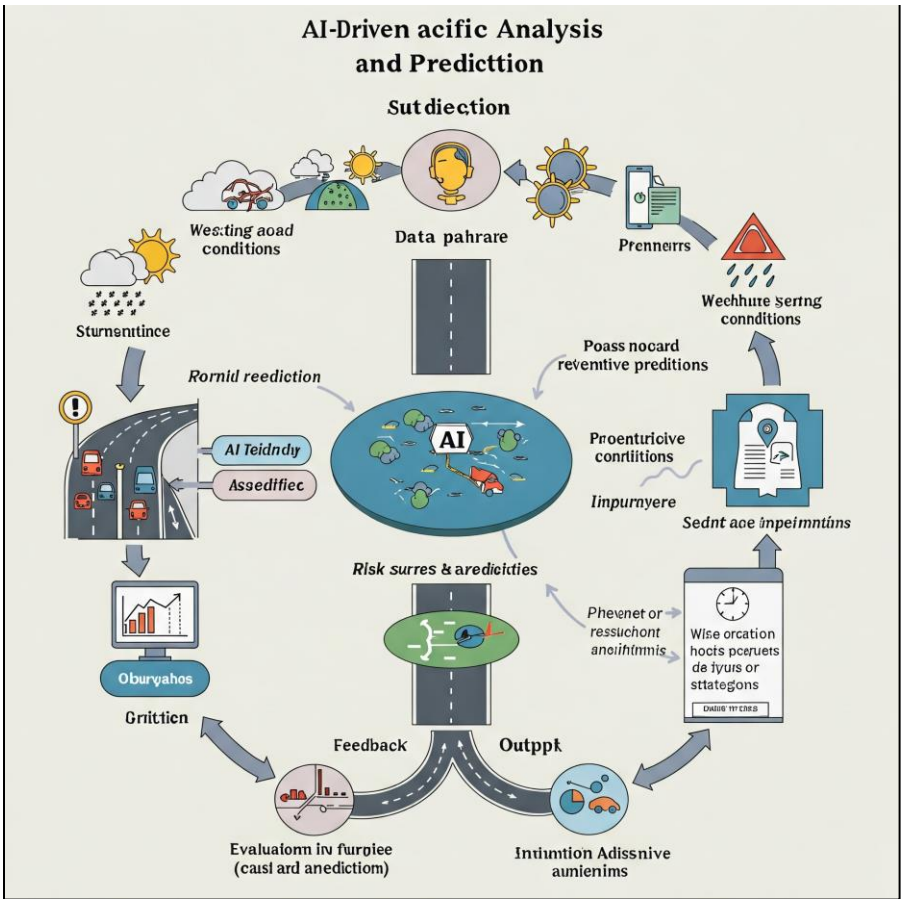
1.Problem Statement:

Road traffic accidents are a significant cause of death and injury worldwide. Predicting and analyzing these incidents using AI can help authorities take proactive steps to reduce their frequency and severity.

2.Project Objectives:

- Analyze historical traffic accident data.
- Identify contributing factors and trends.
- Develop a predictive model to forecast accident likelihood.
- Visualize insights for better decision-making.

3.Flowchart of the Project Workflow:



4.Data Description:
- Date & time of accident
- Location (longitude, latitude)
- Weather conditions
- Road conditions
- Severity levels
- Vehicle and pedestrian involvement

5.Data Preprocessing:
- Handling missing values
- Encoding categorical variables
- Normalization/Standardization
- Outlier detection and removal

6.Exploratory Data Analysis (EDA):
- Accident trends over time
- Heatmaps of high-incident zones
- Impact of weather and road conditions
- Severity distribution by region

7.Feature Engineering:

- Time-based features (e.g., rush hour)
- Aggregated area-level risk scores
- Severity score scaling
- Derived interaction terms

8.Model Building:
- Algorithms used: Random Forest, XGBoost, Logistic Regression
- Evaluation metrics: Accuracy, Precision, Recall, ROC-AUC
- Hyperparameter tuning
- Cross-validation results

9.Visualization of Results & Model Insights:
- Confusion matrix
- Feature importance graphs
- Geographic accident risk maps
- Trendline forecasts

10.Tools and Technologies Used:
- Python (Pandas, NumPy, Scikit-learn, XGBoost)
- Jupyter Notebook
- Tableau / Matplotlib / Seaborn
- GitHub for collaboration
- Google Colab

11.Team Members and Contributions:
- Member A Data collection, preprocessing
- Member B EDA and visualization
- Member C Model building and evaluation
- Member D Documentation and presentation