Phase-1

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Enhancing Road Safety with Ai-Driven Traffic accident method for Traffic accident analysis and prediction

1.ProblemStatement

- Road traffic accidents remain a significant public health concern, causing widespread loss of life and economic damage globally. Existing accident analysis and prevention strategies often rely on reactive measures after accidents have occurred, leaving a gap in proactive, data-driven approaches to improve road safety.

- Developing predictive models using machine learning algorithms to identify areas with a higher likelihood of accidents based on historical data, traffic flow, weather conditions, and other relevant factors. Predicting the severity of potential accidents, allowing for more targeted interventions and resource allocation.

2.ObjectivesoftheProject

- **Building predictive models that can identify high-risk areas, times, and situations based on various factors.**
- Implementing AI-powered systems for real-time traffic monitoring, dynamic route optimization, and automated incident detection.
- Using AI insights to inform infrastructure improvements, law enforcement strategies, and public awareness campaigns.
- Gathering data from various sources, including sensors, cameras, and vehicle telementry.Gathering historical accident data from various sources (e.g., police reports, traffic management systems).
- Building and implementing AI models for accident prediction, traffic flow optimization, and safety alert.

3.Scope of the project:

- Cleaning and preparing the data for analysis, including handling missing values and outliers.
- Identifying relevant features from the data that can predict accidents (e.g., time of day, weather conditions, traffic volume, road conditions.
- Developing predictive models using machine learning algorithms (e.g., supervised learning predicting accident severity, unsupervised learning for identifying patterns.
- Deploying the models to predict potential accident locations and severity.
- Exploring new machine learning techniques and models.
- Integrating real-time data from sensors and cameras to improve prediction accuracy.

4.Existing system

- **Predictive analytics:analysing historical accident data to identify high risk areas and predict potential accidents.**
- **Real time monitoring:using sensors ,cameras and iot devices to monitor traffic conditons and detect potential accidents.**
- **Computer vision:analysing traffic footage to detect incidents,track vehicles,and identify potential hazards.**

5.proposed system

- **Data collection module:gathering data from various sources ,such as traffic cameras,sensors,weather reports ,accident reports,social media feeds.**
- **Data preprocessing module:cleaning processing ,integrating collected data for analysis**
- **Alert the notification system:sending alerts to authorities,emergency services,and drivers in case of predicted or detected accidents.**

6.Data Source

- **Source:kaggle-https://www.kaggle.com/datasets/sobhanmoosavi/us-accidents**
- **Type of data:structured data**
- **Nature of data: Historical accident data collected from various source such as traffic APIs and government records.it includes information like time,location,severity,weather,road condition,traffic flow.**
- **Dataset link:link unavailable**

7.High level methodology:

- **Data collection:gathering relevant data from various source,**
- **Traffic cameras,sensors,accident report,weather data,traffic patterns.**
- **Data preprocessing:clean and preprocess the collected data to ensure the quality and consistency.**
- **Feature Engineering:extract the relavent feature from the preprocessed data that can be used for prediction**
- **Model development:develop and train and AI model using the exteacted feature to predict high -risk areas and optimise emergency response.**
- **Model Evalution:evalute the performance of the developed model using metrics such as accuracy,precaution and recall.**
- **Deployment:deploy the developed model in production-ready environment,integrating it with existing traffic management systems.**

8.Tools and Technologies

- Programming languages:pandas,numpy and matplotlib

- **LIBRARIES**

- **Data visualisation:matplotlib,seaborn**
- **Business intelligence tools:power Bi**
- **Containerization:deployment and intergration**
- **Api development:utilize frame work for traffic management system.**

- **OTHER TOOLS AND TECHNOLOGIES:**

- **Gis and mapping tools**
- **real time data processing**

- **SOME POPULAR AI TOOLS**

- **Google cloud ai platform**
- **Tensor flow**
- **Pytroch**
- **Keras**
- **Apache spark**

9. Team members and roles:

1. S.sushmitha-**Data collection and integration:**responsible for sourcing data sets,conncting Apis,and preparing the initial

2. M.keerthana-**Data cleaning and EDA:**cleans and preprocesses data ,performs exploratory analysis and generates initial insights.

3. k.charushree-**Feature engineering and modeling**:works on feature extraction and selection develops and trains machine learning models.

4. S.gayathri-**Evaluation and optimization** :tunes hyper parameters ,valid dates models and documents performance metrices.

5.k.lakshmi-**Documentation and presentation** :compiles reports,prepares visualizations ,and handles presentation and optional development.