Project Synopsis:

Route Risk - ML Forecasting of Accidental Deaths in India.

Objective

The aim of this project is to build an intelligent machine learning web application named Route Risk that predicts the risk level of traffic-related deaths based on accident statistics in India. The application enables users to estimate the severity of accidents across different regions, supporting data-informed decisions in public safety, infrastructure, and transportation planning.

Methodology

This project follows a complete machine learning development cycle

1. Data Collection:

   o Dataset sourced from the ADSI (Accidental Deaths & Suicides in India) reports published by the Government of India.

   o Includes regional statistics on road, railway, and crossing-related accidents.

2. Data Preprocessing:

   o Cleaned and filtered the dataset to remove null or irrelevant values.

   o Selected key features including number of accident cases, injuries, and deaths by type.

3. Exploratory Data Analysis (EDA):

- Generated graphs (bar charts, pie charts, heatmaps) to find patterns in accident occurrence across states and timeframes.

- Used insights to guide feature selection and model design.

4. Model Building:

- Applied supervised learning models: Logistic Regression, Decision Tree, and Random Forest (via sklearn).

- The Random Forest model provided the highest accuracy and generalization, and was selected for deployment.

- The model classifies accident death risk levels as Low, Medium, or High.

5. Model Evaluation:

- Used metrics such as Accuracy, Precision, Recall, and F1 Score.

- Cross-validation ensured robustness across varying inputs.

Dataset Used

- Name: ADSI_Table_1A.2.csv

- Source: Ministry of Road Transport and Highways, Government of India

- Key Features:

  - Road/Railway/Crossing Accidents – Cases, Injured, Died

  - Total Traffic Accidents – Cases, Injured

Tools & Technologies

- Programming: Python

- Data Handling: Pandas, NumPy

- Visualization: Matplotlib, Seaborn

- ML Modeling: sklearn (Scikit-learn)

Expected Outcomes

- A functional web-based accident risk predictor powered by ML

- Easy to use for authorities, analysts, and the public

- Helps visualize how accident stats translate into safety risk

- Can be expanded with real-time data feeds or mapped outputs in the future