Project Statement

Domain: Data Analytics

Project 6: Real-Time Traffic Data Scraping and Smart Route Optimization
Project Title: AI-Driven Real-Time Traffic Data Analysis and Smart Route Optimization

Project Objective:
The project aims to collect and analyze real-time traffic data (from APIs like Google Maps, OpenStreetMap, or HERE API) to understand congestion patterns, travel time variability, and route performance. Using AI/ML models, it predicts future traffic conditions and suggests optimal travel routes for vehicles, reducing travel time and fuel consumption.

Technologies to Use:

- Python – Core programming language for development.
- Google Maps API / OpenStreetMap API – For real-time traffic and road network data.
- Pandas – Data manipulation and preprocessing.
- NumPy – Numerical computations and array operations.
- NetworkX – Graph-based algorithms for route optimization (Dijkstra, A*).
- OSMnx – Road network extraction and analysis from OpenStreetMap.
- TensorFlow/Keras – Machine Learning & Deep Learning models for traffic prediction.
- Streamlit / Dash – Interactive web dashboard for visualization.
- Folium / Plotly – Map visualization, traffic heatmaps, and route plotting.
- MySQL / MongoDB – Database for storing historical and real-time traffic data.
- AWS / GCP – Cloud platform for deployment and scalability.

Tasks:

- Integrate Google Maps / OSM API to fetch live traffic & road data.
- Store real-time and historical traffic data in a database.
- Clean and preprocess traffic datasets for analysis.
- Perform time-series analysis to identify traffic congestion patterns.
- Train ML models (LSTM/Prophet) for predicting future traffic conditions.
- Implement Dijkstra/A* algorithm for route optimization with live traffic weights.
- Build an interactive dashboard with live maps, heatmaps, and route suggestions.
- Add alert/notification system for accidents, congestion spikes, or delays.
- Deploy project on AWS/GCP/Heroku with web/mobile interface.

Submission:

- Project Report (PDF/Doc with objectives, methodology, results, screenshots)
- Source Code (Python scripts, ML models, API integration)
- Dataset (raw + processed traffic data files)
- Executable Dashboard/Web App (deployed link or local run instructions)

The ZIP will includes all files that used to create the project and Project Report PDF file with graphs and charts.