Project Name: TransitNet Optimizer

Project Description:

TransitNet Optimizer is an interactive web-based platform designed to optimize public transport networks by leveraging mobility patterns derived from cellular data. This system provides transit authorities with a comprehensive toolset to visualize, manage, and enhance their transport networks, ensuring efficiency and better service delivery.

Key Features:

1. **Data Upload & Management:**
    - **Interactive Upload Interface:** Users can upload public transport network data and inter-region mobility percentages. The upload interface is designed to be user-friendly, supporting both complete file uploads and partial input. The backend is updated only if new changes are detected in the uploaded data, ensuring data integrity and efficiency.
    - **Admin Dashboard:** An admin panel allows users to perform CRUD operations on public transport data. This feature empowers users to manage their transport network data effectively.
2. **Network Visualization:**
    - **Multi-layer Map View:** The platform generates a dynamic network graph displayed on a map with multiple visualization layers, including:
        - **Public Transport Stops:** View and analyze the distribution and accessibility of transport stops.
        - **Mobility Patterns:** Visualize the inter-region mobility patterns, identifying areas of high and low traffic flow.
        - **Overlay View:** An interactive overlay that combines public transport stops with mobility patterns, offering insights into the network's performance and identifying potential areas for optimization.
    - **Interactive Filters:** Users can apply multiple filters to each visualization layer, enabling detailed analysis and targeted insights.
3. **Route Optimization:**
    - **Optimization Algorithm:** The system includes a powerful optimization algorithm that analyzes the public transport network and suggests improvements. This feature optimizes routes to minimize travel times, reduce network diameter, and improve overall service efficiency.
    - **Optimized Network Visualization:** The optimized network is displayed with detailed statistics, such as network diameter, coverage, and other relevant metrics. This allows transit authorities to make informed decisions based on quantitative data.

Target Audience:

The primary users of TransitNet Optimizer are mass transit authorities and urban planners. The platform is tailored to help them visualize their current public transport network, understand mobility patterns, and implement optimizations that enhance network performance, ultimately leading to improved public transport services for the community.