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Project Proposal: Transportation Network Optimization

Problem Statement: Optimizing transportation routes in a network is crucial for various industries such as logistics, urban planning, and public transportation. However, existing transportation systems often face challenges in balancing distance, cost, and time constraints while determining optimal routes. There is a need for a comprehensive solution that integrates these factors and applies advanced optimization techniques to improve transportation efficiency and cost-effectiveness.

Objective: The objective of this project is to develop a transportation network that analyses routes between cities and stations, considering distance, cost, and time constraints. By constructing a transportation network graph and applying graph algorithms, the project aims to identify optimal routes that minimize transportation costs while meeting specified time and distance requirements.

Idea of the Project: The project involves the following key components:

1. **Graph Representation:** Construct a transportation network graph where nodes represent cities and stations, and edges represent transportation links or routes between them. Each edge will be associated with weights representing distance, cost, and time.
2. **Edge Weight Calculation:** Normalize distance, cost, and time values to a common scale and define a weighted combination to calculate edge weights. Assign higher weights to time, then cost, and finally distance to prioritize minimizing transportation costs while meeting time and distance constraints.
3. **Graph Analysis:** Apply graph algorithms to identify shortest paths and optimal routes based on specified criteria.