Facility Location Optimization

Cost Minimization Using Haversine and Driving Distance Methods

Objectives

- Determine the optimal facility location to minimize costs.
- Compare results using Haversine and driving distance methods.
- Visualize optimal locations and travel routes.

Methodology

- **Data Inputs:**
  - Locations with weights and fixed costs.
  - Geographic coordinates retrieved via Google Maps API.
- **Optimization Techniques:**
  - Haversine distance: Straight-line approximation.
  - Driving distance: Real-world travel using Google Maps Directions API.
- **Visualization:**
  - Interactive map with optimal locations and routes.

Results - Haversine Distance

- **Optimal Location:** 618 Cresthill Ave NE, Atlanta, GA.
- **Coordinates:** [33.7837, -84.3674].
- **Minimum Cost:** $192,150.77.

Results - Driving Distance

- **Optimal Location:** 1470 Ashwood Way, Lawrenceville, GA.
- **Coordinates:** [34.0, -84.0].
- **Minimum Cost:** $2,954,751.00.

Comparative Analysis

- **Haversine Distance:**
  - Quick and computationally efficient.
  - Ignores road networks and travel conditions.
- **Driving Distance:**
  - Accounts for real-world constraints.
  - Higher computational requirements.

Recommendations

- Use Haversine distance for preliminary analysis.
- Employ driving distance for practical decision-making.
- Update location data periodically to reflect changes.

Conclusion

- **Summary:** Combined geospatial techniques enable informed facility placement decisions.
- **Next Steps:** Leverage optimization results to enhance operational efficiency

Thank You!