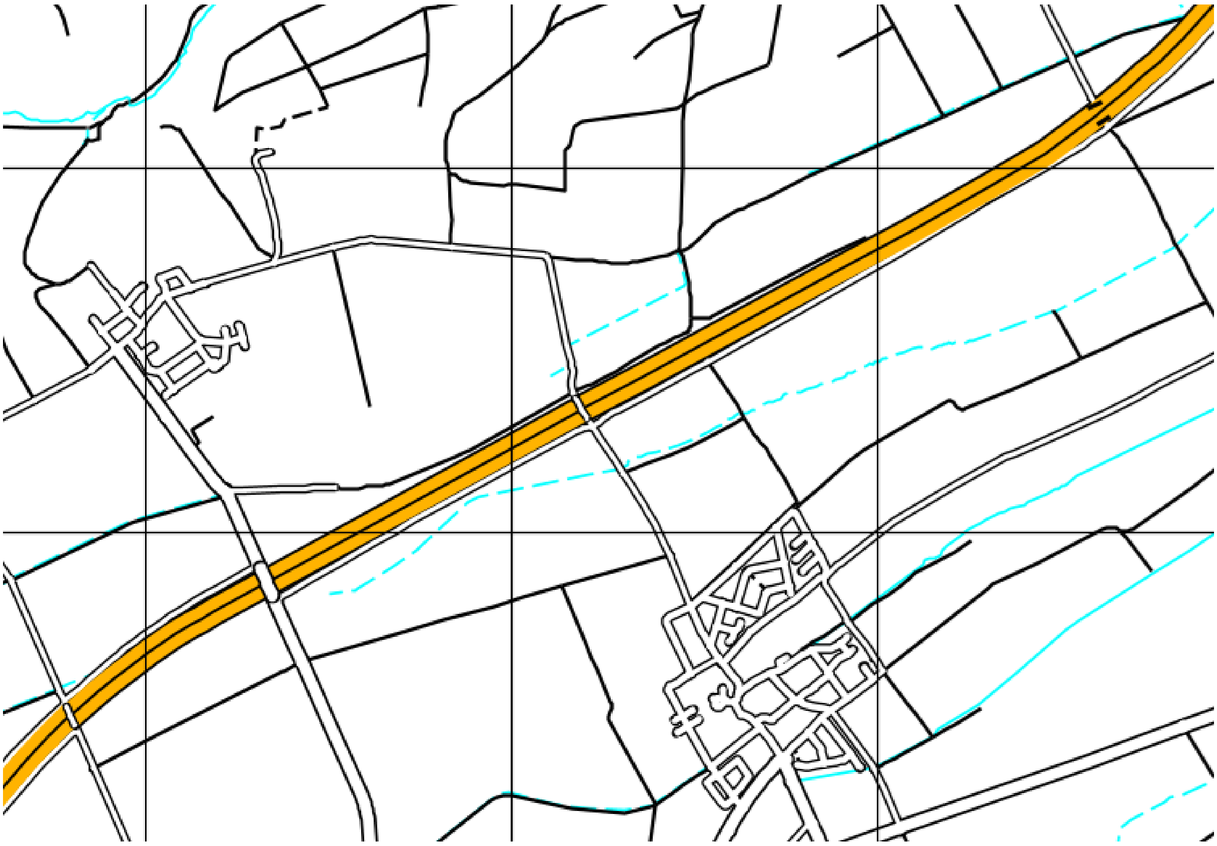
Displacement with AI – (Simplified)

Given:

Vector map data with different feature types:

- **Lines:** Roads, railways, rivers (with different widths when displayed)
- **Polygons:** Land use areas, buildings
- **Points:** Towers, power masts, symbolic representation (eg. Parking, hospital)

Problem: When displayed at map scale, features often overlap and become unreadable (e.g., road hidden under highway width).



Simplified Task:

Build a system to detect overlaps and displace features based on simple priority rules.

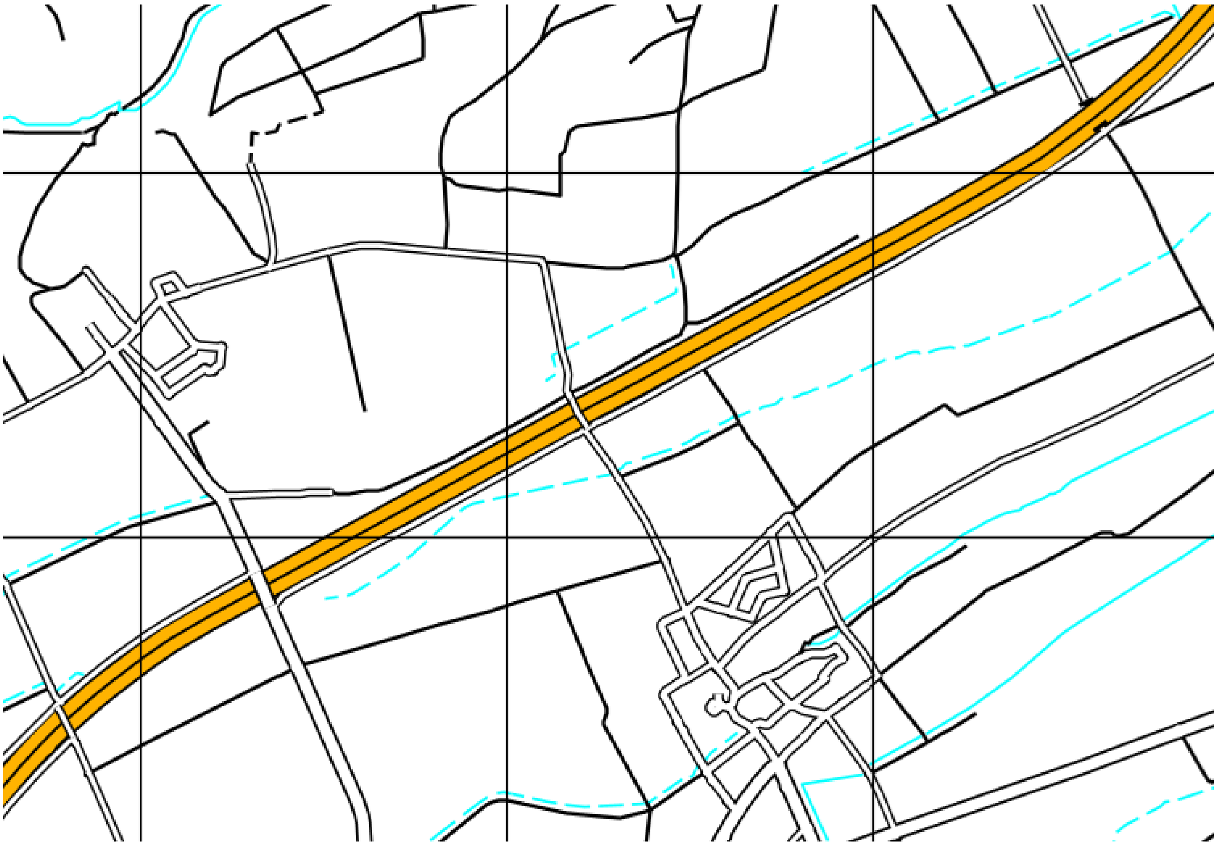
Focus on TWO Core Functions:

1. Overlap Detection

- Identify where displayed features (considering line widths) overlap
- Report which feature pairs conflict
- Calculate overlap distance/area

2. Basic Priority-Based Displacement

- Use simple priority rules (e.g., "highway has priority over secondary road")
- Move lower-priority features away from higher-priority ones
- Aim for minimum required distance between features



possible result

Simplified Requirements:

What to Include:

☑ Detect overlaps between 2-3 feature types (e.g., highway, roads, river)
☑ Apply basic displacement using provided priority rules
☑ Measure improvement (# of overlaps before vs. after)
☑ Preserve network topology of the roads

What to Exclude (Too Complex for Hackathon):

❌ Full topology preservation (shared boundaries, no gaps)
❌ Complex snapping rules
❌ Aesthetic "beauty" optimization
❌ Complete cartographic generalization

Example Scenario:

Input:

- Highway (width: 5pt, priority: 1 - highest)
- Road (width: 3pt, priority: 2)
- Minimum distance required: 2pt between them

Problem: Road runs parallel to highway, overlapping by 1.5pt

Your Solution:

1. Detect the 1.5pt overlap
2. Move road 3.5pt away from highway (to achieve 2pt clearance)
3. Report: "Overlap resolved - road displaced 3.5pt"

Deliverables:

1. **Overlap detector:** Shows which features conflict
2. **Simple displacer:** Moves features based on priorities
3. **Before/after visualization:** Map showing improvements
4. **Metrics:** Number of overlaps resolved