Common Ground in Geocollaboration

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Common Ground in Geocollaboration
Project Objectives

- Investigate a collaborative workspace that provides:
  - multiple role-specific views and team view
  - geo-spatial planning task
- Integrate research from Information Visualization and Computer-Supported Cooperative Work
- Prototype for geo-collaborative tactical operations planning; use our open-source collaborative infrastructure
- Define measures for evaluating common ground in experimental settings
- Articulate relationships between common ground and other computer-supported collaboration constructs
Research Question

• How can collaborative construction of a geo-spatial plan visualization ameliorate problems of too much and too little common ground?

• Approach:
  – Obtain and edit real/realistic map content
  – Design and implement experimental task
  – Implement collaborative map interactions
Outcomes


Common Ground Experiment

Role-specific map-views

Complementary knowledge

Team view is constructed jointly
Multiple views design

- Three users, each with specific role
- Each user sits at a separate computer
Multiple View Issues

- How do users share information using maps?
- How do they stay aware of others’ actions and references?
- What features are available with each view? (navigation, query, annotation)
- How do you coordinate actions across views?
Geocollaboration

• Geocollaboration: How can people collaborate with map software?
• Numerous design decisions
• Existing software tools make different choices
BRIDGE Collaborative Map

- Users add spots to map and link to other content
• Navigation controls for working alone, following, or leading
Geocollaboration Architecture

• Geocollaboration Software Architecture
  – Based on a survey of existing map tools
  – Supports a variety of geocollaboration features

• Software offers:
  – Toolkit for developing geocollaboration applications
  – Support for using multiple features in combination
  – Sandbox for developing new features
• Open-source development project
• Integrates two existing software toolkits:
  – CORK: collaborative infrastructure, replicated objects
  – GeoTools: GIS toolkit, standards compliant
• Focus on reusable and extensible objects
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<th>Geocollaborative BRIDGE Tools</th>
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<td><strong>Shared User Activity</strong></td>
<td><strong>Shared Geographic Map</strong></td>
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<td>Shared History (BRIDGE)</td>
<td>Shared Geospatial Data: Shapefiles, User-Created Data, Styles</td>
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<td>Shared Cursors</td>
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<td>Collaborative Infrastructure (CORK)</td>
<td>GIS Tookit (GeoTools)</td>
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Reuseable Objects

- Same map data is useful for multiple applications
  - Centre county roads, rivers, and buildings:
    - Emergency management software
    - Underground Railroad research
- Applications require different rendering techniques
  - EM: different road types and lane markings
  - UGRR: major roads, historic building sites
Architecture Class Diagram

- User-created content
- Standard map data format
- Map data paired with styles
Multiple Views Application

- Build views from existing map objects
- Share mouse cursors across maps
Emergency Management Scenario

• Emergency task: plan a rescue for a family stranded by flood

• Three, interdependent roles
  – Public works (utilities and roadway infrastructure)
  – Environment (floodplains and weather)
  – Mass care (shelters/rescuees’ needs and vehicles)

• Roles based on an emergency operations center
Demonstration
Other Features

- Draw annotations, pass across views
- Align viewports
- Synchronize team view navigation
Comments, Questions, Suggestions?  Thanks!

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