The DataSplash Environment
- Direct-manipulation interface for constructing pannable/zoomable database visualizations
- Users can specify how much information is displayed at different elevations by a layer manager

The Problem
- The Principle of Constant Information Density: Number of objects per display unit should be constant -> Amount of information should remain constant as users pan and zoom
- DataSplash's users have difficulty constructing self-formed applications that conforms to this principle, displaying constant level of detail at all elevations.

The Solution - "Measure, Visualize, Bound"
- Give users visual feedback about information density as they create each layer
- Guide users to maintain constant density

Reverse and Cancellation Problems
- Introduce a zoom-in delay factor to avoid "swellings" when changing direction
- Introduce a constant default zoom-in rate for when the user simply stop holding down the mouse button.

Critical Zones in Desert Fog: Aids to Multiscale Navigation
Susanne Jul & George W. Furnas

Weaknesses
- A lot of repetition
- Pilot trial added as an after-thought and only mildly relevant to the paper's topic

Strengths
- Comprehensive description of techniques
- Extensive considerations of problems and possible solutions
- Encoding density with width is intuitive, because the cumulative width of all layers at a zoom level = cumulative density

Rate-Based Scrolling – Scroll faster as you move your mouse faster

Fighting Desert Fog – Residues of Objects
Multiscale Residue of Objects: red squares visible at all scales

Layer Manager
Elevation Bar
Tabular Data
Layer Rendering

Rate-Based Scrolling – Measures
- Density Metrics: number of objects or number of vertices
- Other density functions can be defined
- Visualizes
  - Width of layer bars encodes density at a given elevation
  - Color of the elevation gauge indicates whether a level is too dense

Visual Information Density Adjuster
- Measures
- Density Metrics: number of objects or number of vertices
- Other density functions can be defined
- Visualizes

Semi-automatic Adjustment of Layer Density

Modification Functions
- Changing the graphical presentation of data
- Creating views of data table (select/join)

Usability Studies
- Web-browser SDAZ vs. Scrollbars
  - Task completion time roughly equal
  - Subjective preference SDAZ
- Video game players performed better
  - Constant flow of text can cause dizziness
- Isometric input (joysticks) might improve performance, but not tried
- Map Viewer: SDAZ vs. manual zoom-in/out buttons
  - Task completion time: roughly equal
  - Subjective preference: SDAZ
  - Underestimation and course-correction problem
  - Many subject developers coping strategies

Good for mobile!
View Navigation Analysis

- View-navigation theory provides a characterization of the properties that make an information structure navigable, adapted for spatial data

- Viewing-graph a d-graph, nodes = views, links = traversible paths between views

- A traversible world
  - Short path must exist between all nodes
  - All nodes must have small number of outlinks
  - “Small” and “Short” is relative to the complexity of the viewing graph

Critical Zones: residues of interesting views, zooming in reveals more interesting views (and critical zones representation of them)

Calculating 1 crit-zone: Bounding box of all objs in current view
Sub-divide and recurse:
- Critical Zone rectangle changes color when covers all world objects

Navigation Requirements

- All views must have good residue on all nodes
- All views must have small outlink info
- Good residue correctly points out the shortest link to a node

=> In a zoomable world, merely providing residues solve the desert fog problem, because the lack residue means zoom-out

- outlink-info: the representation of the residue. E.g. a text label
- “Small” Relative to number of overall views? Or navigator’s info processing capabilities?

=> Grouping such as landmarking and ZTracker

Strengths

- Novel concept: providing residue of views, not objects
- Thorough treatment of the subject from an implementation pov and a theoretical pov

Weaknesses

- Ztracker algorithm might be expensive. Some heuristics?
- Repeating diagrams with small differences makes navigating the paper confusing

Critique

- More examples of desert fog please?

Q&A

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