Readings Covered

Ware, Chapter 8: Space Perception and the Display of Data in Space
Tufte, Chapter 3: Layering and Separation

Further Readings


Depth and Occlusion

Space Perception

- static
  - occlusion
  - perspective projection
  - linear, texture gradient
  - depth of field
  - atmospheric (fog, depth cueing)
  - lighting and shadows
  - shape from shading
  - cast shadows
- moving
  - structure-from-motion
  - motion parallax (head motion)
- binocular
  - binocular disparity (stereopsis)
  - convergence
  - amount eyes rotate toward center of interest
  - like optical range finder

Layering And Separation

- visual layering
- 3DPS
- graphs embedding in 3D vs. 2D
- EdgeLens
  - interactive occlusion control of 2D graph edges

Visual Clutter

- subtler background than foreground

3DPS

- naive 2D -- 3D extension yields occlusion
  - same problem as van Wijk
- graph-based solution
  - move geometry according to viewpoint
  - magnify focus only
  - introduce curves into formerly straight lines
- focus+context approach

Critique

- sophisticated way to navigate 3D graphs
- purely technique paper
- not a design study
- interesting discussion I'd like to see
- more analysis of why 3D necessary
- cites Ware 3x improvement
- occlusion workaround vs. occlusion avoidance
- never shown on real data
- hard to draw conclusions from toy datasets

Information Density: Codimension

- want balance between clutter and void
- topological approach to describing density
- diff between structure and surrounding space

space structure

webviz 3 1 2 sparse
circle
H3 3 2 1 hemisphere
3DPS 3 3 0 dense cubic grid

Critique

- topological approach to describing density
- diff between structure and surrounding space

Results

- single, multiple foci

Results

- randomly positioned nodes instead of grid
- closer to real dataset

Page dimensions: 362.8x272.1
**EdgeLens Final Algorithm**
- decide which edges affected
- calculate displacements
- calculate spline control points
- draw curves

**EdgeLens Techniques**
- transparency, color

**EdgeLens Results**
- critique
  - very nice technique
  - compelling need
  - shown on real data

**Cheops**
- compact
- show paths through tree
- extreme occlusion deliberately
- browsing/exploration, not topological analysis

**Cheops Interaction**
- flip through overloaded visual representation choices

**Cheops Critique**
- pro
  - tiny footprint
- con
  - relatively hard to understand
  - singular nodes very salient, but not so important

**Hierarchical Edge Bundles**
- bundle by hierarchy using splines

**Hierarchical Edge Bundles**
- alpha blending
  - bundling strength

**Hierarchical Edge Bundles**
- (mostly) agnostic to layout

**Project Resources**