**Information Visualization**

**Rules of Thumb**

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Week 10 async video, Jan 2021

https://www.students.cs.ubc.ca/~cs-436v/21Jan/

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Visualizing the Results of Multimedia Web Search Engines.


WEBPATH-a three dimensional Web history. Frecon and Smith. Proc. InfoVis 1999

http://viz.wtf/post/137826497077/eye-popping-3d-triangles

http://viz.wtf/post/139002022202/designer-drugs-ht-ducqn

**Depth vs power of the plane**

- high-ranked spatial position channels: planar spatial position
  - not depth!

**Magnitude**
- Color luminance
- Color saturation
- Curvature
- Volume (3D size)

**Channels: Expressiveness Types And Effectiveness Ranks**

- **Justified 3D: shape perception**
  - benefits outweigh costs when task is spatial perception for 3D spatial data
  - interactive navigation supports synthesis across many viewpoints

- **Justified 3D: Economic growth curve**
  - constrained navigation steps through carefully designed viewpoints

- **No unjustified 3D**
  - 3D legitimate for true 3D spatial data
  - 3D needs very careful justification for abstract data
    - enthusiasm in 1990s, but now skepticism
    - be especially careful with 3D for point clouds or networks

- **Unjustified 3D all too common, in the news and elsewhere**

- **Perspective distortion loses information**
  - perspective distortion interferes with all size channel encodings
  - power of the plane is lost!

- **Occlusion hides information**
  - occlusion
  - interaction can resolve, but at cost of time and cognitive load

- **3D vs 2D bar charts**
  - 3D bars very difficult to justify!
  - perspective distortion
  - occlusion
  - facing into 2D almost always better choice

- **No unjustified 2D**
  - consider whether network data requires 2D spatial layout
    - especially if reading text is central to task!
    - arranging as network means lower information density and harder label lookup compared to text lists
  - benefits outweigh costs when topological structure/context important for task
    - be especially careful for search results, document collections, ontologies

- **No unjustified 2D**
  - constrained navigation steps through carefully designed viewpoints
Resolution beats immersion
• immersion typically not helpful for abstract data
  – do not need sense of presence or stereoscopic 3D
  – possible to improve aesthetics later on, as refinement
  • exhibit much more important facts are the cartographic resource

Eyes beat memory
• principle: external cognition vs. internal memory
  – easy to compare by moving eyes between both small multiples instead
  – great for transitions between two states

Best practices: Labelling
• make visualizations as self-documenting as possible
  – meaningful & useful title, labels, legends
  • use reasonable numerical format
  – avoid scientific notation in most cases

Overview first, zoom and filter, details on demand
• influential mantra from Shneiderman
  – overview = summary
  – ... known Target unknown
  – action = upcoming

Responsiveness is required
• fast feedback (light category)

Function first, form next
• start with focus on functionality
  – possible to improve aesthetics later on, as refinement
  • dangerous to start with aesthetics
  – usually impossible to add function retroactively

Credits
• Visualization Analysis and Design, Tamara Munzner, CRC Press, 2014
  – Chap 6: Rules of Thumb
  – Chap 6: Rules of Thumb

Change decisions
• if attention is directed elsewhere, even drastic changes not noticeable

Timing
• fast response after mouseclick, button press - Fitts’ Law limits on motor control

Function data form next
• fast with high data density

Function data form next
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Function data form next
• fast with high data density