Information Visualization

Rules of Thumb 2, Next Steps

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https://www.cs.ubc.ca/~tmm/courses/436V-20

News
• Restructuring no Foundations 5/6 exercises, no final exam
  – 24% marks spread: +5% midterms, +10% final project, +6% prog ex, -1% found ex
  – more fully embrace project-based nature of course
• Milestone 3: formally due Wed Apr 8 11:59pm
  – announced Apr 6: new grace days for all teams
  – can turn in without penalty until Fri Apr 10 11:59pm
  – draftrubric released
• M3 demo signups through Canvas Calendar
  – in a hurry? Sat Apr 11
  – during the week? Tue Apr 14 & Wed Apr 15
  – 8-10 min slots at X:10 or X:40

Midterm marks distribution

Evaluations
• reminder if you haven’t filled out yet
  – Professor eval
    – please fill out the official eval, more detailed!!!
  – TA evals
    – take online “KPIK 447V” section “20S”
    – please fill out two times, for each of the two TAs

Rules of Thumb Summary
• No unjustified 3D
• No unjustified 2D
• Eyes beat memory
• Resolution over immersion
• Overview first, zoom and filter, details on demand
• Responsiveness is required
• Function first, form next

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

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

Eyes beat memory
• principle: external cognition vs. internal memory
  – easy to compare by moving eyes between side-by-side views
  – harder to compare visible item to memory of what you saw
• implications for animation
  – great for choreographed storytelling
  – great for transitions between two states
  – poor for many states with changes everywhere
• consider small multiples instead
  – use 2D for small multiples

Why not animation?
• disparate frames and regions comparison difficult
  – vs contiguous frames
  – vs small region
  – vs coherent motion of group
• safe special case
  – animated transitions

Change blindness
• if attention is directed elsewhere, even drastic changes not noticeable
  – remember door experiment
• change blindness demos
  – mask in between images
  – https://youtu.be/bh_9XFzbWV8

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

Resolution beats immersion
• immersion typically not helpful for abstract data
  – do need sense of presence or immersive 3D
  – desktop also better for workflow integration
• resolution much more important: pixels are the scarcest resource
  – virtual reality for abstract data difficult to justify thus far
  – but stay tuned with second wave. AR (augmented reality) has more promise

Overview first, zoom and filter, details on demand
• influential mantra from Shneiderman
  – overview = summary
  – microcosm of full vs design problem


Card 1: Visual Design Process In Depth: Data Sketches
• detailed process notes, from sketching through coding

Card 2: Form: Basic graphic design principles
• proximity
– do group related items together
– avoid equal whitespace between unrelated
• alignment
– do not stretch alignment to line, stick to it
– avoid automatic centering
• repetition
– do unify by pushing existing consistencies
• contrast
– if not identical, then very different
– avoid similar

Card 3: Best practices: Labeling
• make visualizations as self-documenting as possible
– meaningful & useful title, labels, legends
– axes should always correspond with data labels
– use reasonable numerical format
– avoid scientific notation in most cases

Card 4: Beyond D3
• many visualization environments/ecosystems
– D3, R, python, Processing, Tableau, (Excel), charting libraries
– matplotlib, seaborn, Altair
– dramatic tour

Card 5: Visual Design Process In Depth: Dear Data
• inspiring celebration of data humanism

Card 6: Credits
• Visualization Analysis and Design. Tamara Munzner. CRC Press. 2014.
• D3 & Rules of Thumb