Information Visualization
Interactive Views

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Week 4 async video, Jan 2021

- Query
- Analyze
- Produce
- Consume
- Discover
- Annotate
- Identify
- Locate
- Lookup
- Select
- Navigate
- Reduce
- Zoom
- Pan/Translate
- Change over Time
- Select
- Facet
- Consider
- Group
- Reposition
- Staging
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Highlighting
• highlight: change visual encoding for selection targets
  – visual feedback closely tied to but separable from selection (interaction)
• design choices: typical visual channels
  – change item color
    – but hides existing color coding
  – add outline mark
  – change size (e.g.: increase outline mark line width)
  – change shape (e.g.: from solid to dashed line for link mark)
• unusual channels: motion
  – motion: usually avoid for single view
  – with multiple views, could justify to draw attention to other views

Idiom: Scrollytelling
• how: navigate page by scrolling (panning down)
  – pros:
    – familiar & intuitive, from standard web browsing
    – linear (only up & down) vs possible overload of clickable interface choices
  – cons:
    – full-screen mode may lack affordances
    – scrolling does not direct access to data
    – unexpected behaviour
    – continuous control for discrete steps

Idiom: Animated transition + constrained navigation
• how: example: cicle plot
  • example: simple zoom, only viewport changes, shapes preserved

Interaction benefits
• interaction pros
  – major advantage of computer-based vs paper-based visualizations
  – flexible, powerful, intuitive
  – exploratory data analysis change as you go during analysis process
  – fluid task switching: different visual encodings support different tasks
  – animated transitions provide excellent support
  – empirical evidence that animated transitions help people stay oriented

Interaction limitations
• interaction has a time cost
  – sometimes minor, sometimes significant
  – degrades to human-powered search in worst case
  – remembering previous state imposes cognitive load
  – users may not interact as planned by designer

Navigate: Changing viewpoint/visibility
• change viewpoint
  – changes which items are visible within view
• camera metaphor
  – pan/translate/scroll
  – rotate/spin
  – zoom to Bounding Box

Juxtapose and coordinate views
• Share Encoding: Same/Different
• Linked Highlighting
• Share Data: All/Subset/None
• Share Navigation

Facet
• Justpose
• Partition
• Superimpose
Facet

- Superimpose layers
  - layer: set of objects spread out over region
    - each set is visually distinguishable group
    - entire: whole view
    - design choices
      - how many layers, how to distinguish?
      - encode with different, nonoverlapping channels
      - two layers achievable, driven with careful design
      - small static set, or dynamic from many possible!

Superimposing limits (static)
- few layers, more lines
  - up to a few dozen lines
  - but not hundreds
- superimpose vs juxtapose: empirical study
  - same size: all multiple, vs single superimposed
  - superimposed local tasks
  - juxtaposed global tasks, esp. for many charts

Dynamic visual layering
- interactive, based on selection
  - one-hop neighbour highlighting
    - click (heavyweight)
    - hover (flat)

Partitioning: Grouped vs small-multiple bars
- single bar chart with grouped bars
- small-multiple bar charts
- small-multiple bar charts
  - split by state into regions
  - where it's expensive
  - water, parks, land areas

Partitioning: Recursive subdivision
- single bar chart with grouped bars
- small-multiple bar charts
- small-multiple bar charts
  - split by age into regions
  - one-hop neighbour highlighting
  - switch order of splits
  - type patterns
    - within specific type, which neighborhoods inconsistent

System: HIVE
- switch order of splits
- type then neighborhood
- switch color
  - by price variation
- type patterns
  - within specific type, which neighborhoods inconsistent

Partitioning: Recursive subdivision
- different encoding for second-level regions
  - choropleth maps

Dynamic visual layering
- interactive, based on selection
  - one-hop neighbour highlighting

System: HIVE
- switch order of splits
- type then neighborhood
- switch color
  - by price variation
- type patterns
  - within specific type, which neighborhoods inconsistent

Reader notes:
- how can you help here?
- where's your support for this?
- where do you want to go?
- where do you want to be?