Class 3: Overview & Detail

Objectives
By the end of the class, you will be able to...

- Describe the advantages of showing an overview
- Define “overview + detail” and “focus + context” and describe their differences
- Analyze the advantages and disadvantages of various focus + context and overview + detail techniques
- Describe ways to create Micro / Macro readings
- Evaluate the effectiveness of different ways of showing overview and detail

Agenda for Class

- Office hours: M & Th 3:30 – 4:30 (after class)
- Questions about Assignment 1
- Demo Google Maps – an example of “overview + detail”
  - Discuss purposes of having an overview
- Watch Idelix video – an example of “focus + context”. Compare and contrast with Google maps.
- Additional F+C demos & discussion:
  - TJ video – example of focus + context and semantic zooming
  - Hyperbolic browser demo
  - Cone trees
- Discuss Micro / Macro readings

Reading Assignment
Tufte Chapter 2 (Micro / Macro Readings)
Ware pp. 338-346

Demos:
Hyperbolic browser: (http://ucjeps.berkeley.edu/map2.html)
TableLens (http://www.avizsoft.com/contents/table-lens-demo.htm)
Idelix software, TreeJuxtaposer, Google Maps

Notes:
Shneiderman’s visualization mantra: overview first, zoom & filter, details on demand

1. Why should you show an overview / context?
- Help people keep track of where they are
- Make it easier to navigate to a new location

Do you always want to show an overview?
No, sometimes people don’t need / want to see everything. Context can still be useful though. (E.g. youtube).
Alternate visualization mantra: search, show context, expand on demand (van Ham, InfoVis09)

2. What are some different ways of showing both an overview and details?
   • Separate windows (“overview + detail”). Usually the location of detail view(s) are indicated in the overview and you are allowed to navigate by moving the view icon.
     o + No distortion, which may be confusing or make some parts difficult to read
     o + Shows overview + detail simultaneously
     o – Information is fragmented across multiple views
   • Distortion – give more room to data of interest, in its current spatial location. E.g. intelligent zoom, hyperbolic tree, fisheye lens, table lens. (“focus + context” or “detail-in-context”)
     o + Contextual information is close to the focal point
     o – Distortion may make some parts of the data hard to interpret
     o – Distortion may obscure structure in the data
     o May be better suited to data where exact distances between objects do not represent data values (e.g. trees rather than spatial maps)
   • Semantic Zooming (Ware calls this Elision) – show more information as you zoom in or drill down

Additional Detail + Context Examples
Cone Trees
+ Displays hierarchical structure well
- Occlusion is a big problem
- Does not scale well to large trees

Hyperbolic browser
+ Scales well to large trees
+ Makes good use of screen space
- Animated navigation can be difficult to follow

TreeJuxtaposer (Rubber sheet navigation + guaranteed visibility)
+ Scales well to large trees
+ Guaranteed visibility is effective way of maintaining useful context information
- Navigation by dragging a box can be awkward and non-intuitive

3. Micro / Macro Readings
Definition
A visualization that enables you to see both large scale structure and small scale details in the same image.

Advantages:
• Lets you see both large scale overview and small scale details
• No navigation, zooming, or filtering required (reading is very fast)

Disadvantages
• May become quite cluttered and hard to read details (e.g. temperature / connectivity graphs in Tufte p. 39, train schedule p. 45)
  Solutions?
    o Better visual layering (e.g. using colour) I (but this only scales so far)
    o Interactivity (e.g. semantic zooming)
    o Larger, higher resolution display (but this only scales so far)
• Challenging to produce a good one, both in terms of graphic design and display / printing

How to create Micro / Macro readings?
• Visual layering – using different colours and visual marks to represent different data components – enables you to overlay many related pieces of data
• Pixel-based techniques – represent each detailed data value as a coloured pixel (or small area). The collection of these pixels gives an overview
• Stem & leaf plots

More generally:
• Design the display so that each visual mark serves multiple purposes, and marks are not repeated when this isn’t necessary.

Key Concepts for Today:
1. Showing both an overview + detail is considered good design practice.
2. There are many ways to accomplish this and each comes with benefits and drawbacks.
3. Think about the user’s goal: an overview is not always needed / desired