Assignment 2: Creating Visualizations

Use existing software to formulate & answer questions

First steps
- Step 1: Pick a domain
- Step 2: Pose question
- Step 3: Find data
- May need to iterate

Create visualization
- Interact with data
- Question will evolve
- Tableau or Spotfire DXP

Make wiki notebook
- Keep record of all steps you took to answer the questions

Due before class on Sep 24, 2008
Interaction

Gulfs of execution & evaluation

[Norman 1986]
Gulf of evaluation

Conceptual model: $x, y$ correlated?

Real world:

<table>
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<th>Y</th>
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Gulf of evaluation

Conceptual model: $x,y$ correlated?

Real world:

$$\rho = -.29$$

Gulf of execution

Conceptual model: Draw a scatterplot

Real world

Move 90 30
Rotate 35
Pen down
...
Gulf of execution

Conceptual model: Draw a scatterplot

Real world

Execution

Topics

Brushing and linking
Dynamic queries
Rearrangements
Brushing and Linking

Highlighting

Focus user attention on a subset of the data within one graph [from Wills 95]
Brushing

- Interactively select subset of data
- See selected data in other views
- Two things (normally views) must be linked to allow for brushing

Baseball statistics [from Wills 95]

- how long in majors
- avg assists vs avg putouts (fielding ability)
- distribution of positions played
- select high salaries
- avg career HRs vs avg career hits (batting ability)

[www.sims.berkeley.edu/courses/is247/s02/lectures/Lecture3.ppt]
Linking assists to positions

[www.sims.berkeley.edu/courses/is247/s02/lectures/Lecture3.ppt]

GGobi: Brushing

http://www.ggobi.org/
Dynamic Queries

Query and results

SELECT house
FROM east bay
WHERE price < 1,000,000 AND bedrooms > 2
ORDER BY price
Issues

1. For programmers
2. Rigid syntax
3. Only shows exact matches
4. Too few or too many hits
5. No hint on how to reformulate the query
6. Slow question-answer loop
7. Results returned as table

HomeFinder

The yellow dots shown are houses in the DC area for sale. You may get more information on a house by selecting it. You may drag the ‘A’ and ‘B’ distance markers to your office or any other location you want to live near. Select distances, bedrooms, and cost range by dragging the corresponding slider bars on the right. Select specific home types and services by pressing the labeled buttons on the right.

[Ahlberg and Schneiderman 92]
Direct manipulation

1. Visual representation of objects and actions
2. Rapid, incremental and reversible actions
3. Selection by pointing (not typing)
4. Immediate and continuous display of results

Alphaslider

Title: Moonstruck

[Alhberg and Schneiderman 94]
FilmFinder

[Ahlberg and Schneiderman 93]

FilmFinder

[Ahlberg and Schneiderman 93]
FilmFinder

[Ahlberg and Schneiderman 93]

Cellphones

http://www.myrateplan.com/cellphones/
Zipdecode [from Fry 04]

http://acg.media.mit.edu/people/fry/zipdecode/

Attribute explorer [Spence and Tweedie 98]

Video Clip
**TimeSearcher** [Hochheiser & Schneiderman 02]

Based on Wattenberg's [2001] idea for sketch-based queries of time-series data.

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**3D dynamic queries** [Akers et al. 04]

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3D dynamic queries [Akers et al. 04]

Pros and cons

Pros
- Controls useful for both novices and experts
- Quick way to explore data

Cons
- Simple queries
- Lots of controls
- Amount of data shown limited by screen space

Who would use these kinds of tools?
Rearrangements

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1% CLIENTELE FEMALE
2% LOCAL
3% U.S.A.,

4% SOUTH AMERICA
5% EUROPE

6% M.EAST.AFRICA
7% ASIA
8% BUSINESSMEN
9% TOURISTS

10% DIRECT RESERVATIONS
11% AGENCY
12% AIR CREWS

13% CLIENTS UNDER 20 YEARS
14% 20-35
15% 35-55

16% MORE THAN 55
17% PRICE OF ROOMS
18% LENGTH OF STAY
19% % OCCUPANCY

[Graphics and Graphic Information Processing, Bertin 81]
Graphics and Graphic Information Processing, Bertin 81
[Graphics and Graphic Information Processing, Bertin 81]
Rivet: Interactive reordering

Performance Analysis and Visualization of Parallel Systems Using SimOS and Rivet: A Case Study [Bosch et al. 00]

Trellis
[Becker, Cleveland, and Shyu 96]
Trellis
[Becker, Cleveland, and Shyu 96]
Summary

Most visualizations are interactive
- Even passive media elicit interactions

Good visualizations are task dependant
- Choose the right space
- Pick the right interaction technique

Human factors are important
- Leverage human strengths
- Assist to get past human limitations