Interaction

Lecture 10 CPSC 533C, Fall 2005

19 Oct 2005

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News

- Topic choices due tomorrow (Thu) 5pm
- Meet with me before submitting proposal
  - Fully booked tomorrow, fly out Friday, back Mon Oct 31
  - Proposals due 2pm Fri Nov 4

Projects

- Proposal expectations
- Software resources on web
  - And one more time-series data list added

- Ware: Interacting with Visualizations
- Ware: Thinking with Visualizations
- Cognitive Co Processor
- SDM
- Dynamic Queries
- more linked views
  - Exploratory Data Views
  - Influence Explorer

Ware Interaction

- control loops
  - Fitts' Law
    - time to select depends on distance, target size
  - two-handed interaction
    - coarse vs. fine control: paper vs. pen hold
- learning
  - power law of practice
- vigilance
  - difficult, erodes with fatigue

Ware Interaction 2

- navigation
  - next time
- rapid zooming
  - next time
- distortion
  - next week
- multiple windows, linked highlighting
  - today!
- dynamic queries
  - today!

Ware Thinking with Viz

- problem solving loops
  - external representations
- visual working memory
  - low capacity
  - visual attention
  - gist: 100ms
  - change blindness
    - "world is its own memory"

Memory and Loops

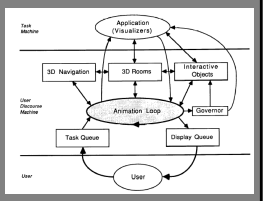
- long term memory
  - chunking
  - memory palaces (method of loci)
- loops
  - problem-solving strategy
  - visual query construction
  - pattern-finding loop
  - eye movement control loop
  - intrasaccadic image-scanning loop

InfoVis Implications

- visual query patterns
- navigation cost
- multiple windows vs. zoom

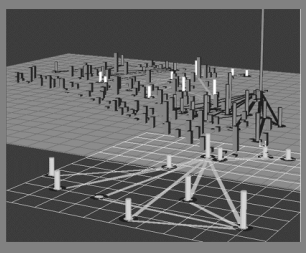
Cognitive Co-Processor

- animated transitions
  - object constancy
  - fixed frame rate required
- architectural solution
  - split work into small chunks
  - animation vs. idle states
  - governor controls frame rate
- [video: 3D rooms]



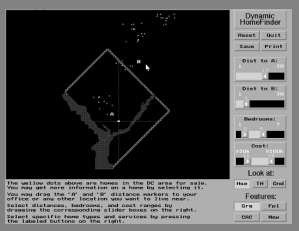
SDM

- sophisticated selection, highlighting,
- object manipulation
- [video]

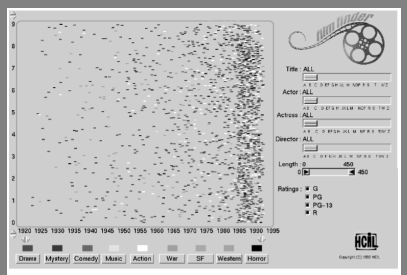


Dynamic Queries: HomeFinder

- filter with immediate visual feedback
- "starfield": scatterplot
- [video]

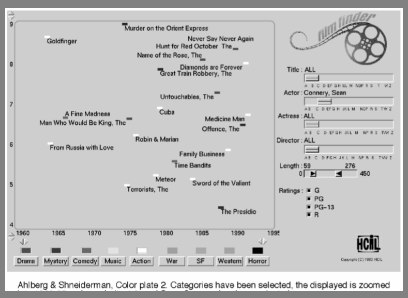


DQ 2: FilmFinder



Ahlberg & Shneiderman, Color plate 1. The FilmFinder.

DQ 2: FilmFinder



Ahlberg & Shneiderman, Color plate 2. Categories have been selected, the displayed is zoomed

More Linked Views

key infovis interaction principle

so far: Ware, Trellis, cluster calendar, ….

brushing: linked highlighting
- Becker and Cleveland, "Brushing Scatterplots", Technometrics 29, 127-142

new examples:
- EDV
- Attribute Explorer

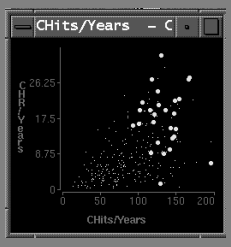
EDV

Exploratory Data Visualizer

Graham J. Wills. Visual Exploration of Large Structured Datasets. In *New Techniques and Trends in Statistics*, 237–246. IOS Press, 1995.

Highlighting (Focusing)

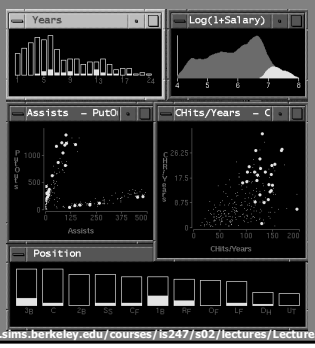
Focus user attention on a subset of the data within one graph (from Wills 95)



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

Link different types of graphs: Scatterplots and histograms and bars

(from Wills 95)



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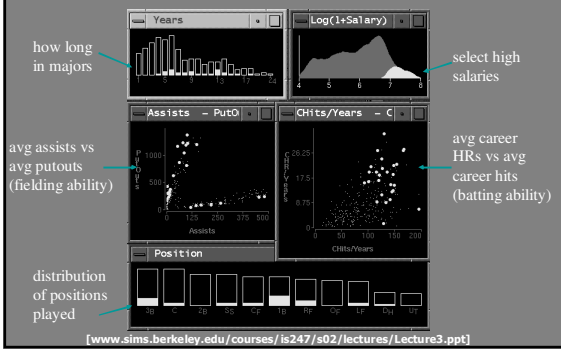
Baseball data: Scatterplots and histograms and bars (from Wills 95)



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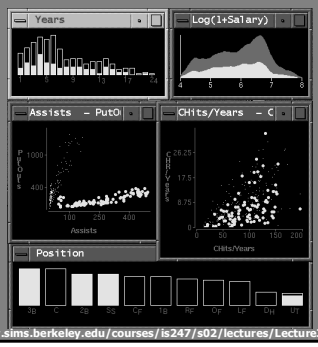
Linking types of assist behavior to position played (from Wills 95)



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Influence/Attribute Explorer

- Visualization for Functional Design, Bob Spense, Lisa Tweedie, Huw Dawkes, Hua Su, InfoVis 95

[video]