

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

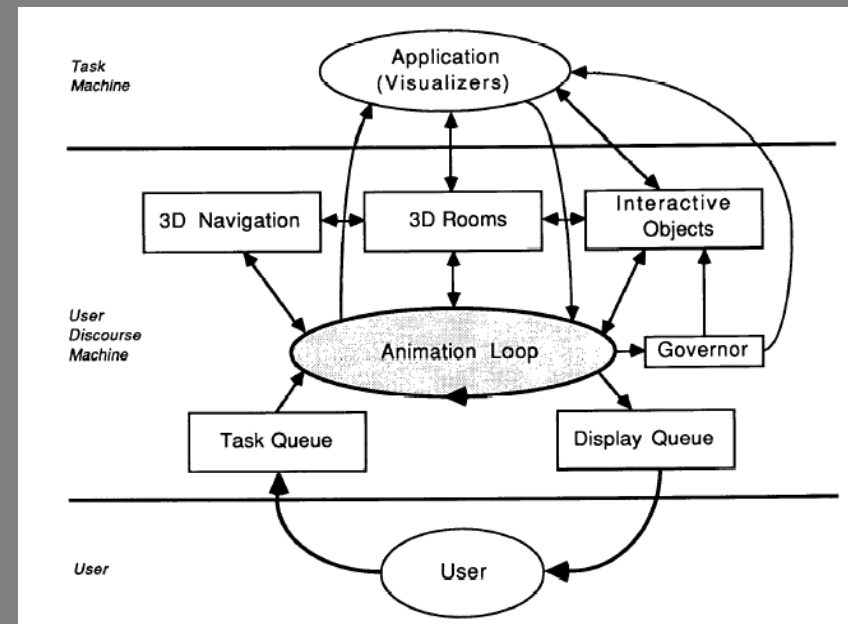
- long term memory
 - chunking
 - memory palaces (method of loci)
- loops
 - problem-solving strategy
 - visual query construction
 - pattern-finding loop
 - eye movement control loop
 - intrasaccadic image-scanning loop

InfoVis Implications

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

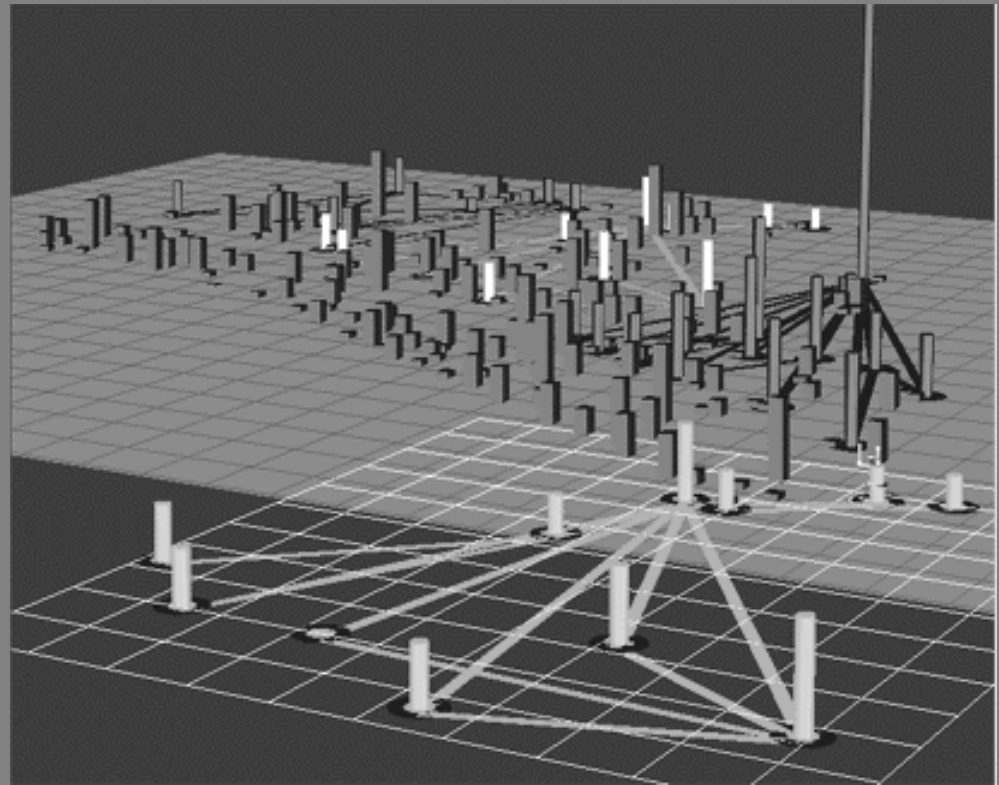
Cognitive Co-Processor

- 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]

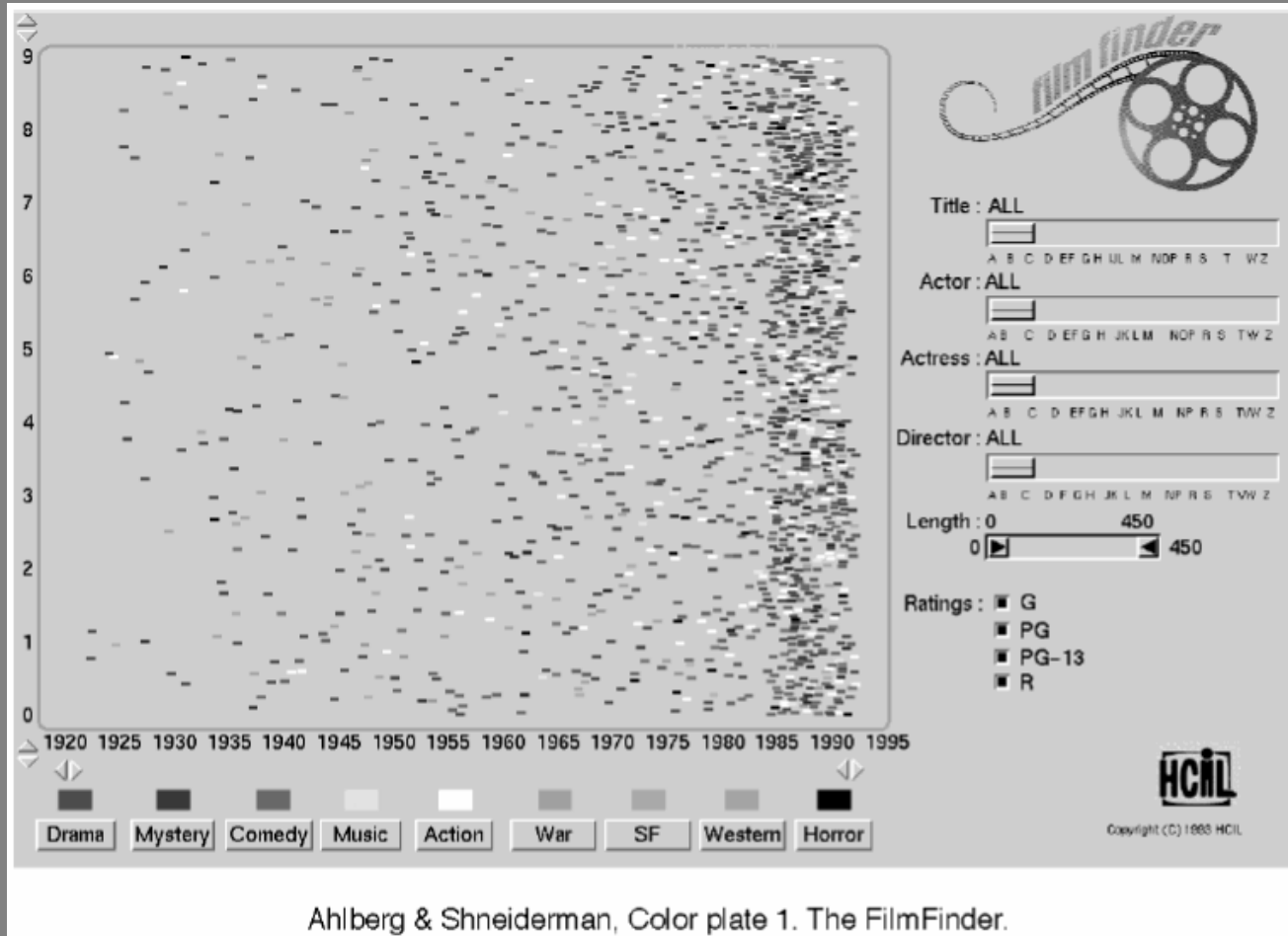


Dynamic Queries: HomeFinder

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

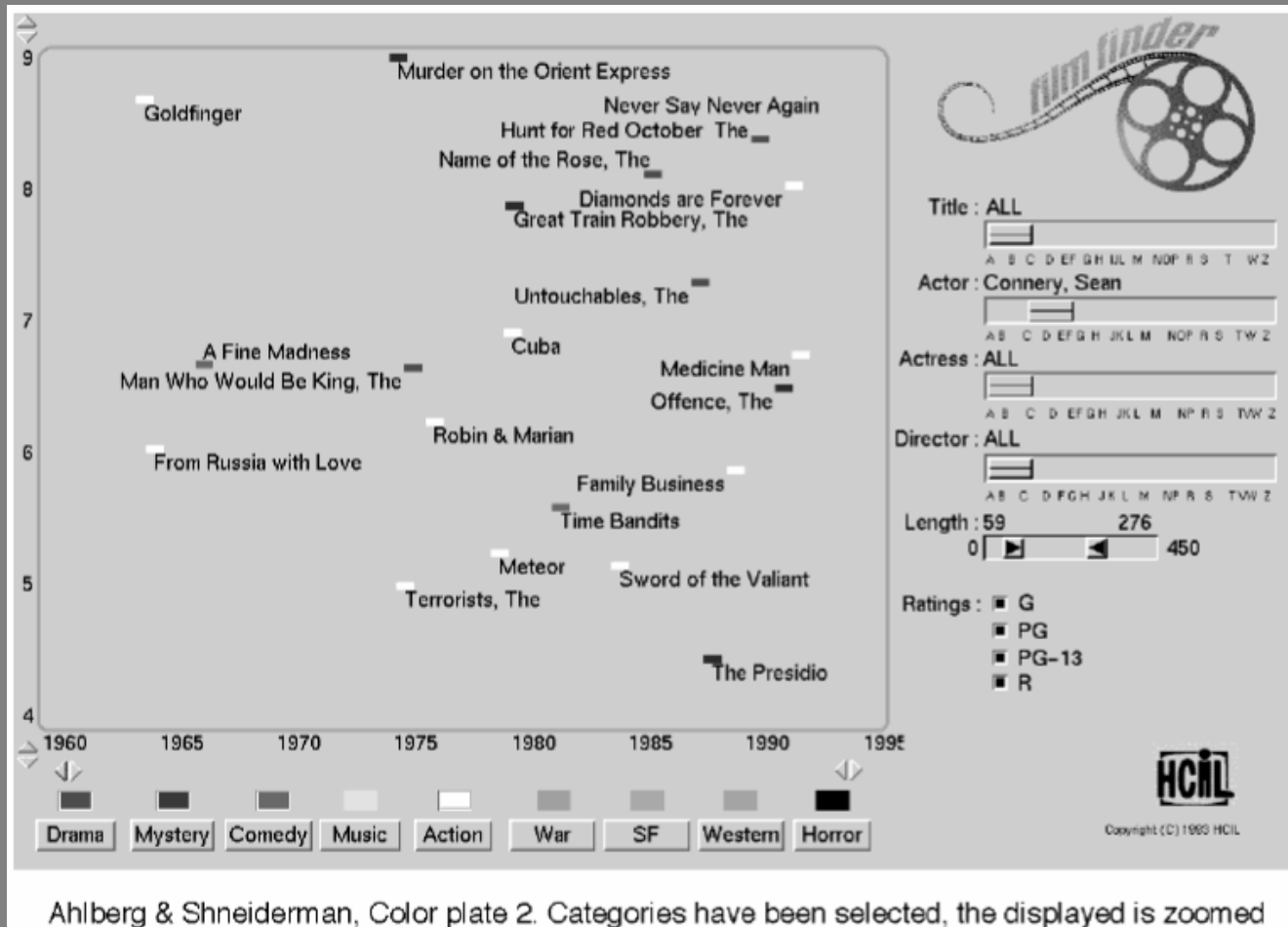


DQ 2: FilmFinder



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

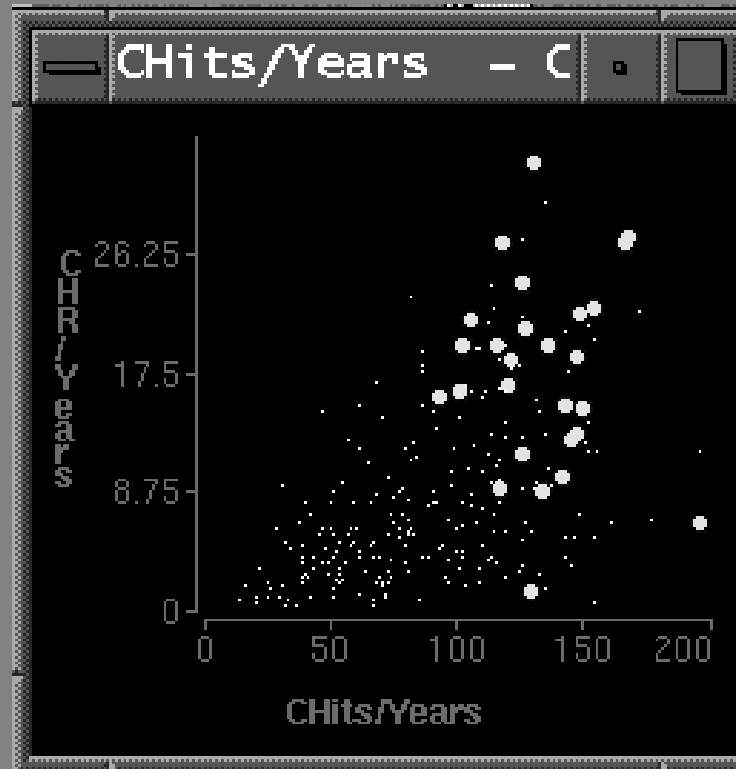
EDV

Exploratory Data Visualizer

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

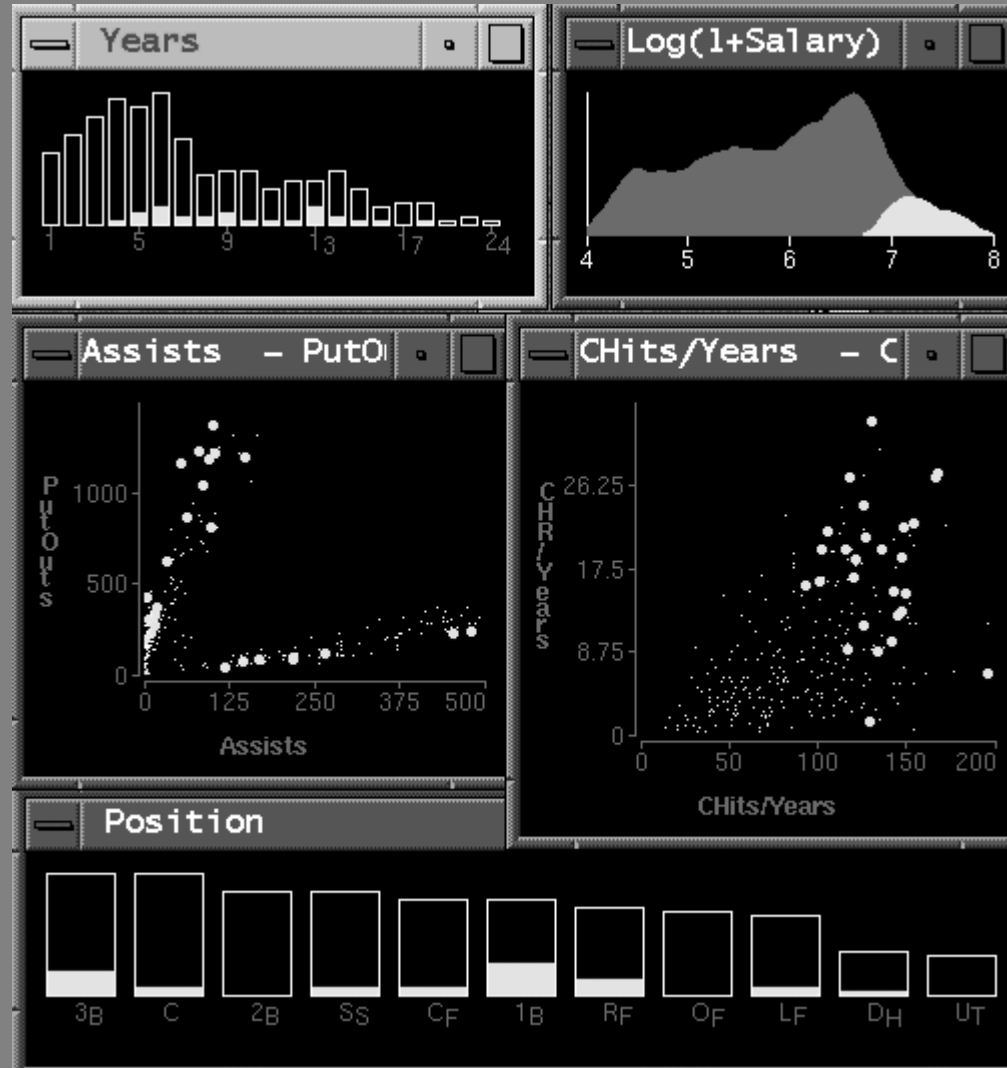
Highlighting (Focusing)

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



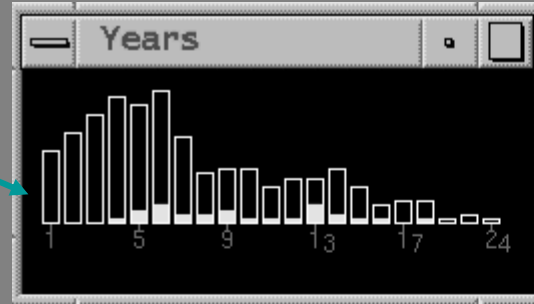
Link different types of graphs: Scatterplots and histograms and bars

(from Wills 95)

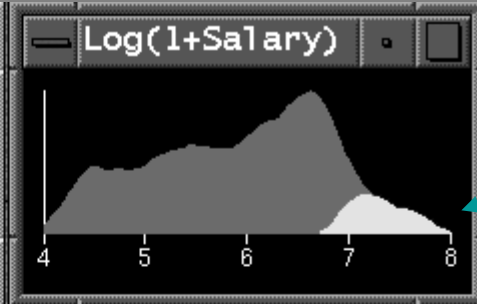


Baseball data: Scatterplots and histograms and bars (from Wills 95)

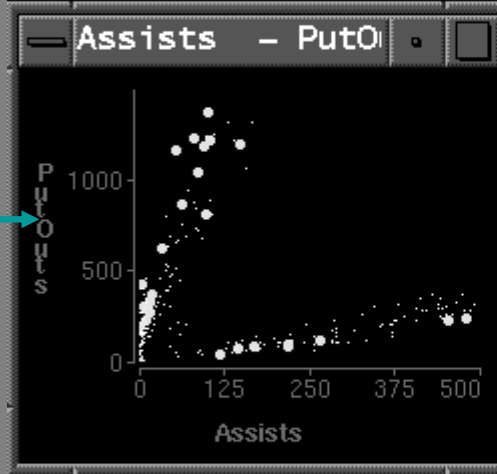
how long
in majors



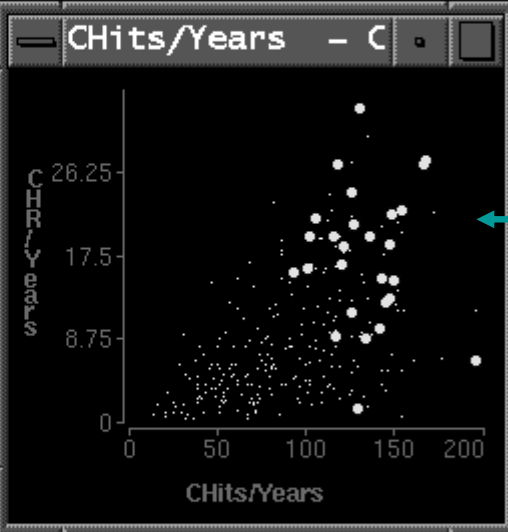
select high
salaries



avg assists vs
avg putouts
(fielding ability)



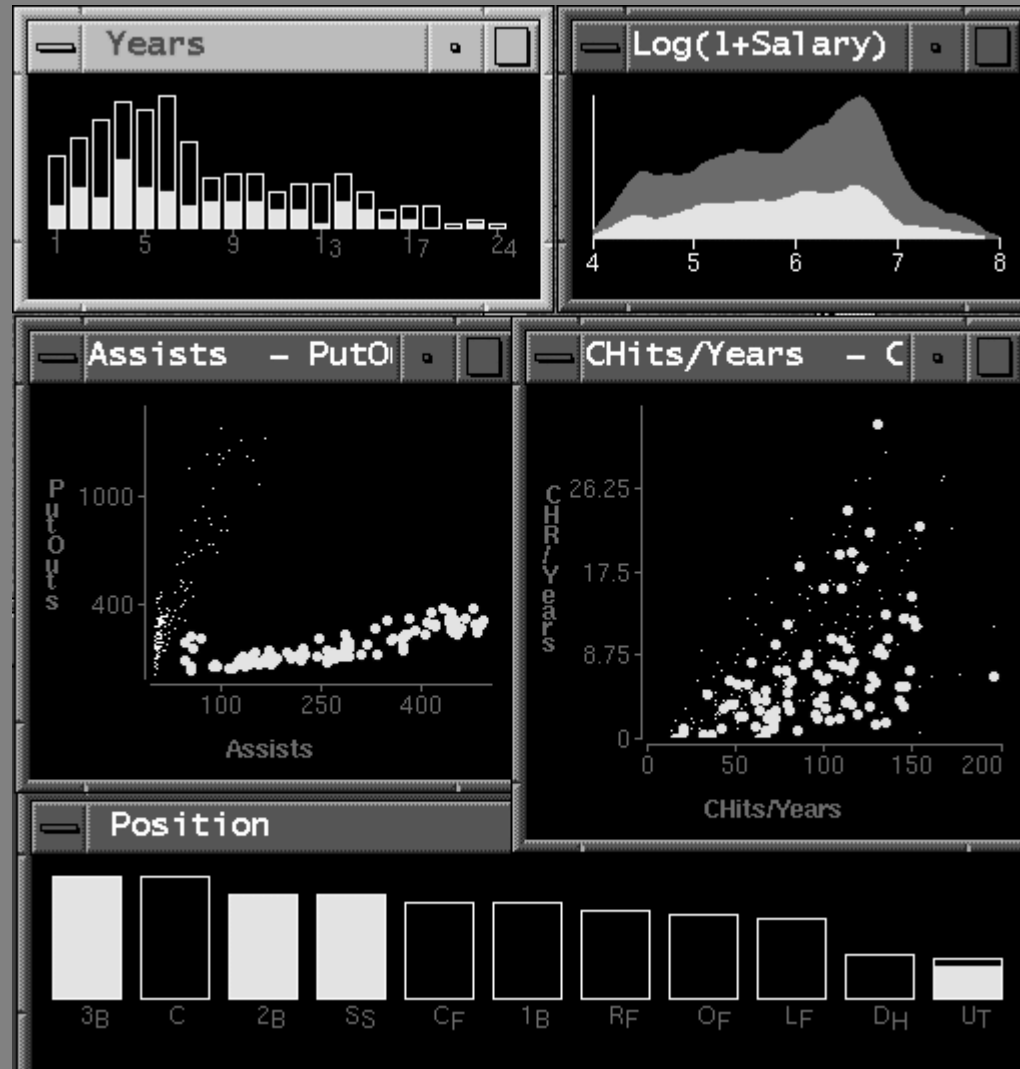
avg career
HRs vs avg
career hits
(batting ability)



distribution
of positions
played



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



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

Influence/Attribute Explorer

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

[video]