

Interaction

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Slides adapted from John Stasko (Georgia Tech),
Petra Isenberg & Jean-Daniel Fekete (INRIA),
Chris North (Virginia Tech)

Outline

- Interactivity, latency
- Schneiderman's mantra
- Linked views
- Glossing & brushing
- Focus+context

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Response time

- 0.1 sec — *animation, visual continuity*
- 1 sec — *system response, conversation break*
- 10 sec — *cognitive response*

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Dynamic queries



[Ahlberg & Shneiderman, '92]

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Animation

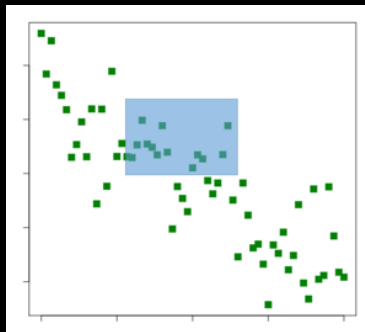
- Help maintain transition
- Reconcile before & after
- Use perception vs. cognition

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Shneiderman's mantra

- Overview first, zoom & filter, details on demand
- Overview first, zoom & filter, details on demand
- Overview first, zoom & filter, details on demand
- Overview first, zoom & filter, details on demand

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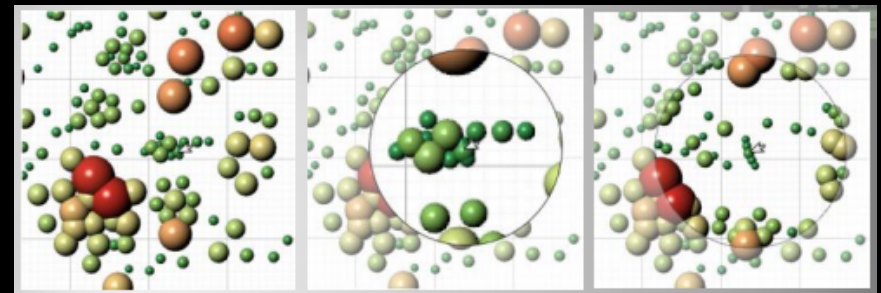


Tesla S (2015)
Acceleration : ...
Cost: ...
Weight: ...



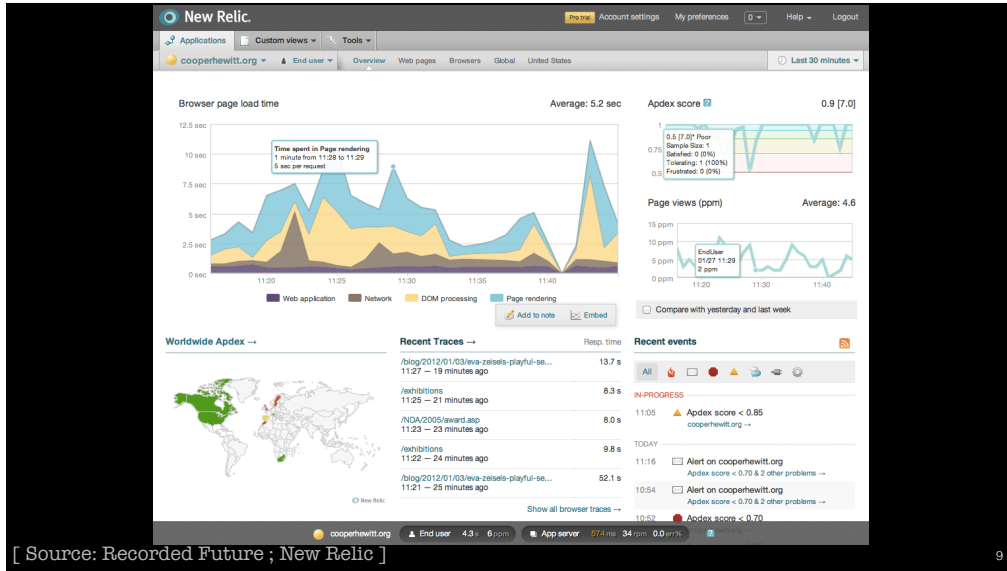
[Source : Brooke Fitzgerald]

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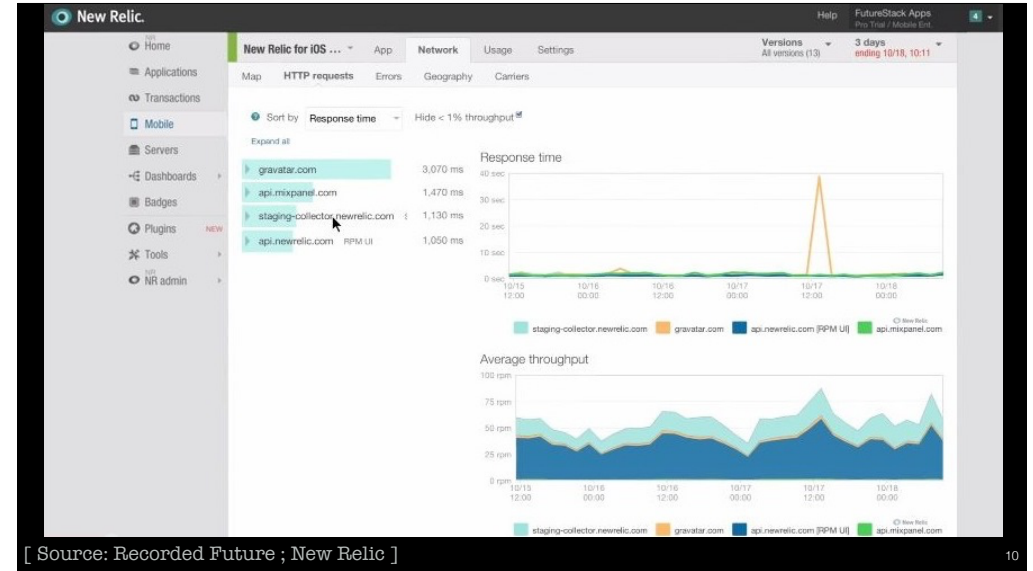


[Source : Brooke Fitzgerald]

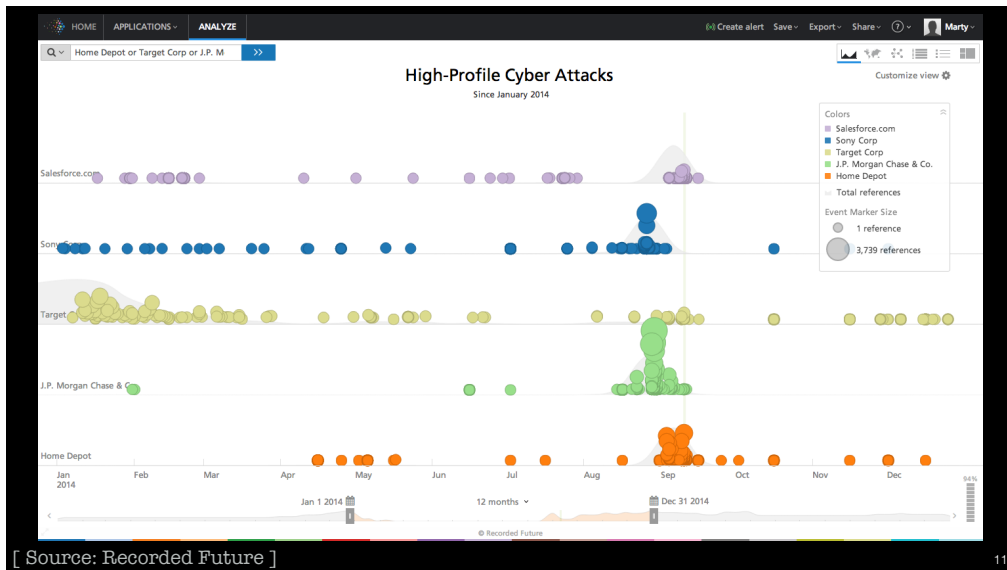
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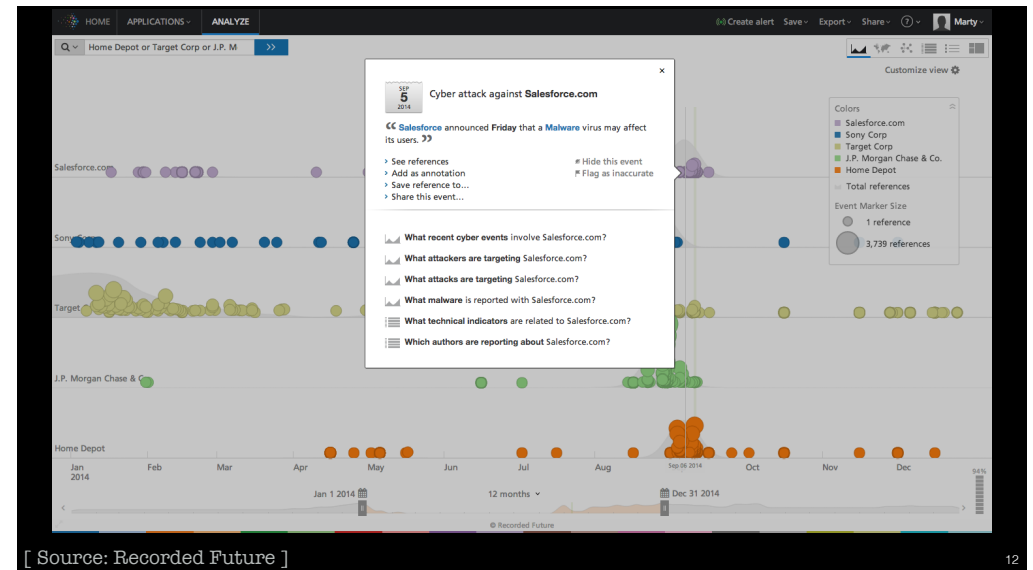
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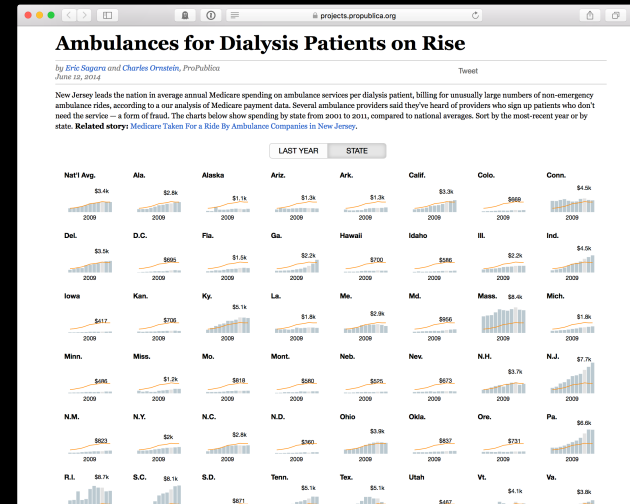


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Linked Views

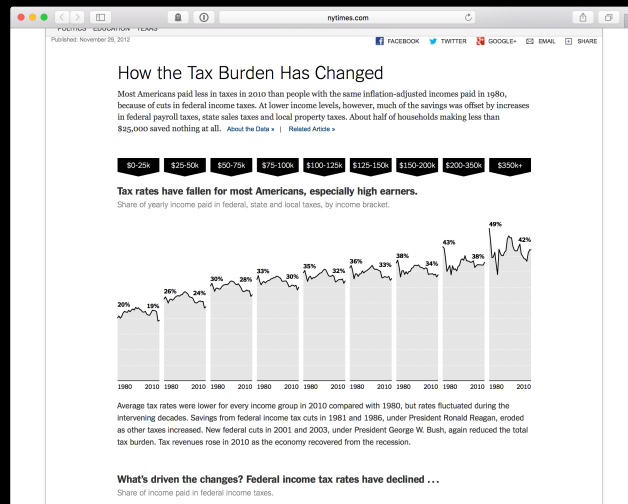
- Multiple views of the same data
- Show different aspects of data
- Reduces use of working memory

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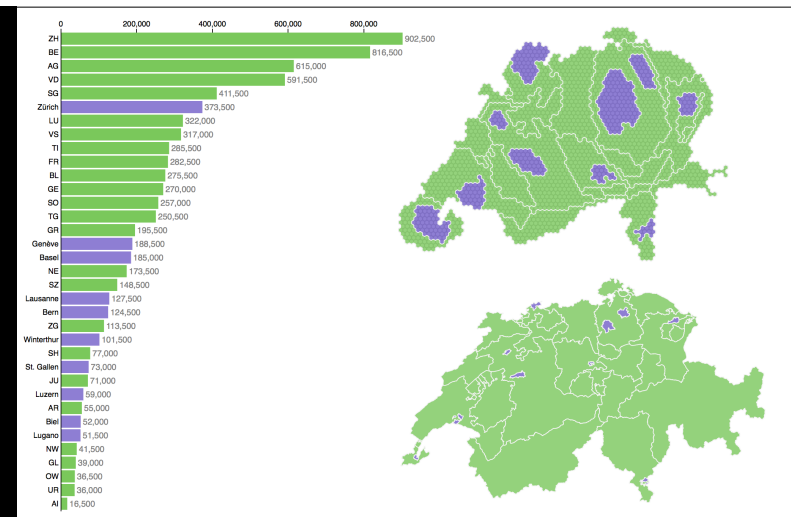
[<https://projects.propublica.org/graphics/ambulances>]

14



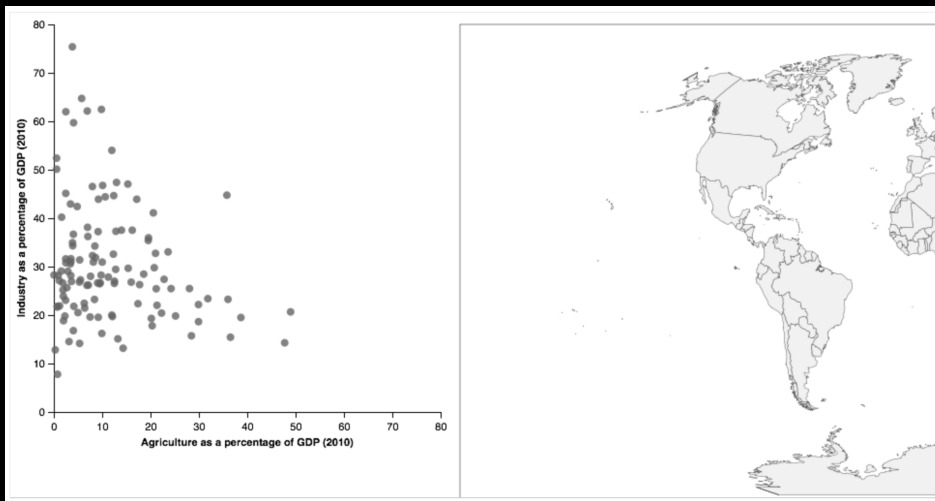
[<http://www.nytimes.com/interactive/2012/11/30/us/tax-burden.html>]

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[http://www.ralphstraumann.ch/projects/swiss-population-cartogram/index_fr.html]

16



[<http://bl.ocks.org/iaindillingham/0683f7ddb90c263c6d92>]

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Glossing & brushing

- Often associated with multiple linked views
- Brushing : slide cursor over area to select
- Glossing : hovering over an item to reveal more info (e.g. tooltip)
- Powerful when combined with linked views

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[van den Elzen & van Wijk, InfoVis '14]

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Focus + Context

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Can we integrate overview w/ detail?

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Combine overview & detail
into a single view

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Combine **focus + context**
into a single view

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Fisheye views

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```
1 #define DIG 40
2 #include <stdio.h>
...4 main()
5 {
6     int c, i, x[DIG/4], t[DIG/4], k = DIG/4, noprint = 0;
...8     while((c=getchar()) != EOF){
9         if(c >= '0' && c <= '9'){
...16             } else {
17                 switch(c){
18                     case '+':
...27                     case '-':
...38                     case 'e':
>>39                         for(i=0;i<k;i++) t[i] = x[i];
40                         break;
41                     case 'q':
...43                     default:
...46                 }
47                 if(!noprint){
...57                 }
58             }
59             noprint = 0;
60         }
61     }
```

[Furnas, CHI 1986]

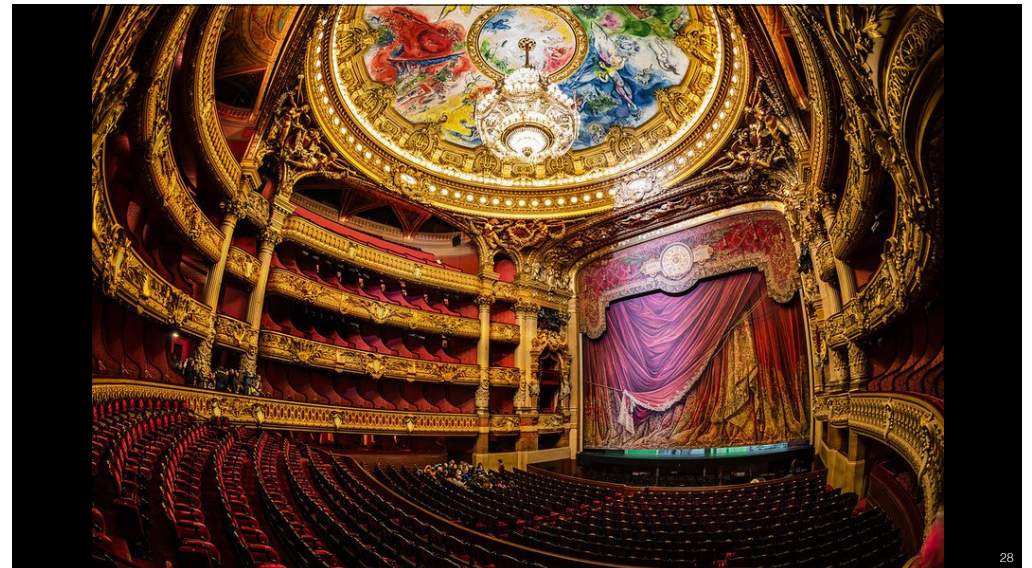
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What are fisheye views?

“Provide[s] detailed views (focus) and overviews (context) without obscuring anything...The focus area (or areas) is magnified to show detail, while preserving the context, all in a single display.”

– Ben Shneiderman, 1998

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[The New Yorker, 1976]

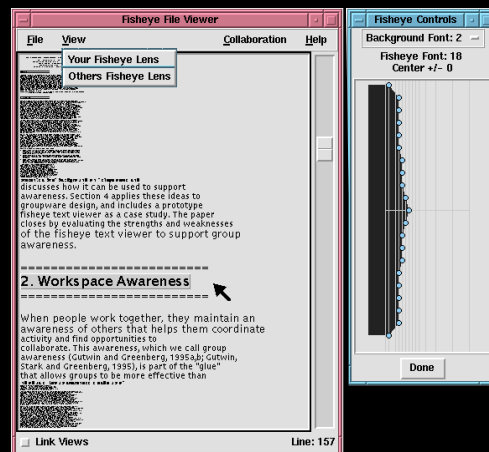
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[luminous-landscape.com]

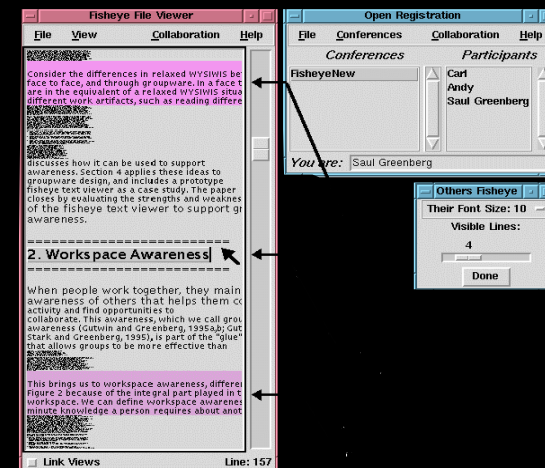
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32



[Gutwin & Greenberg, CHI 1996]

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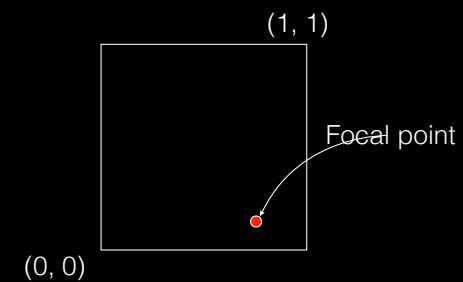
[Gutwin & Greenberg, CHI 1996]

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- * Focal point
- * Level of detail
- * Distance from focus
- * Degree of interest function

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Focal point



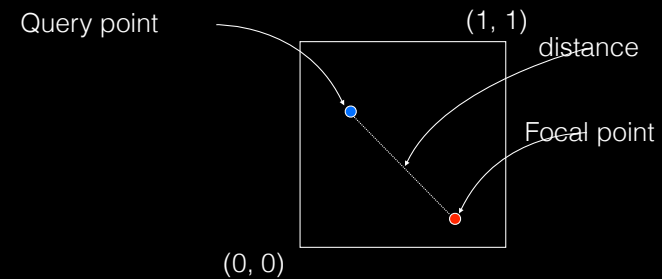
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Level of detail

(general importance of each item)

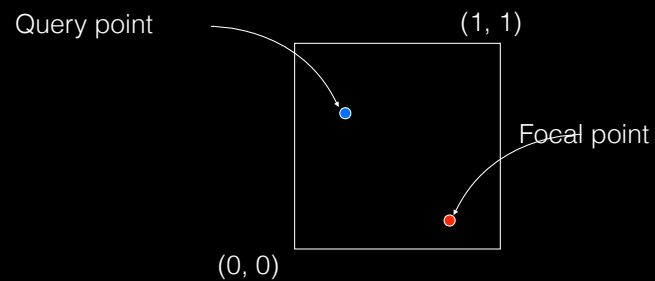
37

Distance from focus



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Degree of interest function



degree of interest = level of detail - distance from focus
= level of detail / distance from focus

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DOI function varieties

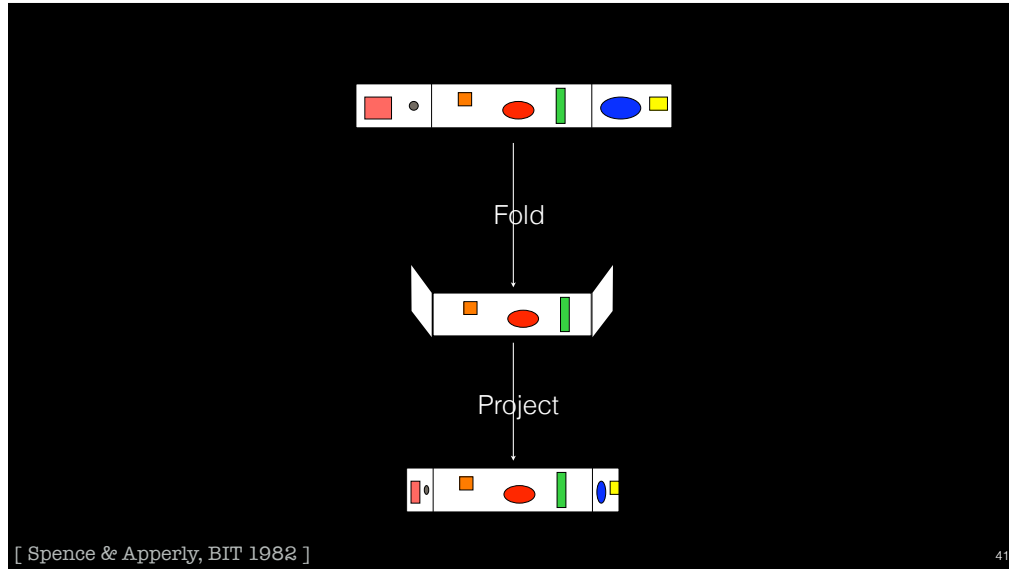
continuous — smooth falloff

step — levels of falloff

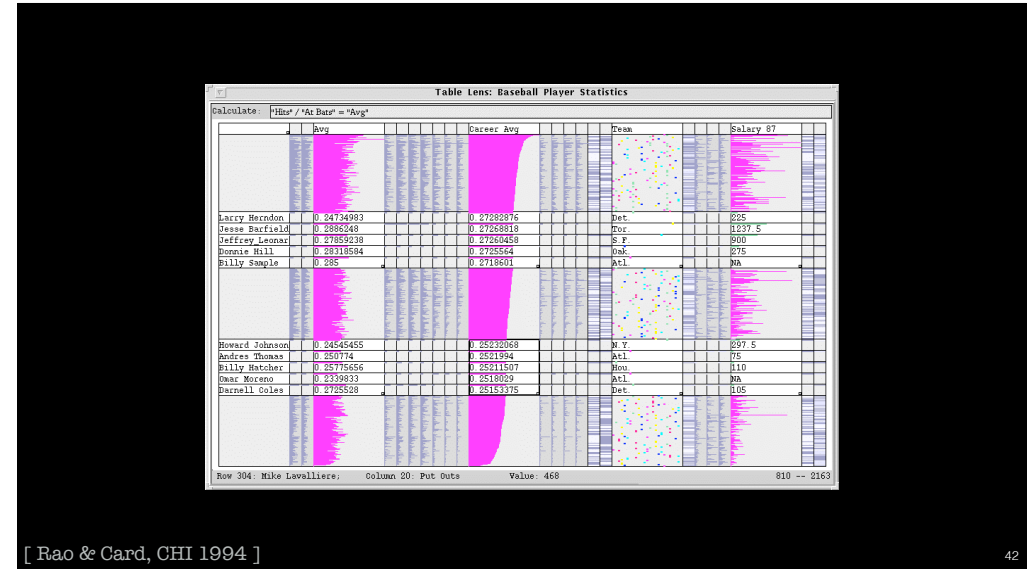
filtering — below a threshold, items disappear

semantic changes — representations change

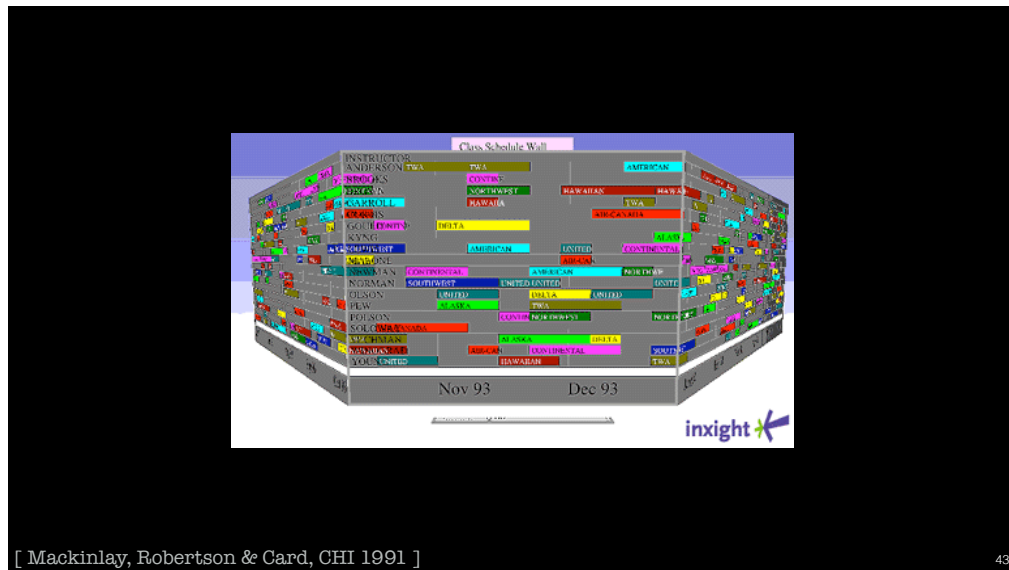
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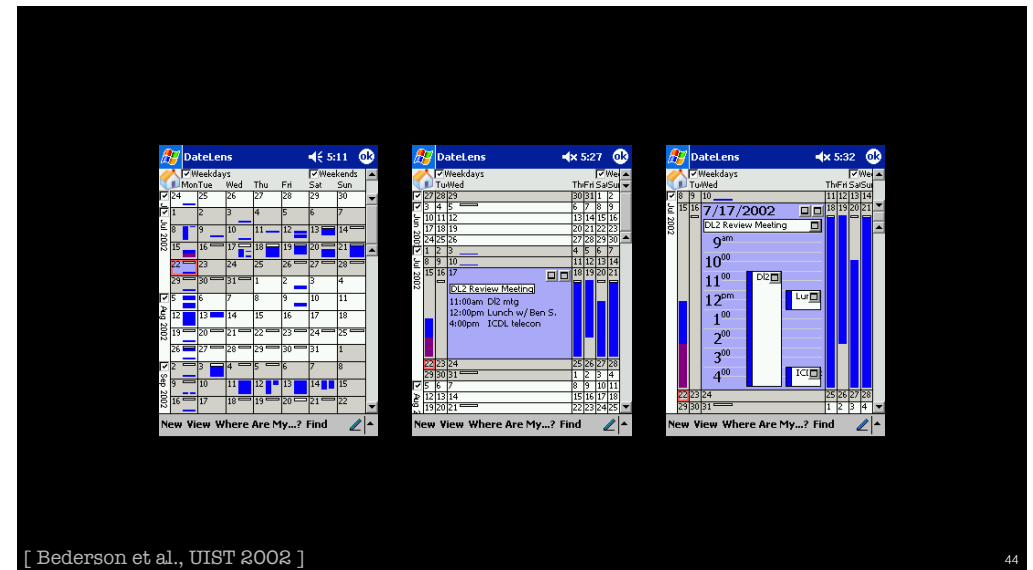
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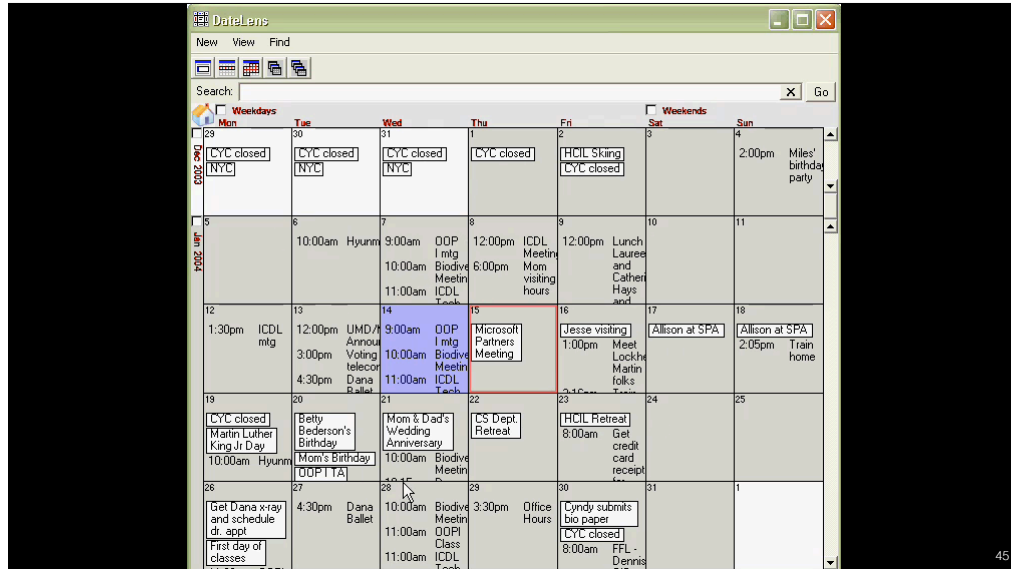
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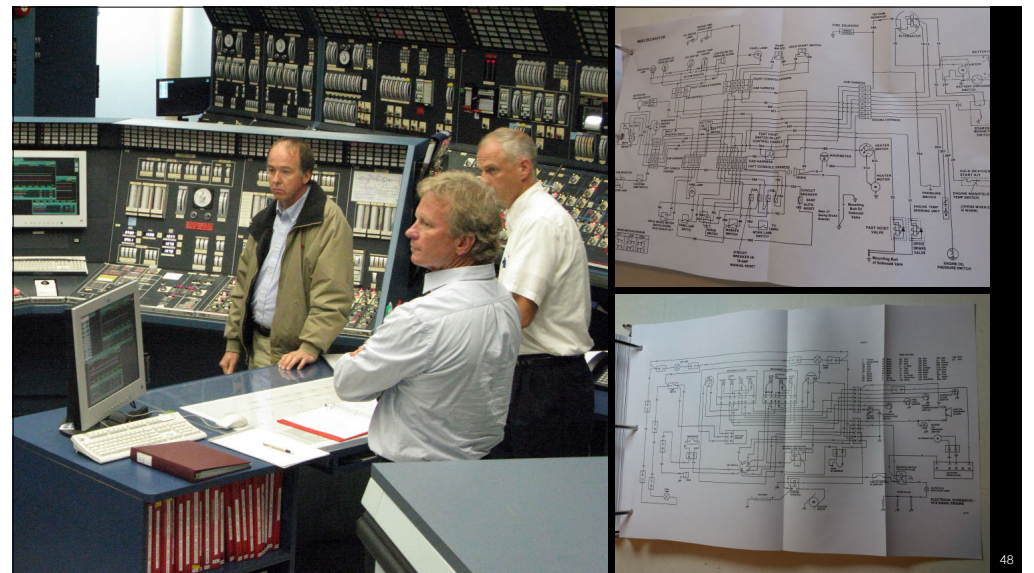
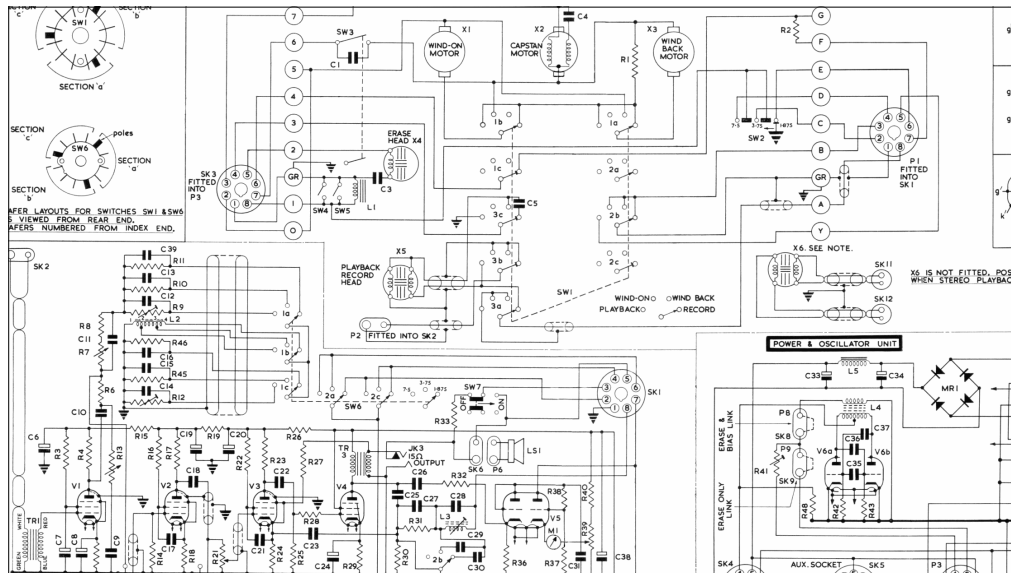
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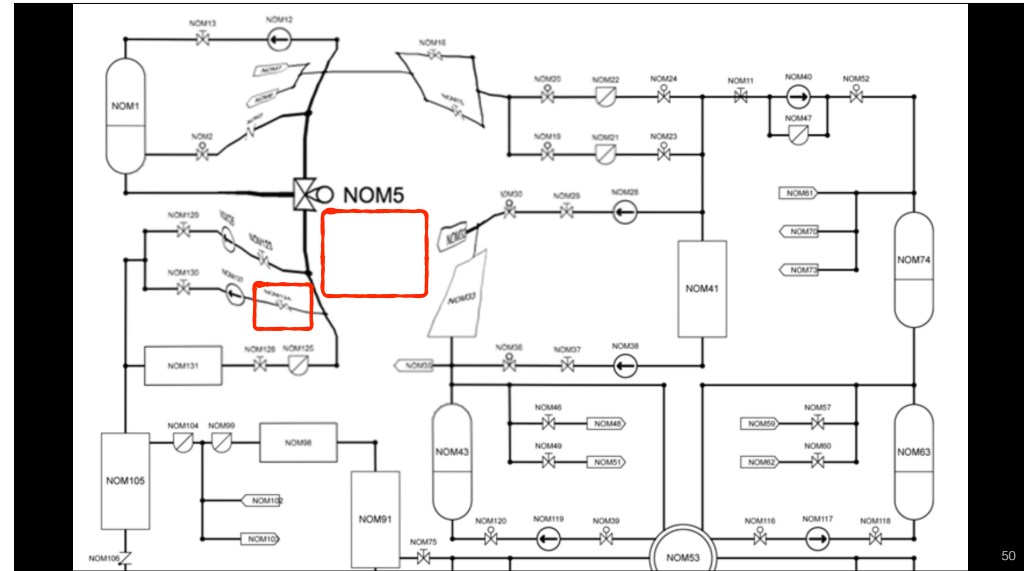
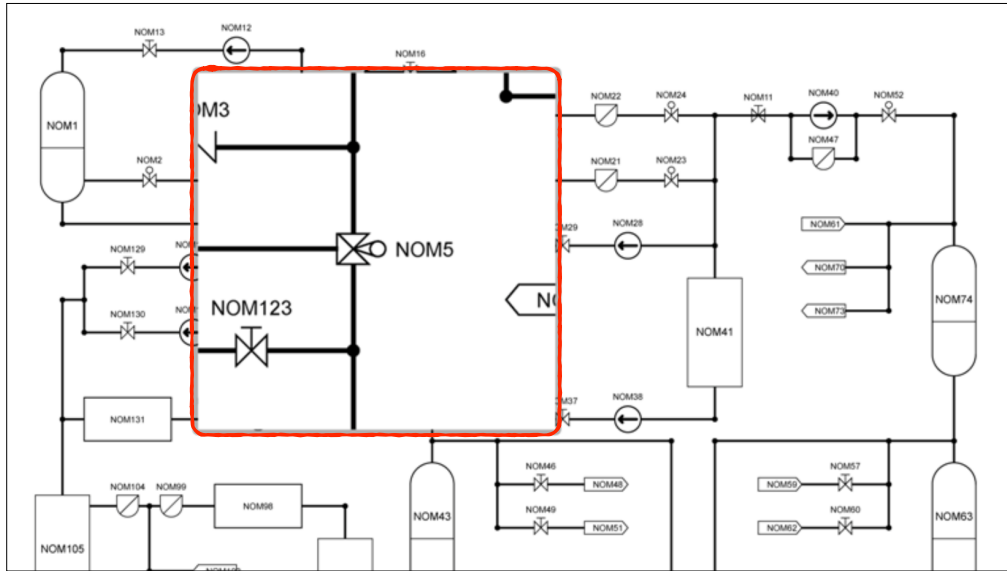
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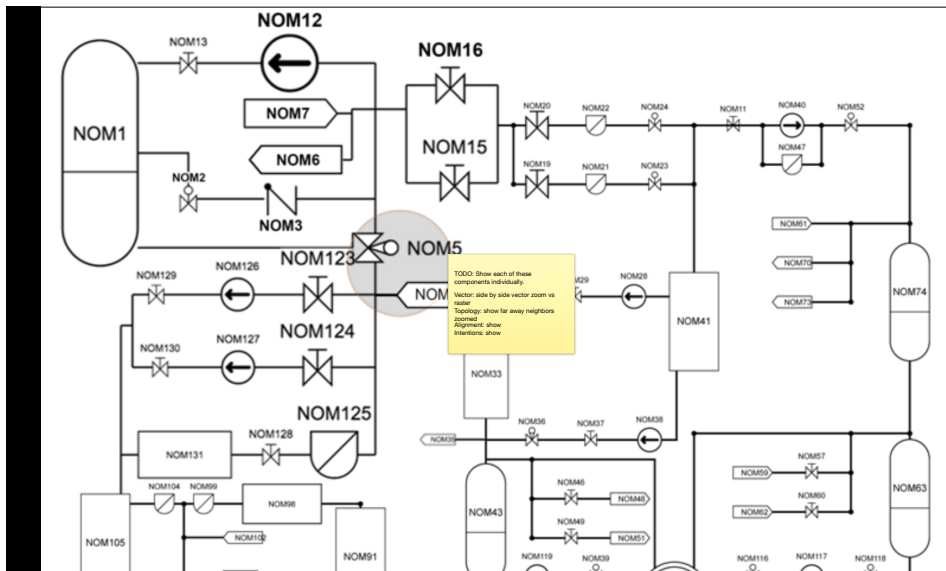
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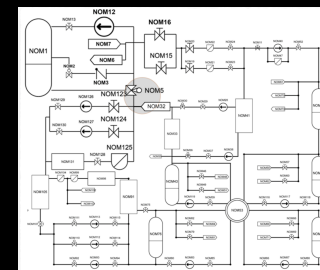


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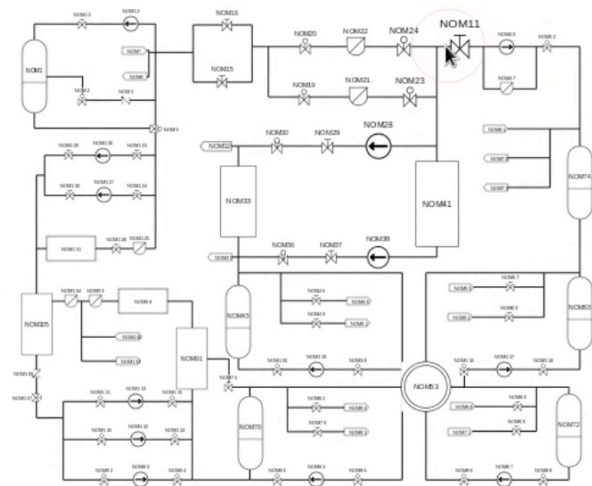


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SchemeLens



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Schemelens