Week 4: Facet

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JRNL 520M, Special Topics in Contemporary Journalism: Visualization for Journalists
Week 4: 6 October 2015

http://www.cs.ubc.ca/~tmm/courses/journ15

Now

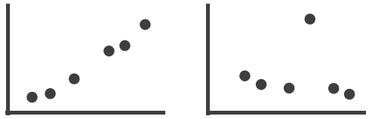
- Finish up color theory + demos (30-45 min)
- break (15 min)
- Recreating News in Tableau (60+ min)
  - working through together in lab mode, not fast in demo mode
- Facet lecture, if there's enough time

Lab/Assignment 4

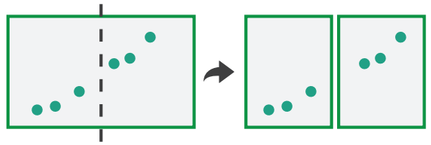
- Work through Recreating News Visualizations in Tableau
- Create Drought Footprints yearly and monthly versions
- Fix two previous obstacles from previous labs (but not a duplicate of color for this week)
- submit next week
  - by 9am Tue, email tmm@cs.ubc.ca with subject JOURN Week 4

VAD Chap 11: Facet Into Multiple Views

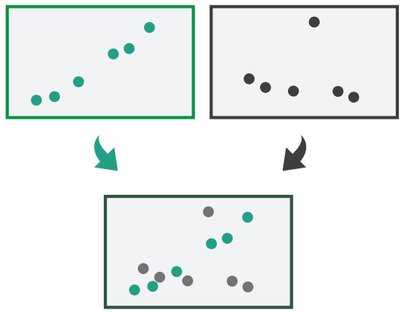
Juxtapose



Partition



Superimpose



How?

Encode

Arrange

- Express
- Separate
- Order
- Align
- Use

Map

from categorical and ordered attributes

- Color
  - *Hue*
  - *Saturation*
  - *Luminance*
- Size, Angle, Curvature, ...
- Shape
- Motion
  Direction, Rate, Frequency, ...

Manipulate

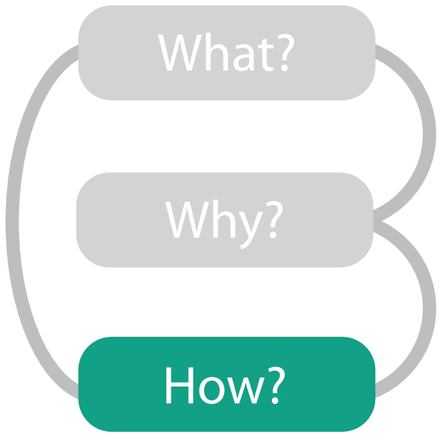
- Change
- Select
- Navigate

Facet

- Juxtapose
- Partition
- Superimpose

Reduce

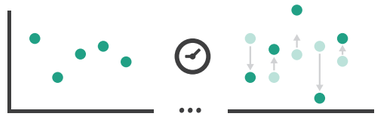
- Filter
- Aggregate
- Embed



How to handle complexity: 3 more strategies + 1 previous

Manipulate

- Change



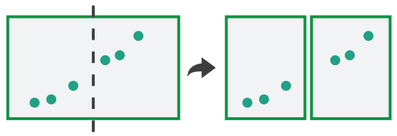
- Select

- Navigate

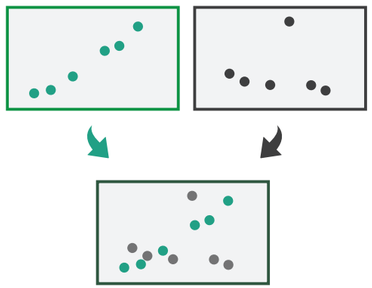
Facet

- Juxtapose

- Partition



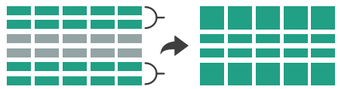
- Superimpose



Reduce

- Filter

- Aggregate



- Embed

→ *Derive*

- change view over time
- facet across multiple views
- reduce items/attributes within single view
- derive new data to show within view

How to handle complexity: 3 more strategies + 1 previous

Manipulate

- Change

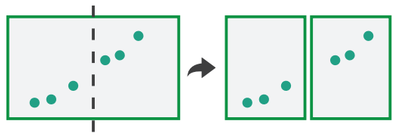
- Select

- Navigate

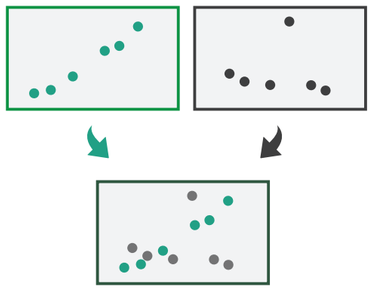
Facet

- Juxtapose

- Partition



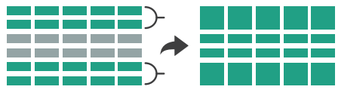
- Superimpose



Reduce

- Filter

- Aggregate



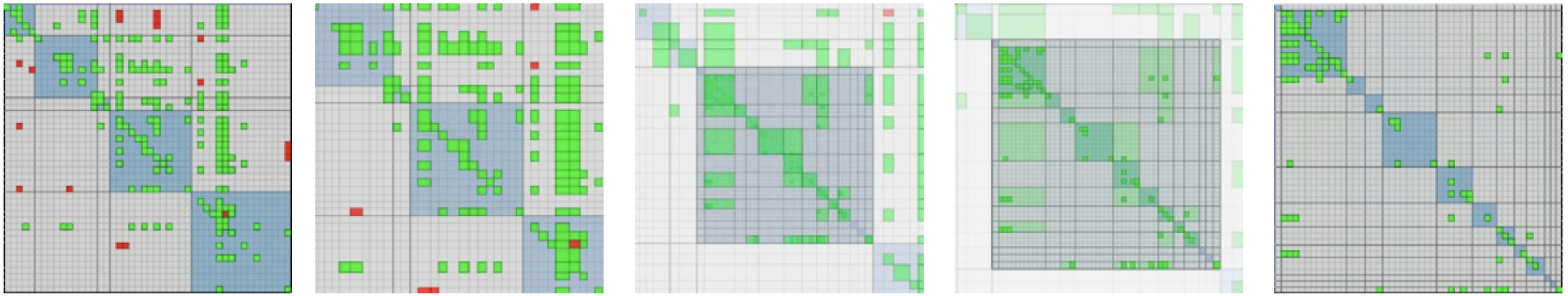
- Embed

→ *Derive*

- change over time
  - most obvious & flexible of the 4 strategies

Idiom: **Animated transitions**

- smooth transition from one state to another
  - alternative to jump cuts
  - support for item tracking when amount of change is limited
- example: multilevel matrix views
  - scope of what is shown narrows down
    - middle block stretches to fill space, additional structure appears within
    - other blocks squish down to increasingly aggregated representations



[Using Multilevel Call Matrices in Large Software Projects. van Ham. Proc. IEEE Symp. Information Visualization (InfoVis), pp. 227–232, 2003.]

How to handle complexity: 3 more strategies + 1 previous

Manipulate

- Change
- Select
- Navigate

Facet

- Juxtapose
- Partition
- Superimpose

Reduce

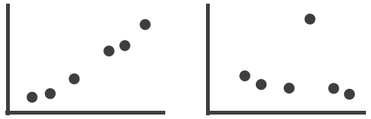
- Filter
- Aggregate
- Embed

→ *Derive*

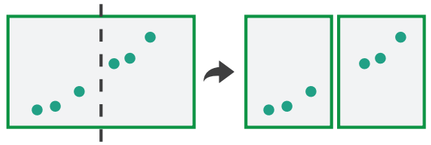
- facet data across multiple views

Facet

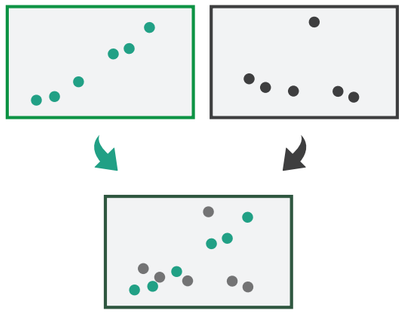
Juxtapose



Partition



Superimpose



Coordinate Multiple Side By Side Views

Share Encoding: Same/Different

Linked Highlighting

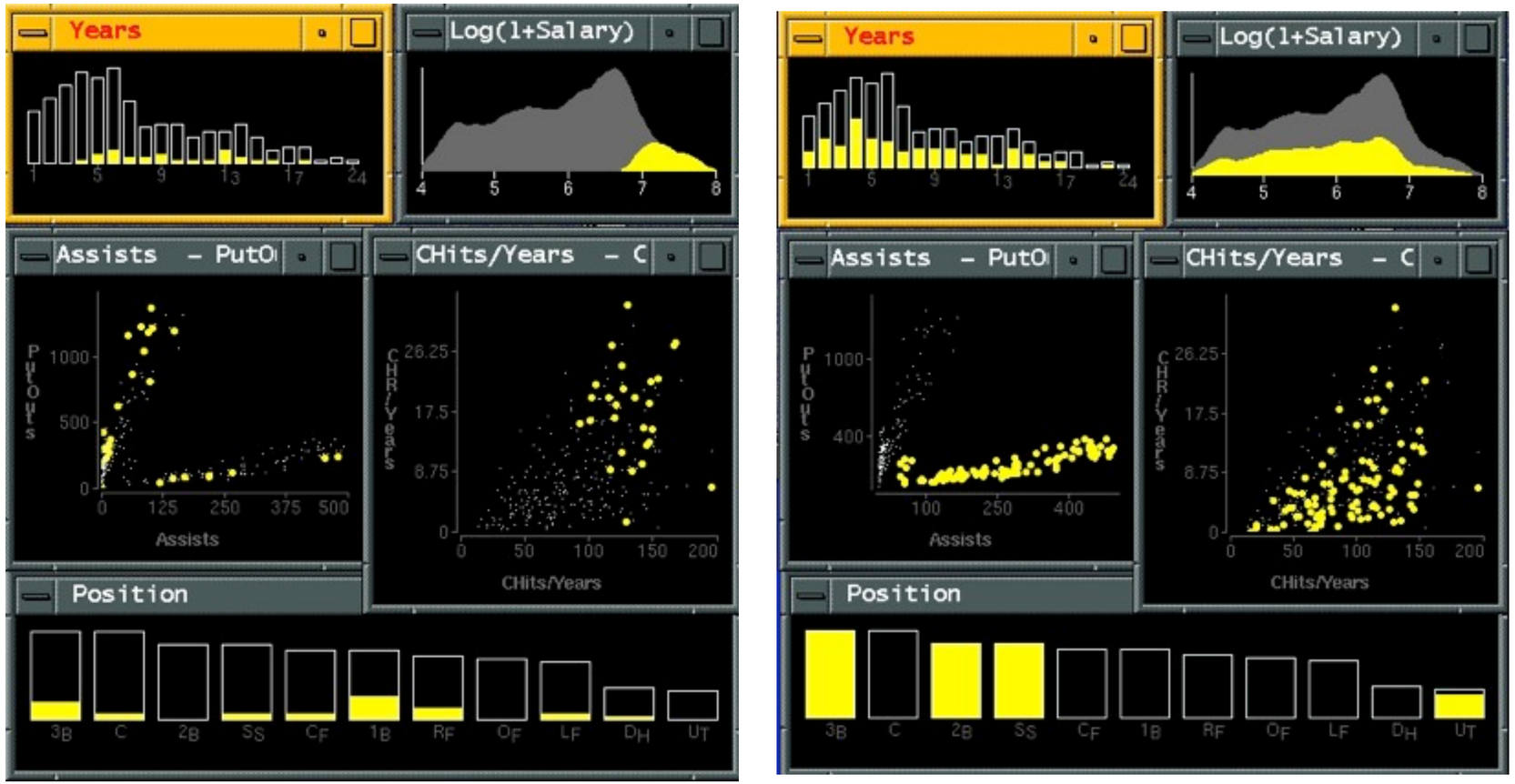
Share Data: All/Subset/None

Share Navigation

Idiom: **Linked highlighting**

System: **EDV**

- see how regions contiguous in one view are distributed within another
  - powerful and pervasive interaction idiom
- encoding: different
  - ***multiform***
- data: all shared



[Visual Exploration of Large Structured Datasets. Wills. Proc. New Techniques and Trends in Statistics (NTTS), pp. 237–246. IOS Press, 1995.]

Idiom: **bird's-eye maps**

System: **Google Maps**

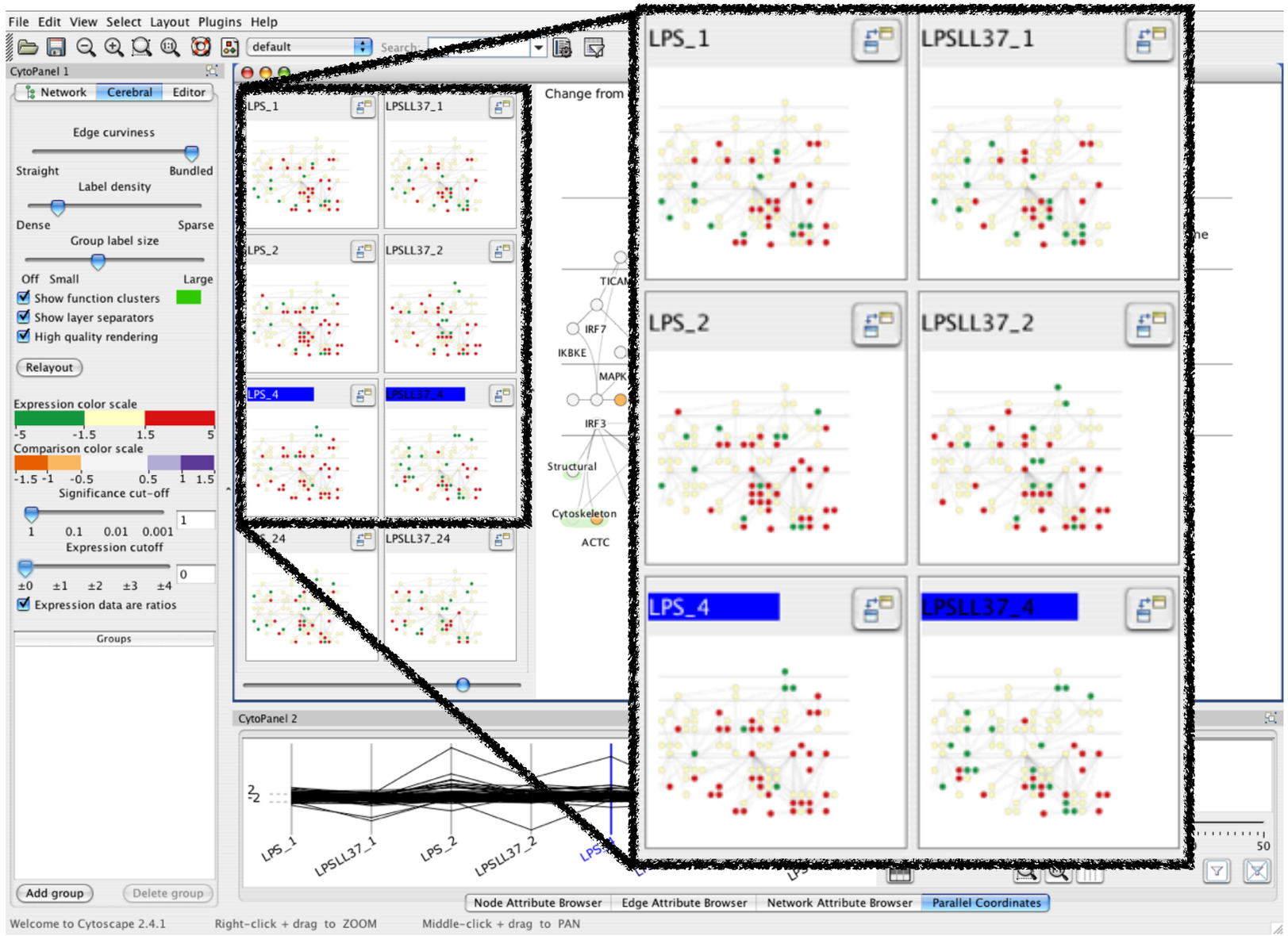
- encoding: same
- data: subset shared
- navigation: shared
  - bidirectional linking
- differences
  - viewpoint
  - (size)
- ***overview-detail***

[A Review of Overview+Detail, Zooming, and Focus+Context Interfaces. Cockburn, Karlson, and Bederson. ACM Computing Surveys 41:1 (2008), 1–31.]

Idiom: **Small multiples**

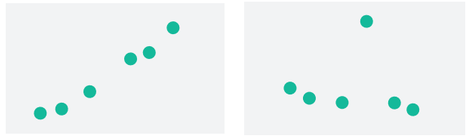
System: **Cerebral**

- encoding: same
- data: none shared
  - different attributes for node colors
  - (same network layout)
- navigation: shared



[Cerebral:Visualizing Multiple Experimental Conditions on a Graph with Biological Context. Barsky, Munzner, Gardy, and Kincaid. IEEE Trans. Visualization and Computer Graphics (Proc. InfoVis 2008) 14:6 (2008), 1253–1260.]

Coordinate views: Design choice interaction

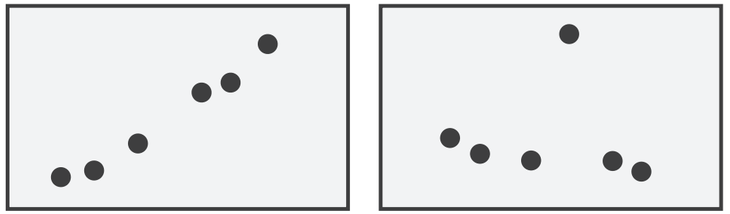
		Data		
		All	Subset	None
Encoding	Same	Redundant	 Overview/ Detail	 Small Multiples
	Different	 Multiform	 Multiform, Overview/ Detail	No Linkage

- why juxtapose views?
  - benefits: eyes vs memory
    - lower cognitive load to move eyes between 2 views than remembering previous state with single changing view
  - costs: display area, 2 views side by side each have only half the area of one view

Partition into views

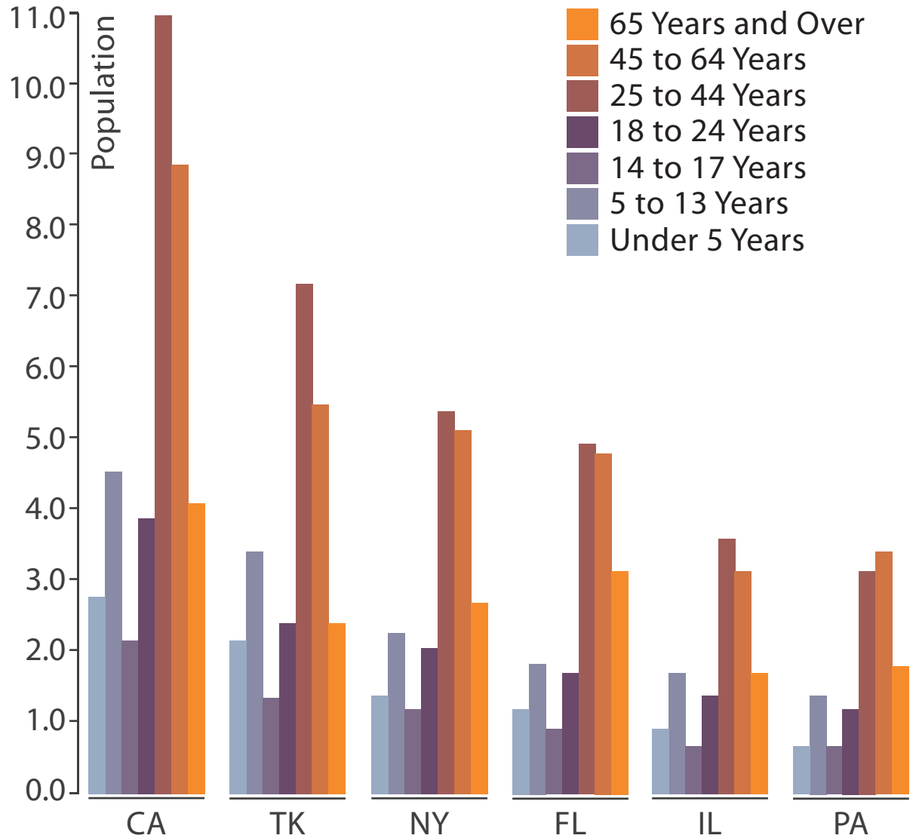
- how to divide data between views
  - encodes association between items using spatial proximity
  - major implications for what patterns are visible
  - split according to attributes
- design choices
  - how many splits
    - all the way down: one mark per region?
    - stop earlier, for more complex structure within region?
  - order in which attribs used to split
  - how many views

➔ **Partition into Side-by-Side Views**

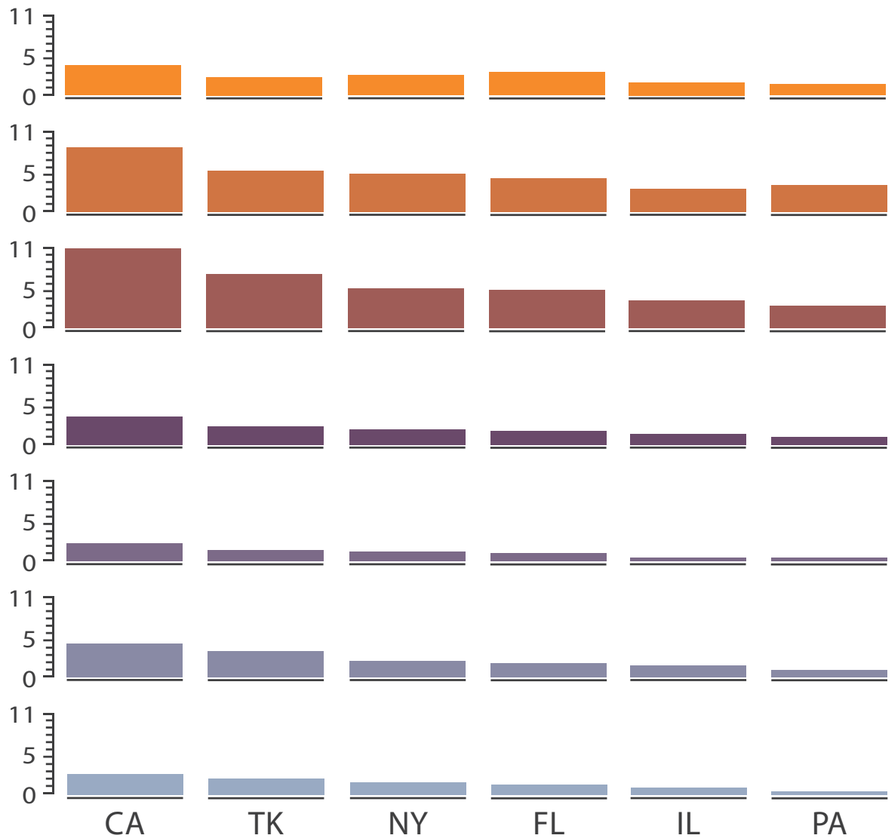


Partitioning: List alignment

- single bar chart with grouped bars
  - split by state into regions
    - complex glyph within each region showing all ages
  - compare: easy within state, hard across ages



- small-multiple bar charts
  - split by age into regions
    - one chart per region
  - compare: easy within age, harder across states

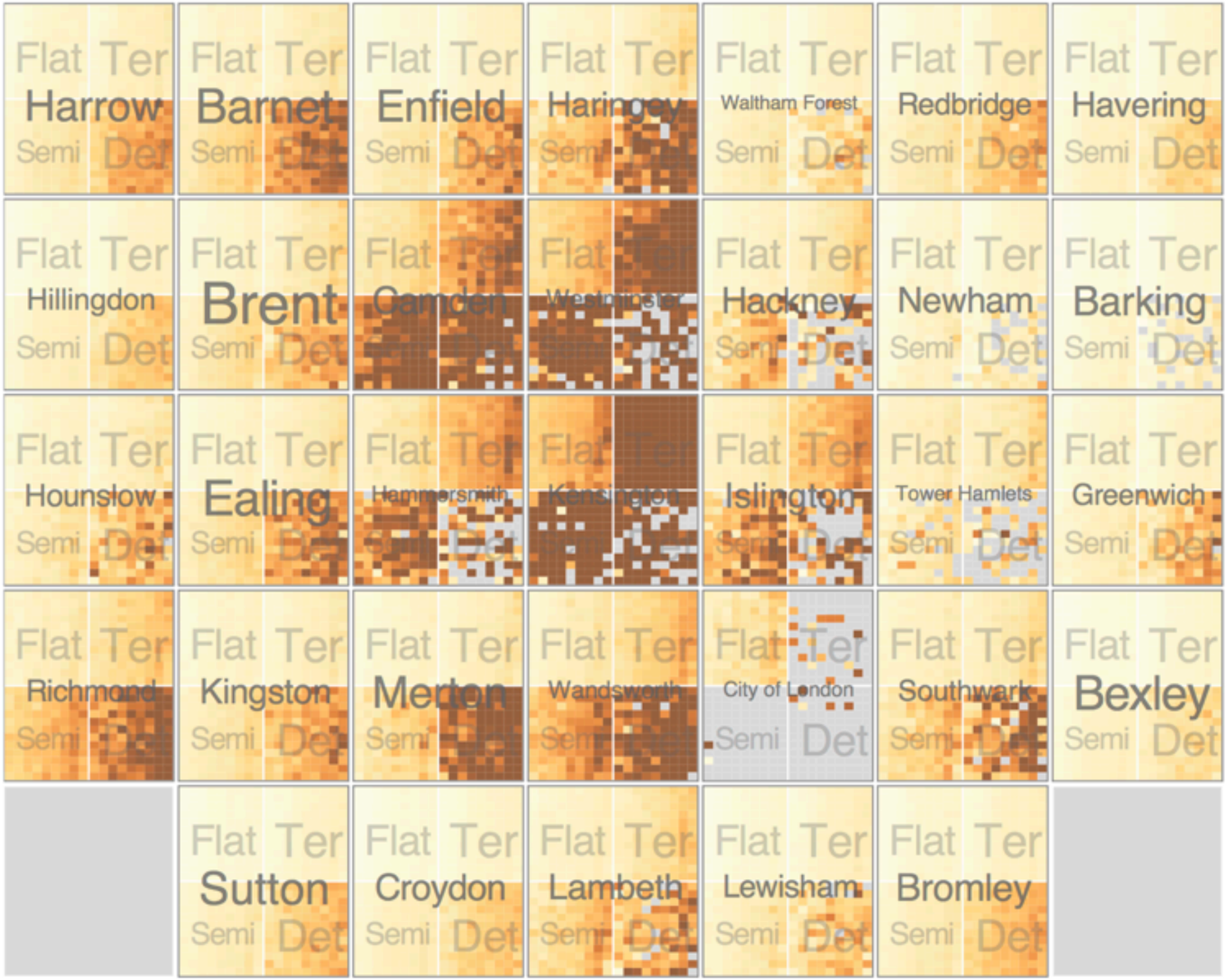


Partitioning: Recursive subdivision

System: **HIVE**

- split by neighborhood
- then by type
- then time
  - years as rows
  - months as columns
- color by price

- neighborhood patterns
  - where it's expensive
  - where you pay much more for detached type



[Configuring Hierarchical Layouts to Address Research Questions. Slingsby, Dykes, and Wood. IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis 2009) 15:6 (2009), 977–984.]

Partitioning: Recursive subdivision

System: **HIVE**

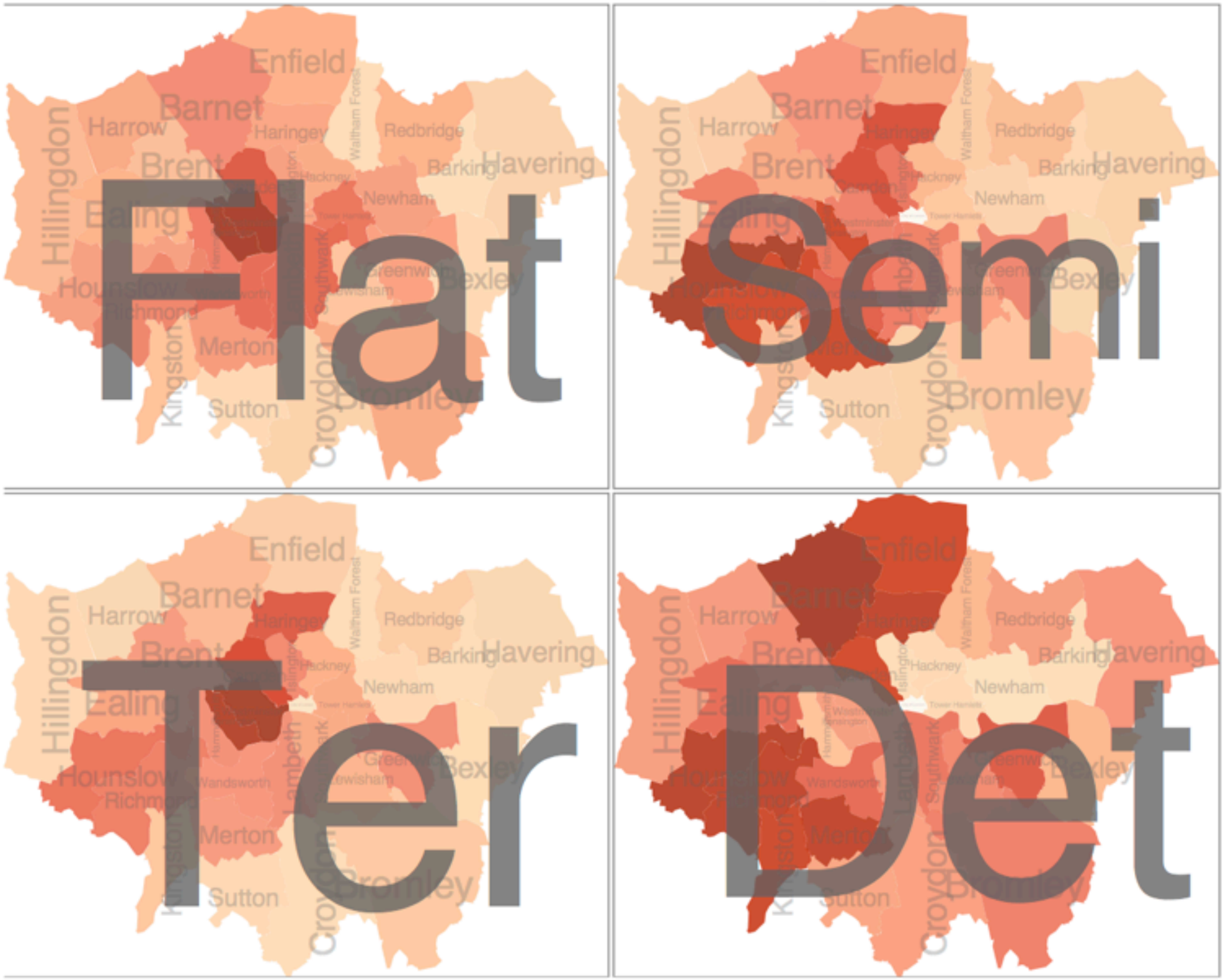
- switch order of splits
  - type then neighborhood
- switch color
  - by price variation
- type patterns
  - within specific type, which neighborhoods inconsistent

[Configuring Hierarchical Layouts to Address Research Questions. Slingsby, Dykes, and Wood. IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis 2009) 15:6 (2009), 977–984.]

Partitioning: Recursive subdivision

System: **HIVE**

- different encoding for second-level regions
  - choropleth maps

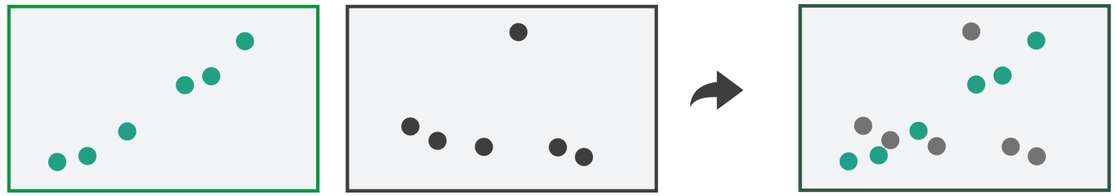


[Configuring Hierarchical Layouts to Address Research Questions. Slingsby, Dykes, and Wood. IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis 2009) 15:6 (2009), 977–984.]

Superimpose layers

- ***layer***: set of objects spread out over region
  - each set is visually distinguishable group
  - extent: whole view

Superimpose Layers



- design choices
  - how many layers?
  - how are layers distinguished?
  - small static set or dynamic from many possible?
  - how partitioned?
    - heavyweight with attribs vs lightweight with selection
- distinguishable layers
  - encode with different, nonoverlapping channels
    - two layers achieveable, three with careful design

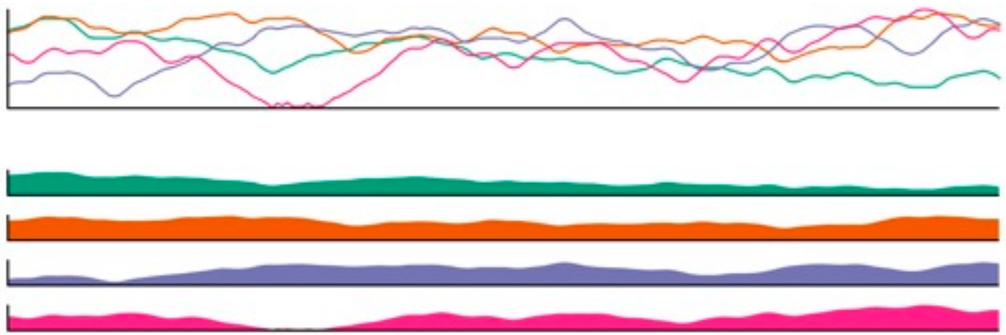
Static visual layering

- foreground layer: roads
  - hue, size distinguishing main from minor
  - high luminance contrast from background
- background layer: regions
  - desaturated colors for water, parks, land areas
- user can selectively focus attention
- "get it right in black and white"
  - check luminance contrast with greyscale view

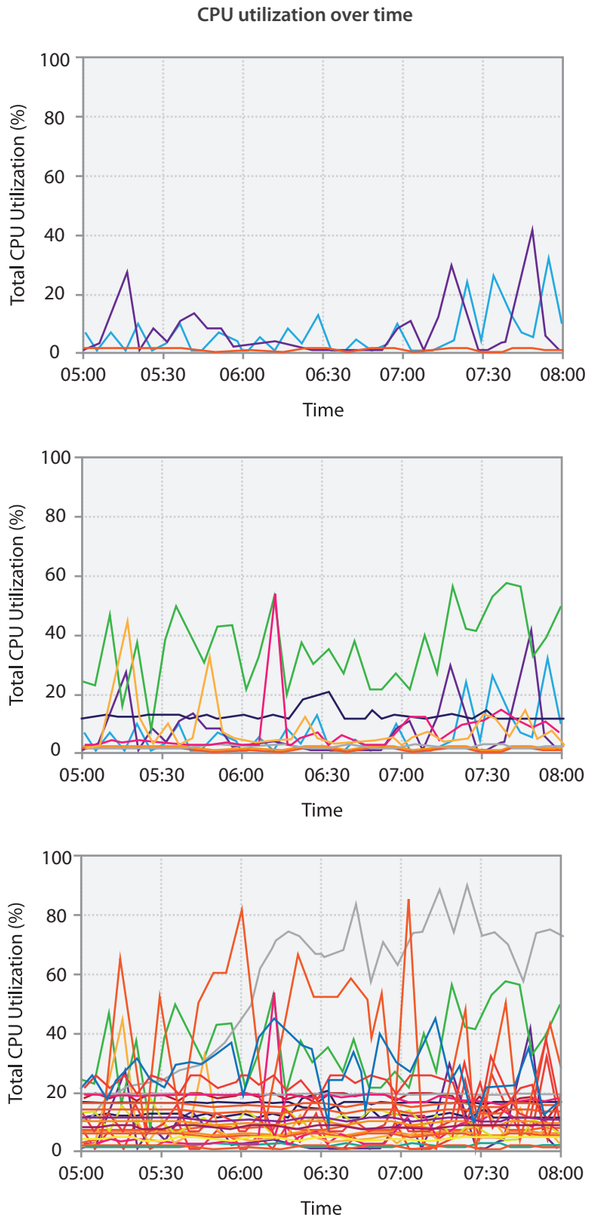
[Get it right in black and white. Stone. 2010. http://www.stonesc.com/wordpress/2010/03/get-it-right-in-black-and-white]

Superimposing limits

- few layers, but many lines
  - up to a few dozen
  - but not hundreds
- superimpose vs juxtapose: empirical study
  - superimposed for local visual, multiple for global
  - same screen space for all multiples, single superimposed
  - tasks
    - local: maximum, global: slope, discrimination



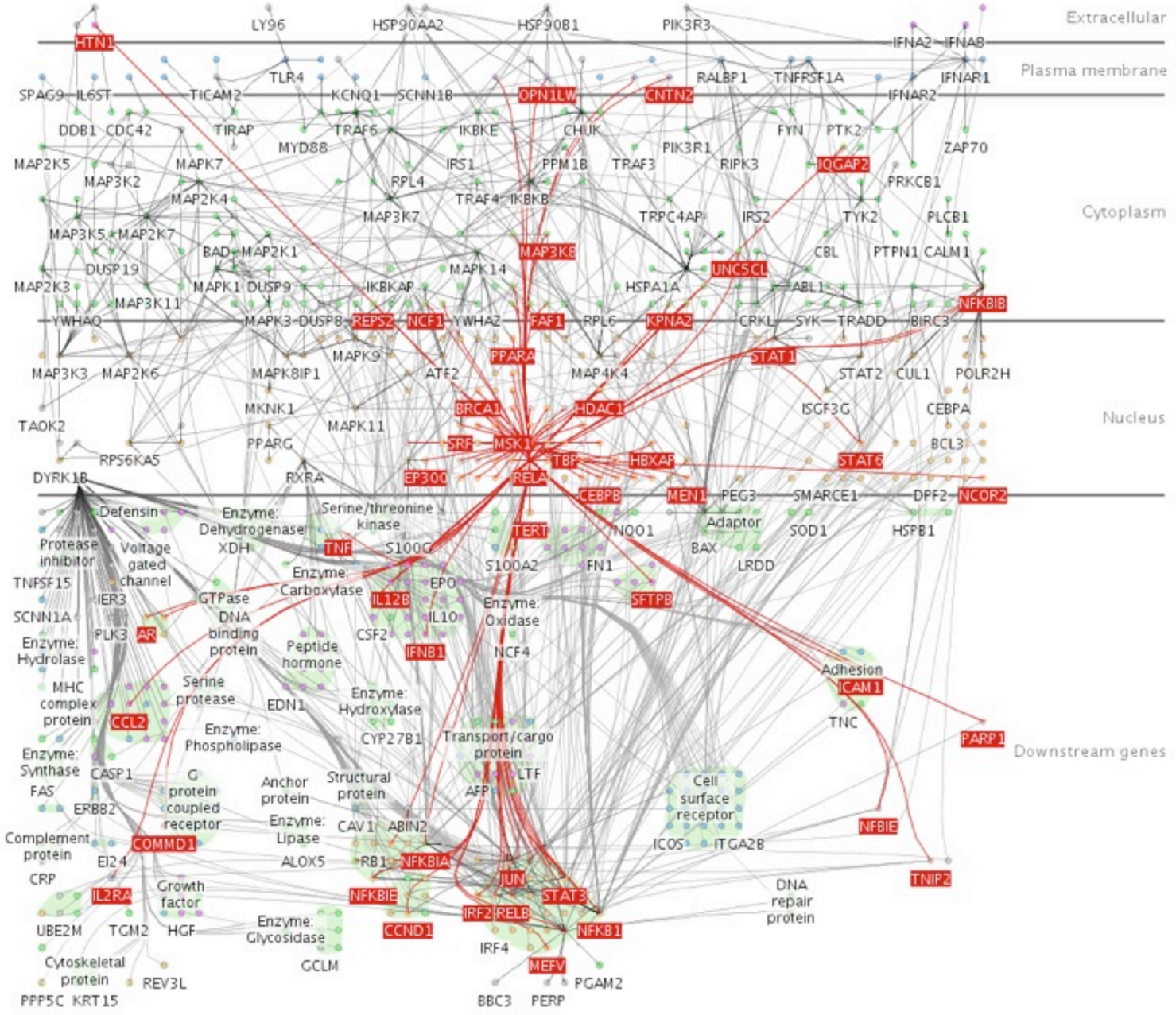
[Graphical Perception of Multiple Time Series. Javed, McDonnel, and Elmqvist. IEEE Transactions on Visualization and Computer Graphics (Proc. IEEE InfoVis 2010) 16:6 (2010), 927–934.]



Dynamic visual layering

System: **Cerebral**

- interactive, from selection
  - lightweight: click
  - very lightweight: hover
- ex: 1-hop neighbors



[Cerebral: a Cytoscape plugin for layout of and interaction with biological networks using subcellular localization annotation. Barsky, Gardy, Hancock, and Munzner. Bioinformatics 23:8 (2007), 1040–1042.]

Further reading

- Visualization Analysis and Design. Tamara Munzner. CRC Press, 2014.
  - *Chap 11: Facet Into Multiple Views*