Manipulate View

Introduction

- A change could be made from **one choice to another** to change idioms, and any of the **parameters** for a particular idiom can be changed.
- Any **aspect** of visual encoding can be changed, including the **ordering**, any other choice pertaining to the **spatial arrangement**, and the use of other visual channels such as **color**.
- Changes could be made concerning what elements are filtered, **the level of detail of aggregation**, and how the data is partitioned into **multiple views**.
- Switching from **a node–link** layout to a **matrix** layout of a network.

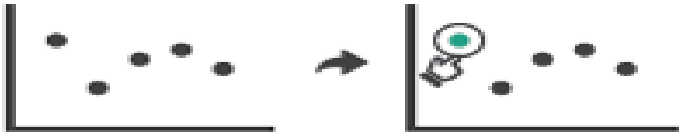
Why Change?

- Datasets are often sufficiently large and complex that showing everything at once in a single static view would lead to overwhelming visual clutter.
- There are 5 major options for handling complexity.
- These 5 choices are not mutually exclusive and can be combined together.
- A view that changes over time is one of them

Manipulate

Change over Time

Select



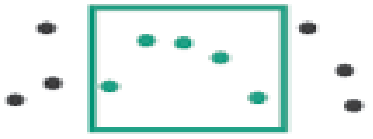
Navigate

Item Reduction

- *Zoom*
  Geometric or *Semantic*

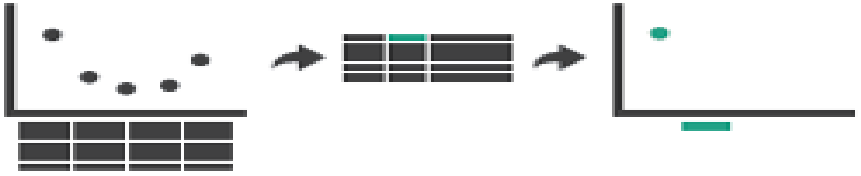
- *Pan/Translate*

- *Constrained*

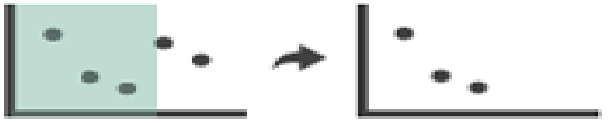


Attribute Reduction

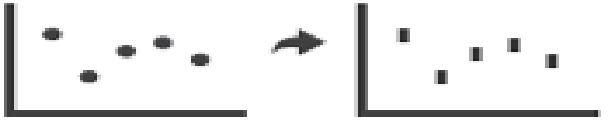
- *Slice*



- *Cut*



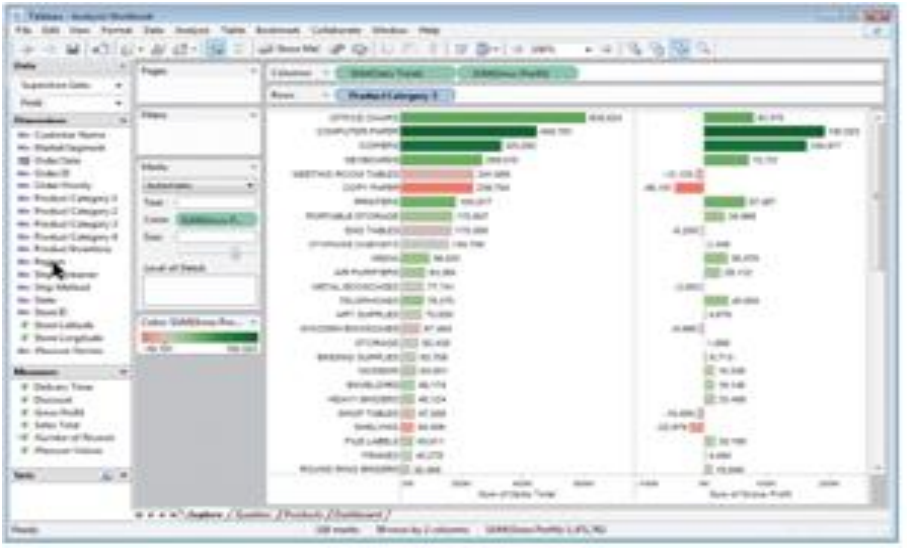
- *Project*



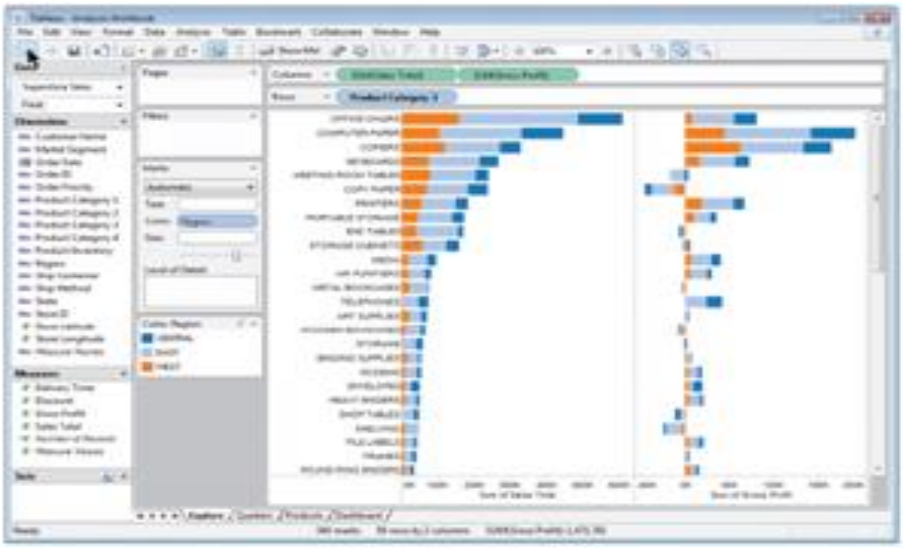
Change View over Time

The possibilities for how the view changes can be

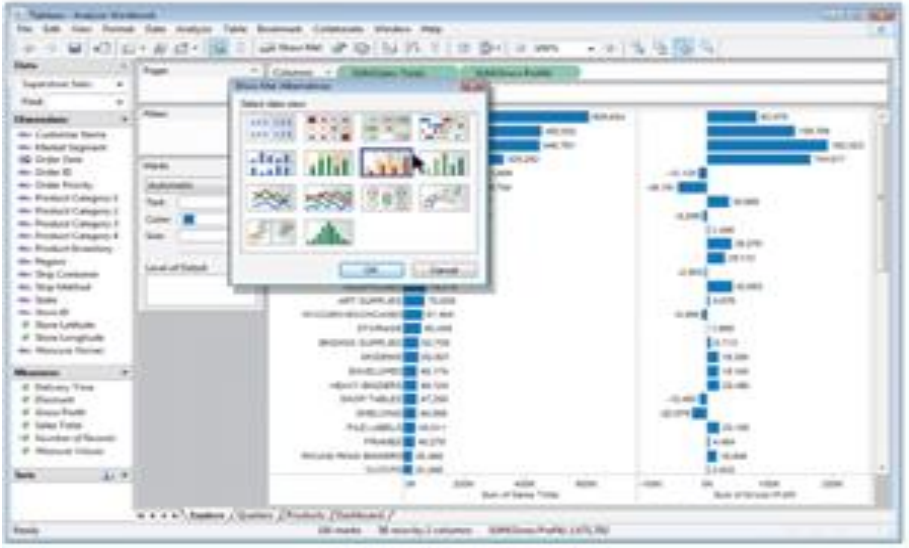
- Change the encoding
- Change the arrangement
- Change the order
- Change the viewpoint
- Change which attributes are filtered
- Change the aggregation level, and so on
- Example:
  - LineUp (World University Rankings 2012)



(a)

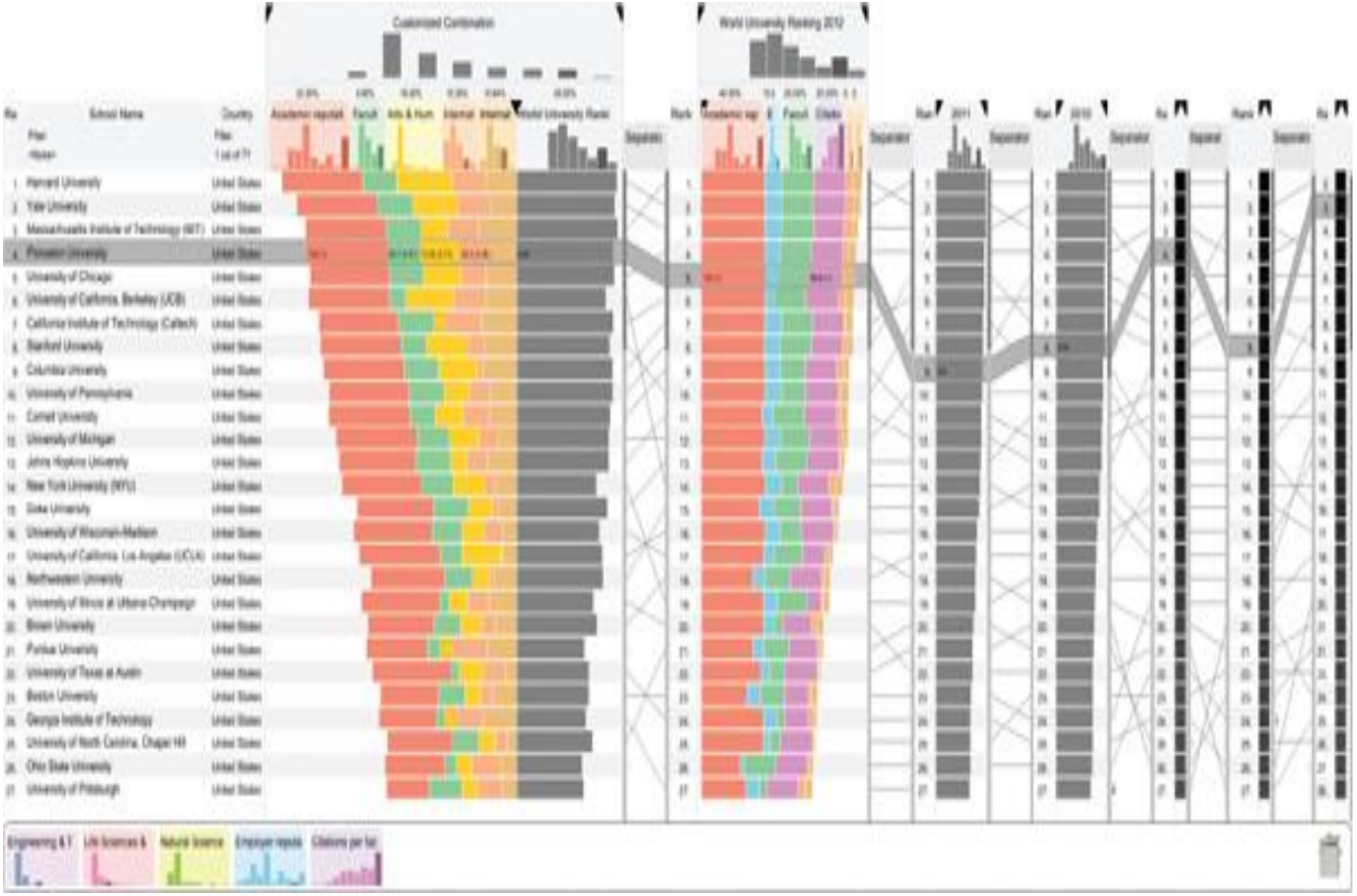


(b)



(c)

(d)


Customized Combination
World University Ranking 2012
Rank
School Name
Country
Filter
1 out of 71
Harvard University
Yale University
Massachusetts Institute of Technology (MIT)
Princeton University
University of Chicago
University of California, Berkeley (UCB)
California Institute of Technology (Caltech)
Stanford University
Columbia University
University of Pennsylvania
Cornell University
University of Michigan
Johns Hopkins University
New York University (NYU)
Duke University
University of Wisconsin-Madison
University of California, Los Angeles (UCLA)
Northwestern University
University of Illinois at Urbana-Champaign
Brown University
Purdue University
University of Texas at Austin
Boston University
Georgia Institute of Technology
University of North Carolina, Chapel Hill
Ohio State University
University of Pittsburgh
Separator
Engineering & T
Life Sciences &
Natural Science
Employer reputa
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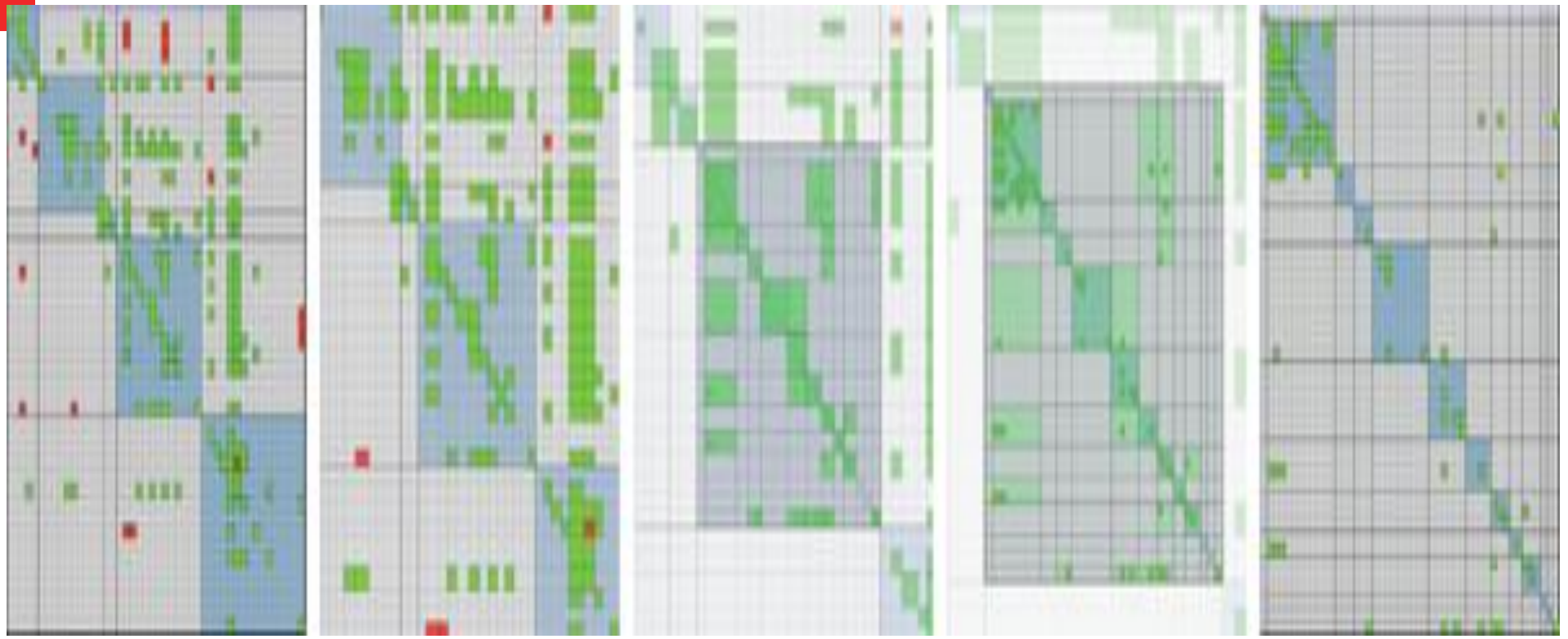
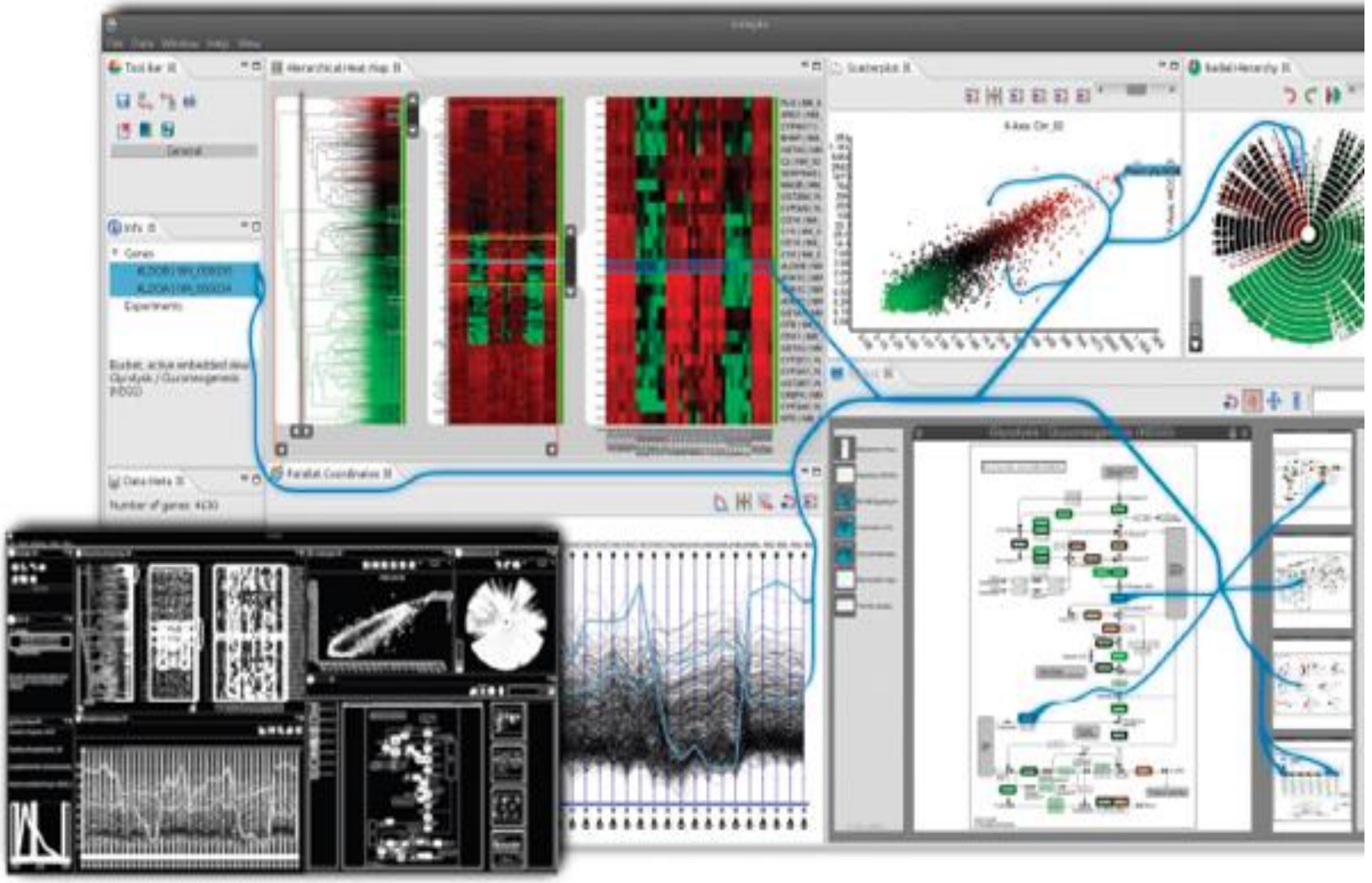


Select Elements

- Allowing users to select one or more elements of interest in a vis is a fundamental action that supports nearly every interactive idiom.
- The output of a selection operation is often the input to a subsequent operation.
- In particular, the change choice is usually dependent on a previous select result.
  - Selection Design Choices
  - Highlighting
  - Selection Outcomes

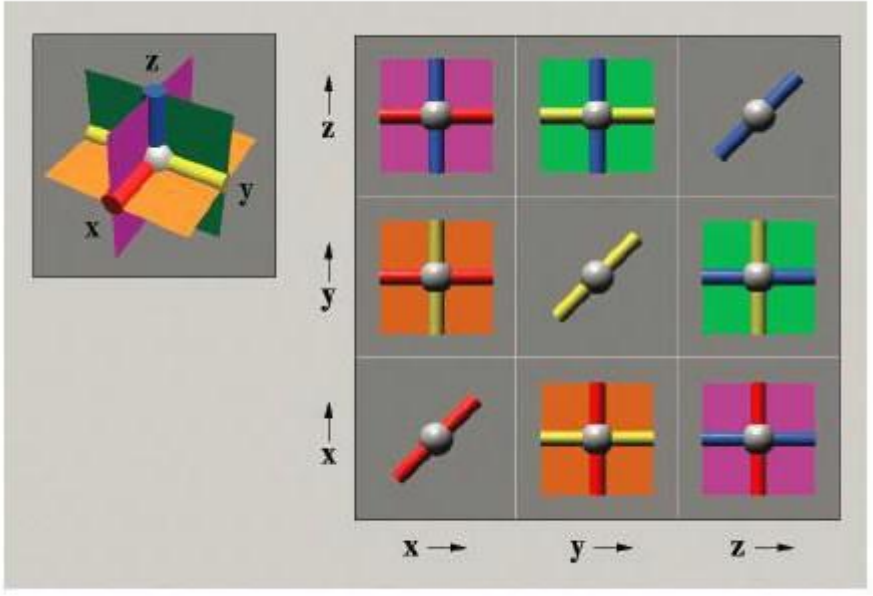


Navigate: Changing Viewpoint

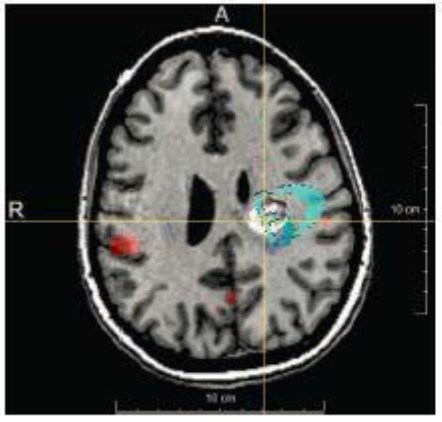
- Large and complex datasets often cannot be understood from only a single point of view.
- Many interactive vis systems support a metaphor of navigation, analogous to navigation through the physical world.
- In these, the spatial layout is fixed and navigation acts as a change of the viewpoint.
- **Zooming** (Geometric, Semantic)
- **Panning**
- **Rotating**

Navigate: Reducing Attributes

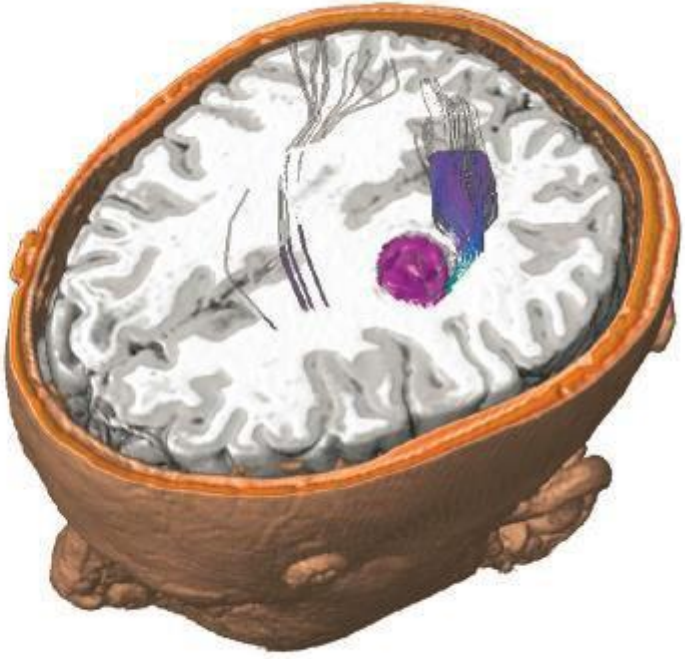
- The geometric intuitions that underlie the metaphor of navigation with a virtual camera also lead to a set of design choices for reducing the number of attributes:
- Slice
- Cut and Project.



(a)



(a)



(b)