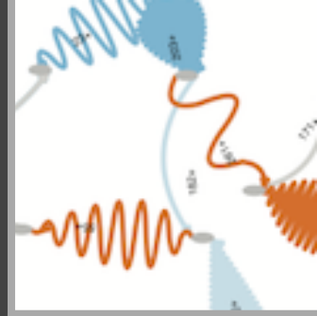
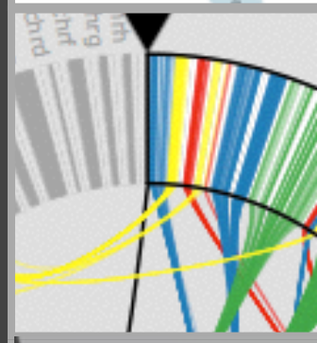
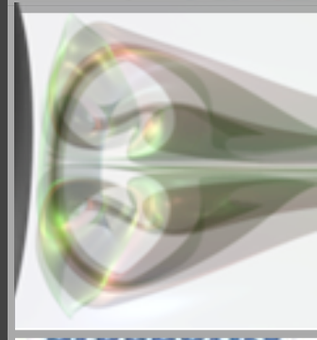
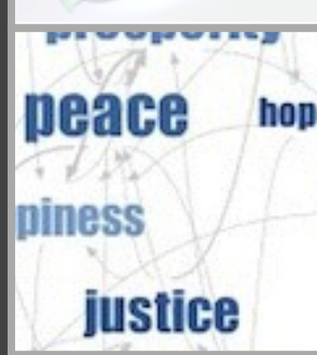
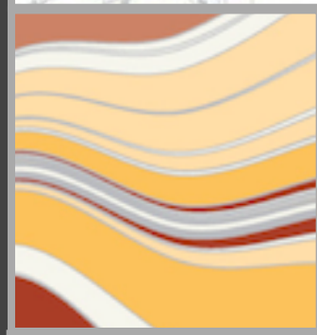
cs6630 | September 30 2014

FOCUS+CONTEXT

Miriah Meyer
University of Utah




administrivia . . .

- tbd

last time . . .

multiple views

eyes over memory

trade-off of display space and working memory

Juxtapose and Coordinate Multiple Side-by-Side Views

- Share Encoding: Same/Different
  - *Linked Highlighting*

- Share Data: All/Subset/None

- Share Navigation

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

Partition into Side-by-Side Views

Superimpose Layers

LINKED VIEWS

multiple views that are simultaneously visible and linked together such that actions in one view affect the others

- **encoding**: same or multiform
- **dataset**: share all, subset, or none
- **highlighting**: to link, or not
- **navigation**: to share, or not

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

PARTITIONING

action on the dataset that separates the data into groups

design choices

how to divide data up between views, given a hierarchy of attributes

how many splits, and order of splits

how many views (usually data driven)

partition attribute(s)

typically categorical

GLYPHS

a graphical object with internal structure
that arises from multiple marks

ambiguity

no distinct line between *glyph* and *view*!

LAYERING

combining multiple views on top of one another to form a composite view

LAYERING

combining multiple views on top of one another to form a composite view

GLOBAL COMPOSITING

LAYERING

combining multiple views on top of one another to form a composite view

GLOBAL COMPOSITING

ITEM STACKING

critique

Manipulate

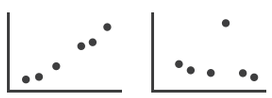
Change

Select

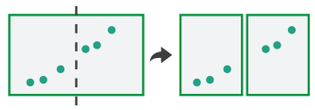
Navigate

Facet

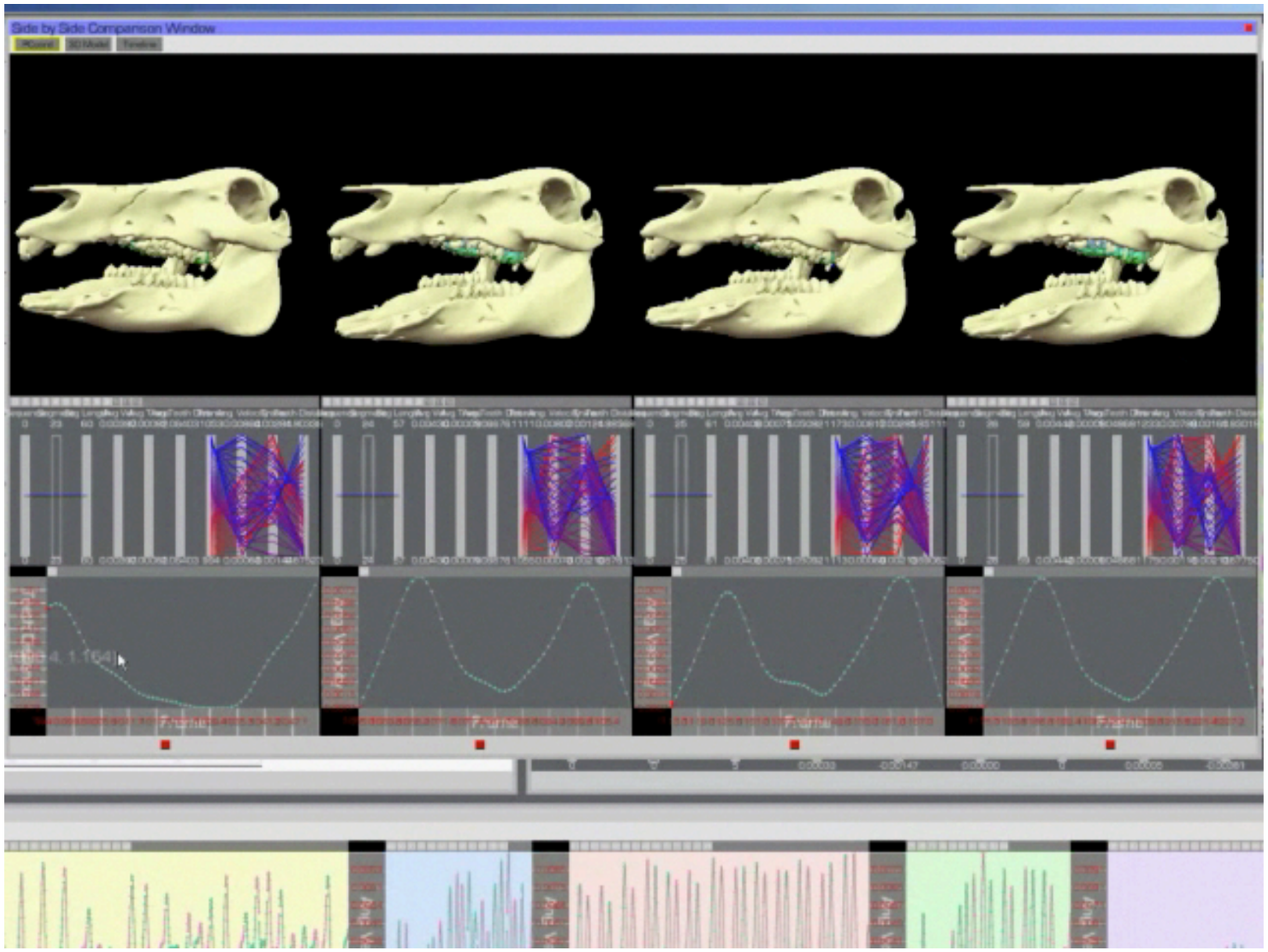
Juxtapose



Partition



Superimpose



Manipulate

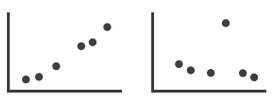
Change

Select

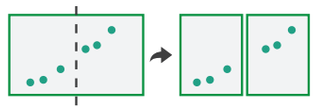
Navigate

Facet

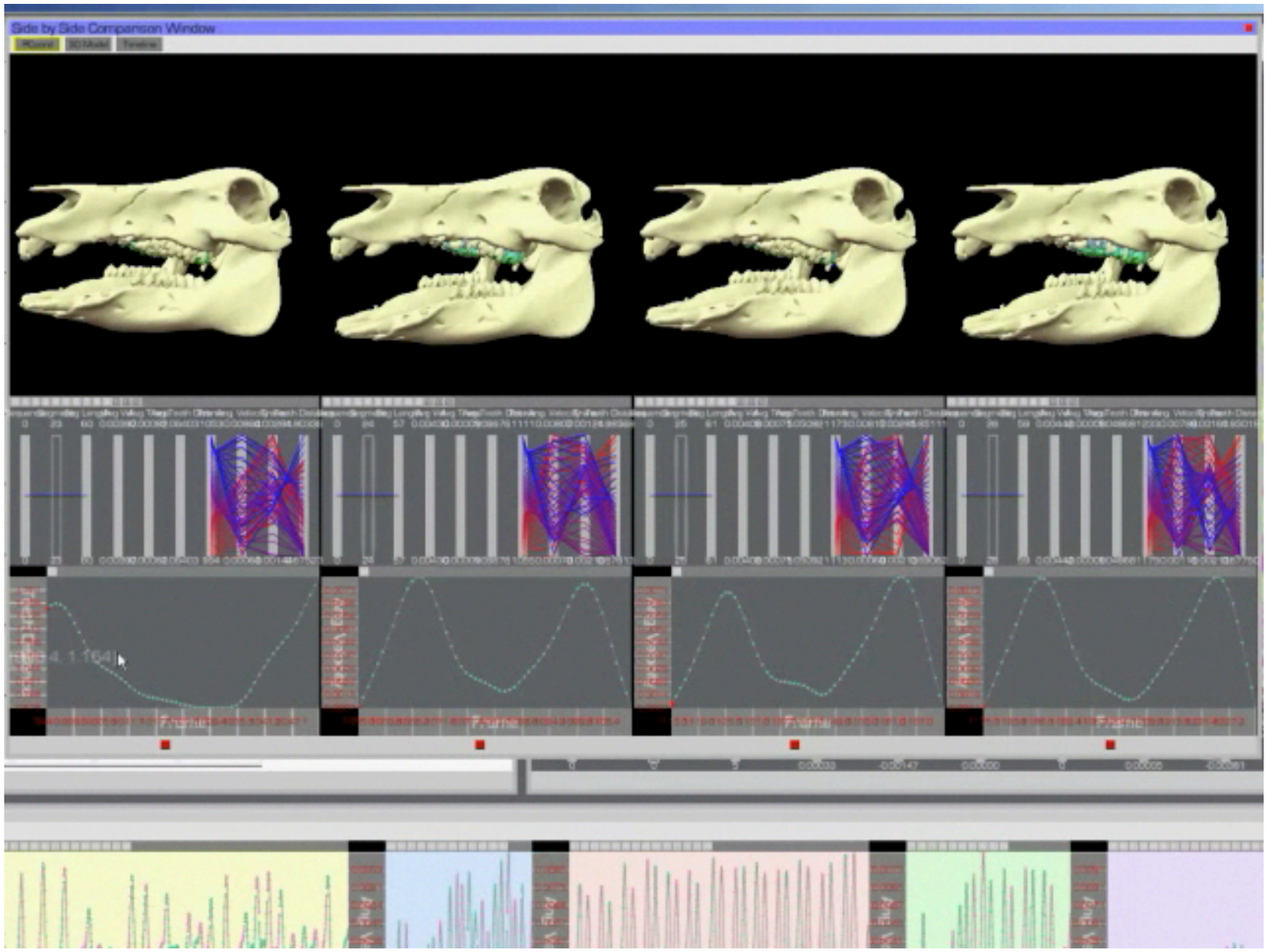
Juxtapose



Partition



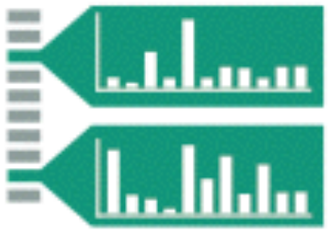
Superimpose



today . . .

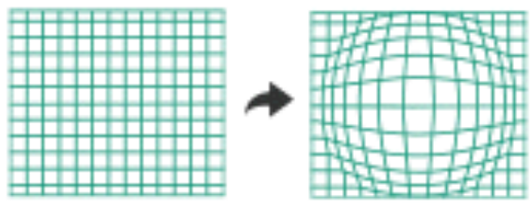
Embed

- Elide Data



- Superimpose Layer

- Distort Geometry



- focus + context

- elision

- superimpose

- distort

- focus + context
- elision
- superimpose
- distort

FOCUS + CONTEXT

carefully pick what to show

hint at what you are not showing

FOCUS + CONTEXT

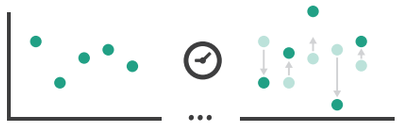
- synthesis of visual encoding and interaction

- user selects region of interest (focus) through navigation or selection

- provide context through aggregation, reduction, or layering

Manipulate

Change

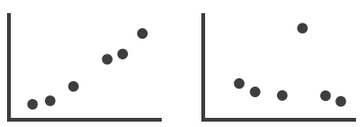


Select

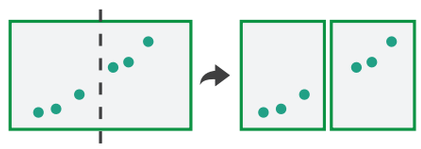
Navigate

Facet

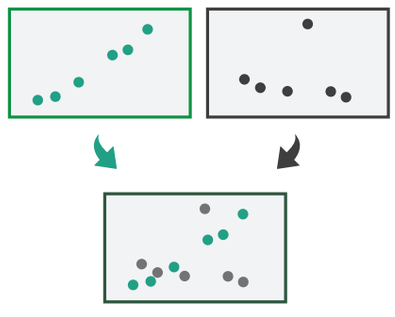
Juxtapose



Partition



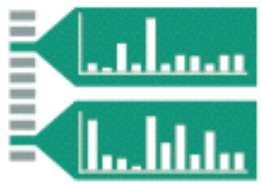
Superimpose



Reduce

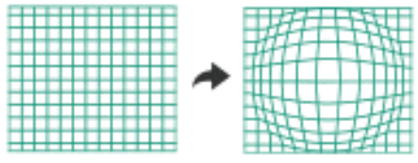
Embed

- Elide Data



- Superimpose Layer

- Distort Geometry



- focus + context

- elision

- superimpose

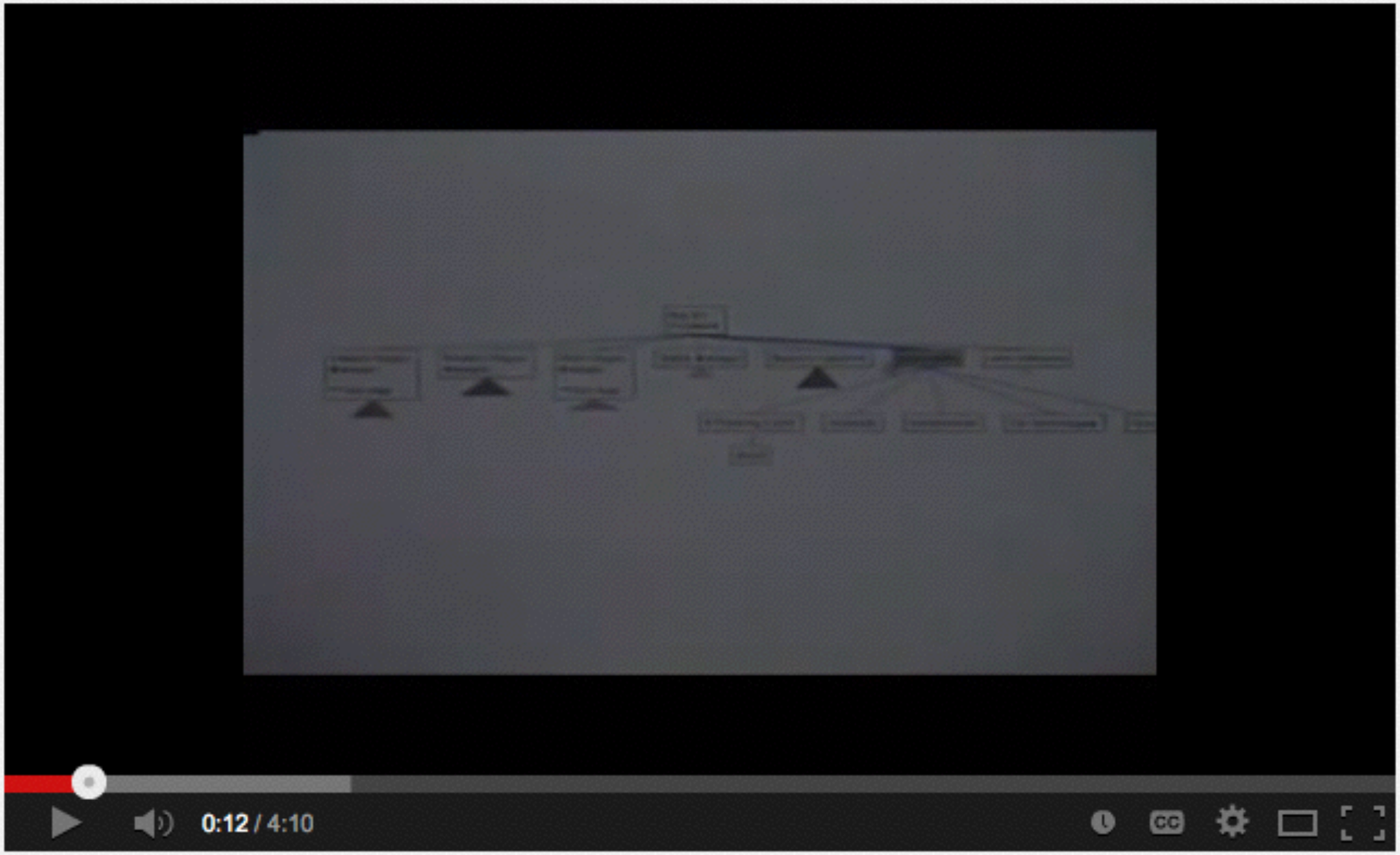
- distort

what is elision?

what is elision?

focus items shown in detail, other items summarized for context

SpaceTree



2002 spacetree

Catherine Plaisant

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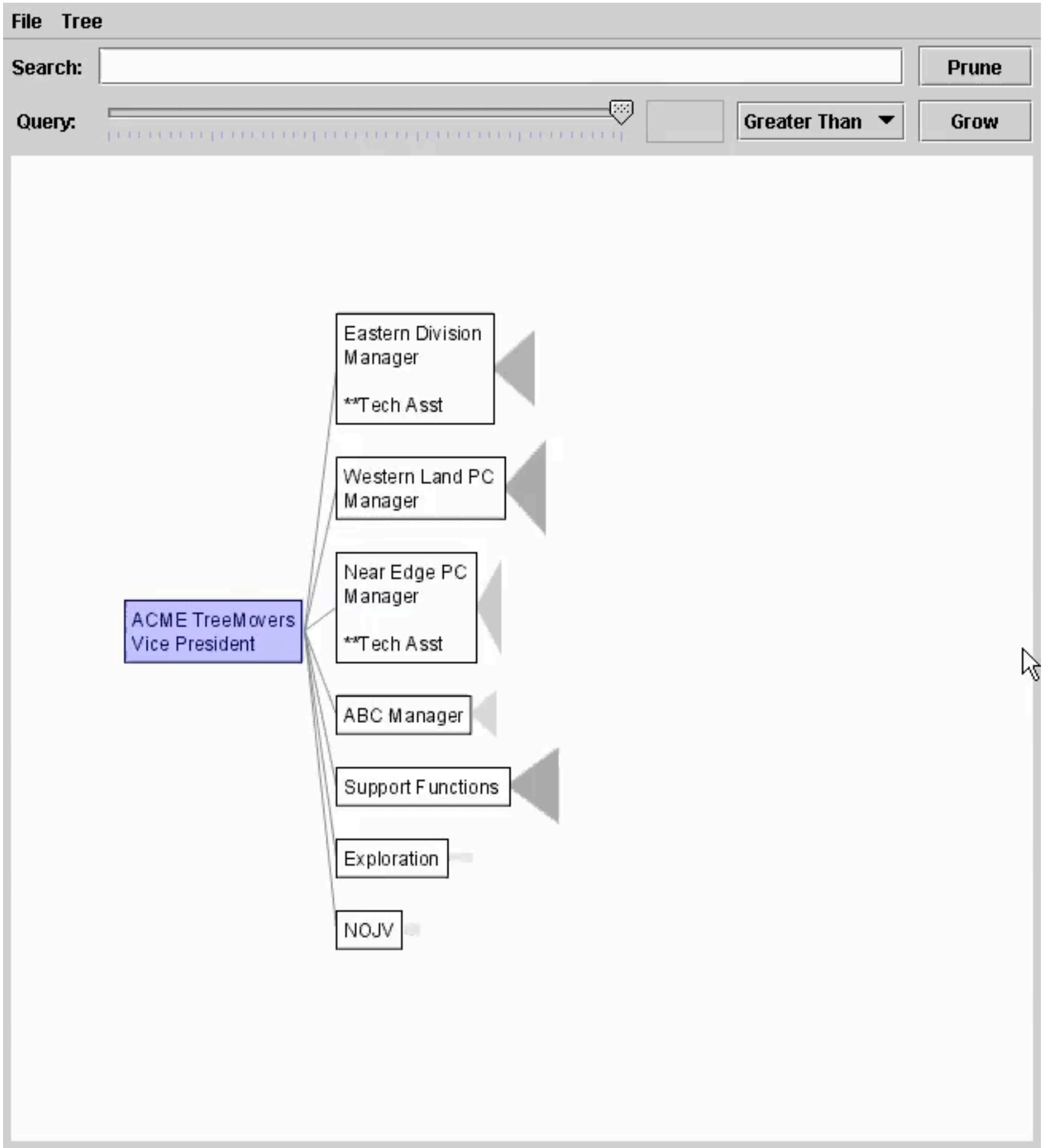
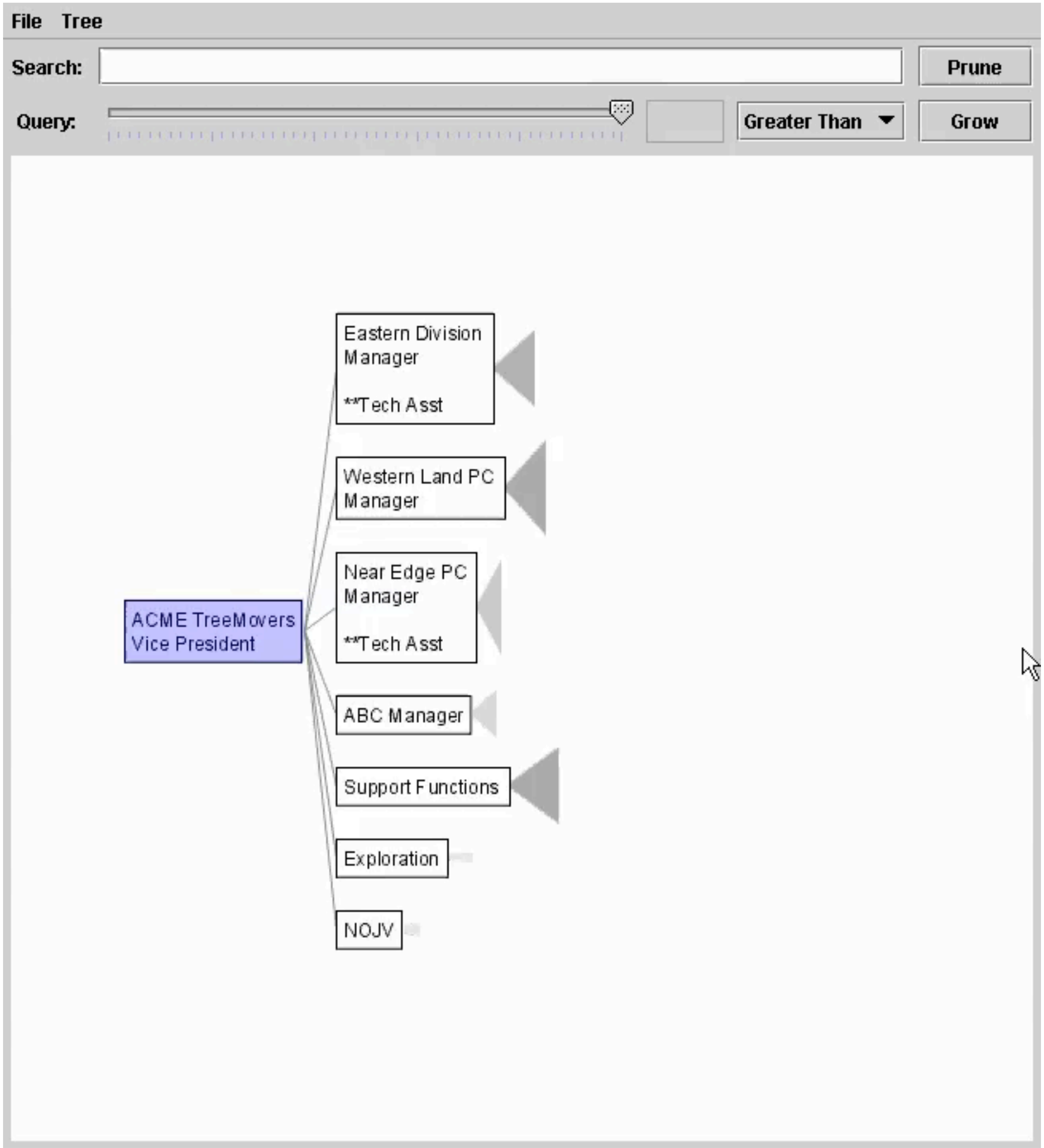
Grosjean 2002

SpaceTree



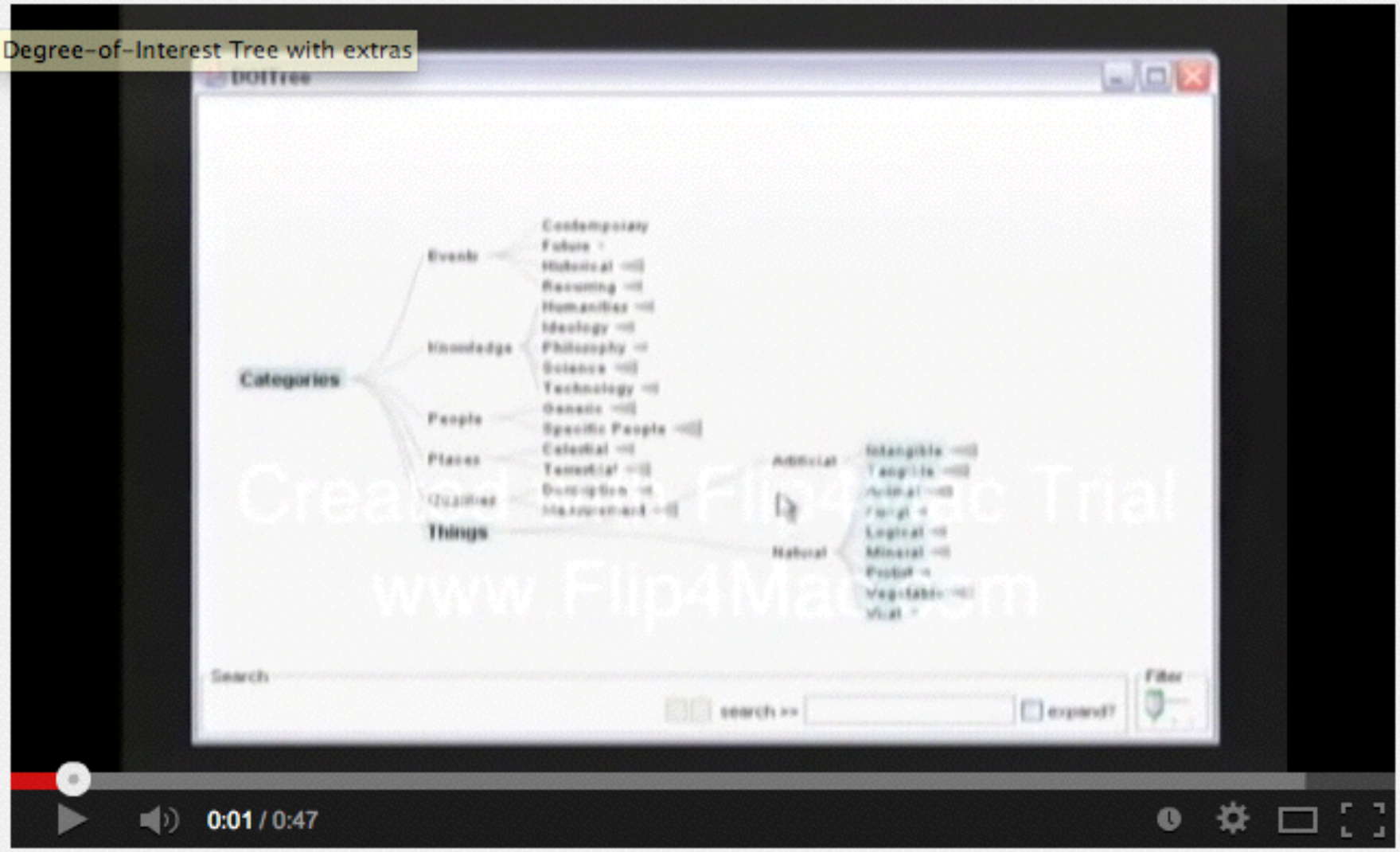
Grosjean 2002

SpaceTree



Grosjean 2002

DOITree



Degree-of-Interest Tree with extras

rekamso

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Heer 2004

DOI

- degree of interest

- based on observation that humans often represent their own neighborhood in detail, yet only major landmarks far away

- goal is balance between local detail and global context

DOI(x) = API(x) - D(x,y)

- can have multiple foci

Furnas 1986

DOITree

- interactive trees with animated transitions that fit within a bounded region of space

- layout depends on the user's estimated DOI

- use:
  - *logical filtering* based on DOI
  - *geometric distortion* of node size based on DOI
  - *semantic zooming* on content based on node size
  - *aggregate representations* of elided subtrees

Heer 2004

- focus + context

- elision

- superimpose

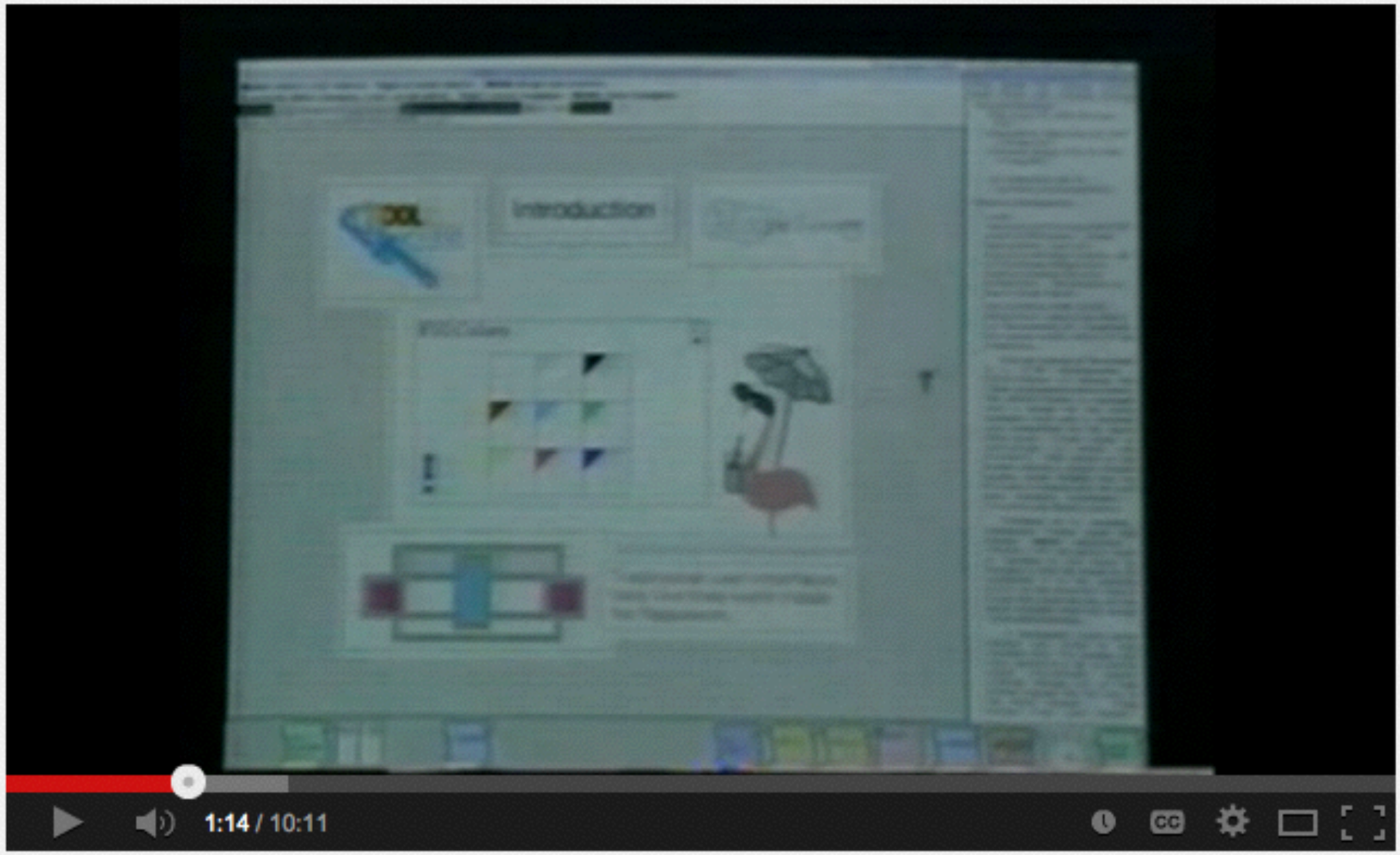
- distort

- superimpose

superimpose

focus layer limited to a local region of view, instead of stretching across the entire view

Toolglass & Magic Lenses



Toolglass & Magic Lenses: The See-Through Interface

tabletopresearch201

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Exploring Information Spaces by Using Tangible Magic Lenses in a Tabletop Environment

Kanal von UISElab

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LivingLiquidDemo

from **test** 1 year ago NOT YET RATED

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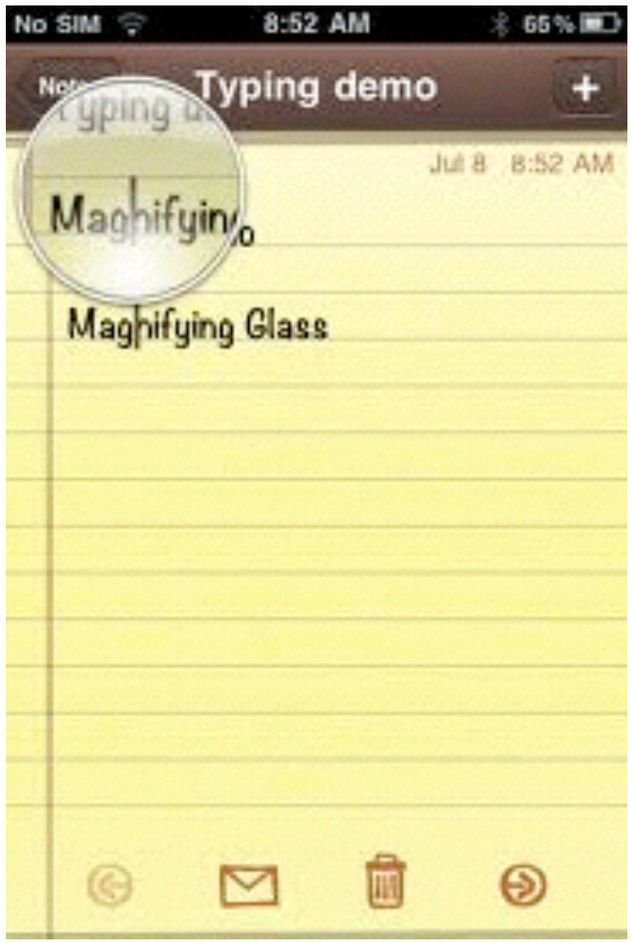
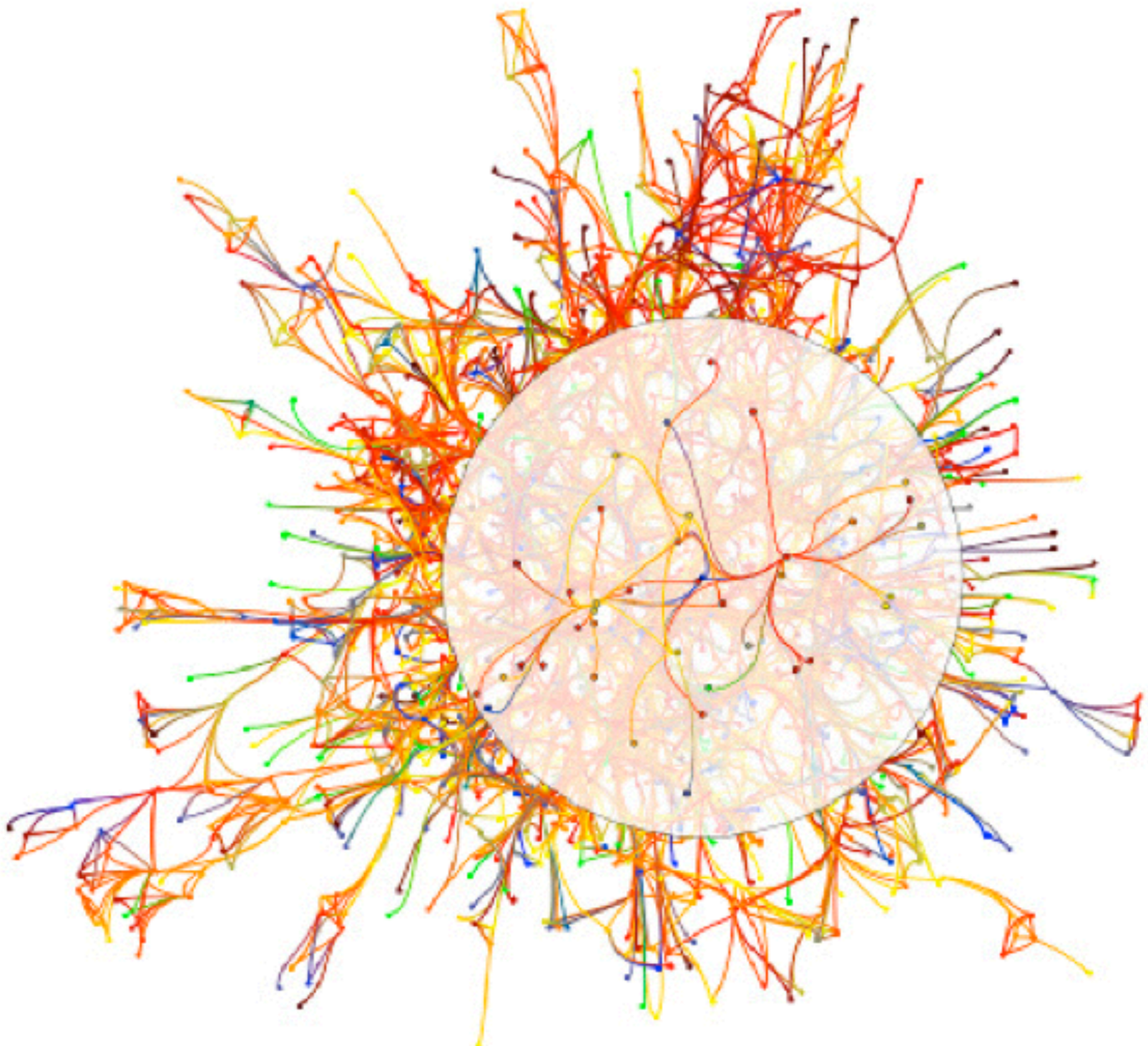


magnification



highlight | suppress

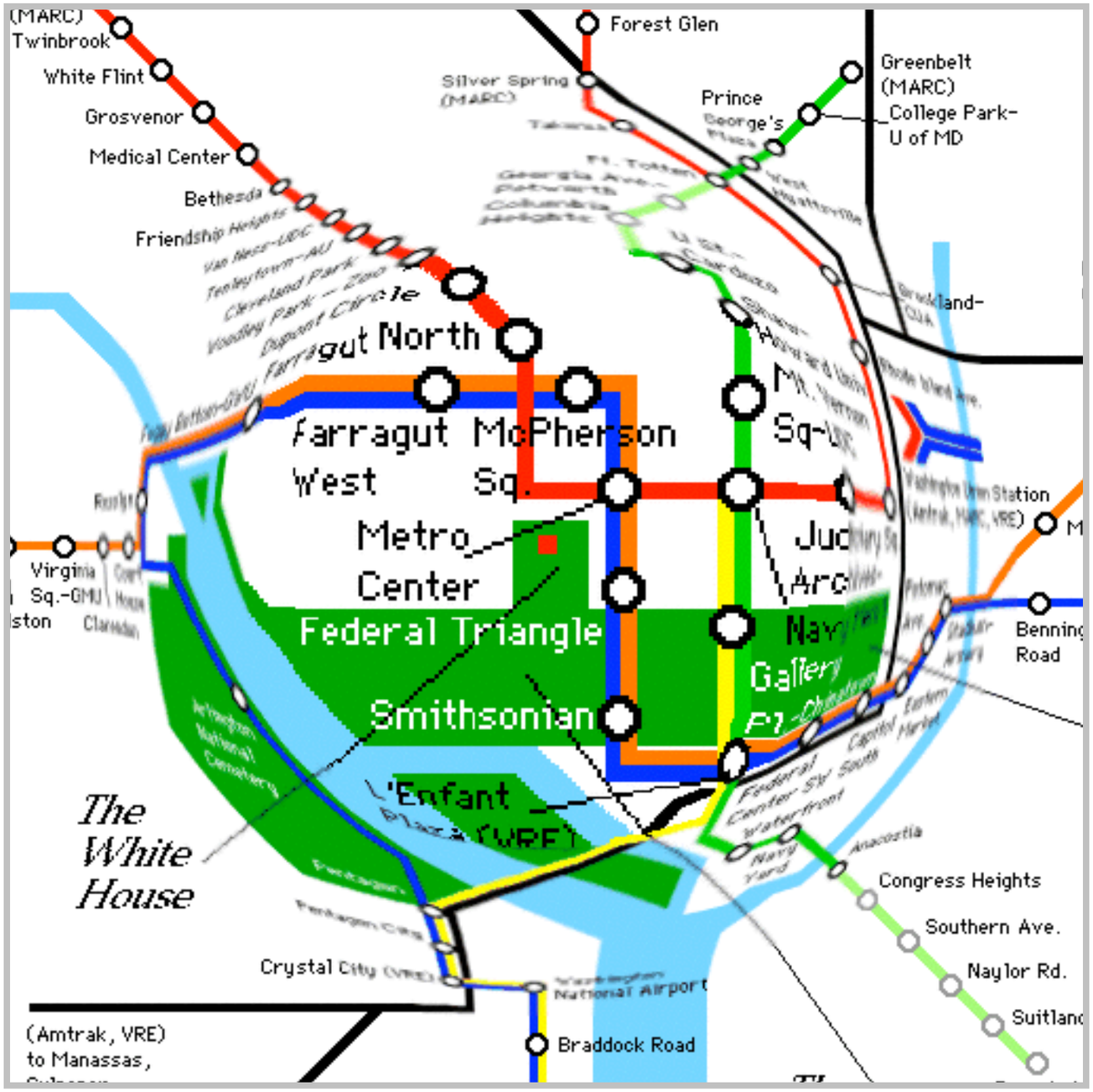
- focus + context
- elision
- superimpose
- distort

distort

distort

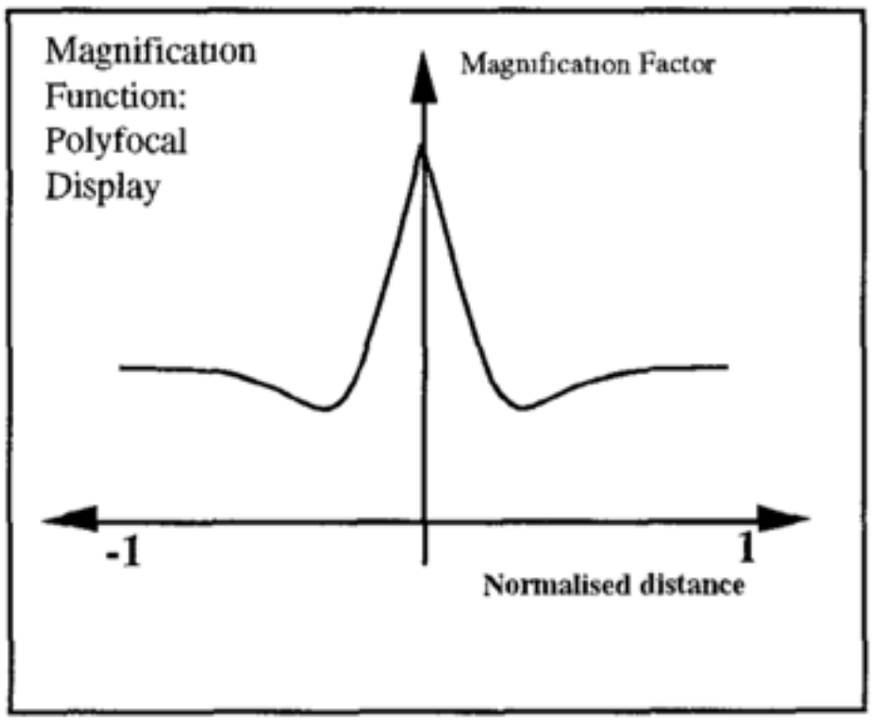
use geometric distortion of the contextual regions to make room for the details in the focus region(s)

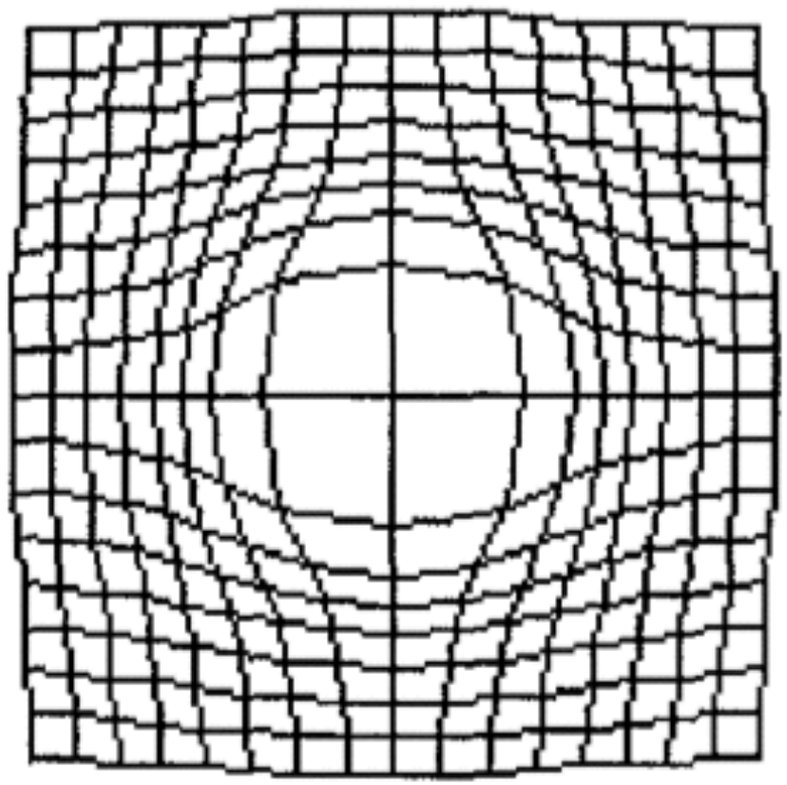
FISHEYE

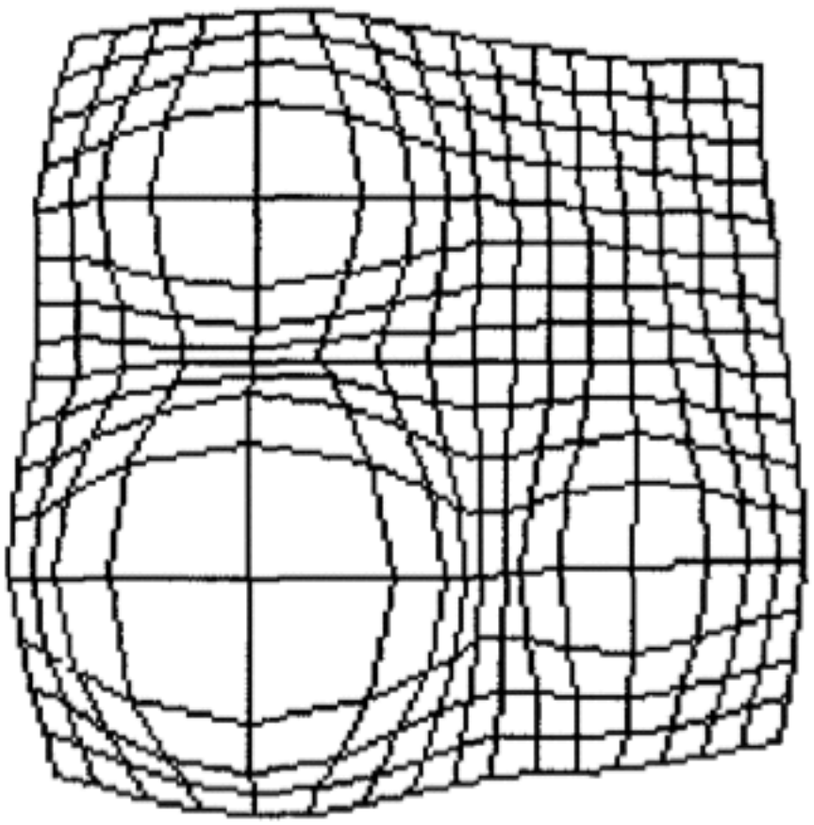


http://www.cs.umd.edu/class/fall2002/cmsc838s/tichi/fisheye.html

FISHEYE







Leung 1994

Unfolding - Fisheye and Zoom lens example

Visualization et al.

Published on Apr 22, 2012

7 Comments

Data lenses

The **Data Lenses** is a visual exploration tool for several attributes of the same dataset: buses in Singapore. As described in the video, it enables to select various types of data, while speeding up and slowing down the simulation. The data that it reads is not pre-processed and therefore is aggregated on the fly on a bus level.

Nevertheless, what interests me more here is the experiment that his tool is on visualization per se. I wanted to provide a great amplitude of zoom levels without the classical pan and zoom that often gets me lost. The classical solution for this is the fish-eye lens. The problem is that the typical fish-eye does not carry a zoom level as great as this one: from the island overview to the narrow contemplation of the street. Other solutions can pass by just mapping a magnified circle over the interest point but this obviously brings the occlusion of the periphery of the magnified location, destroying the experience of surroundings' orientated browsing.

After trying to distort the space around a point in all sorts of ways, I came up with a distortion strategy that implements a lens equation of a somehow surreal nature. A point is distorted in function of its current radius to the center of the lens. This distortion rate varies with an arctangent and a square root (after trying all sorts of combinations of

Fisheye Tree View

ctominski

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100 views

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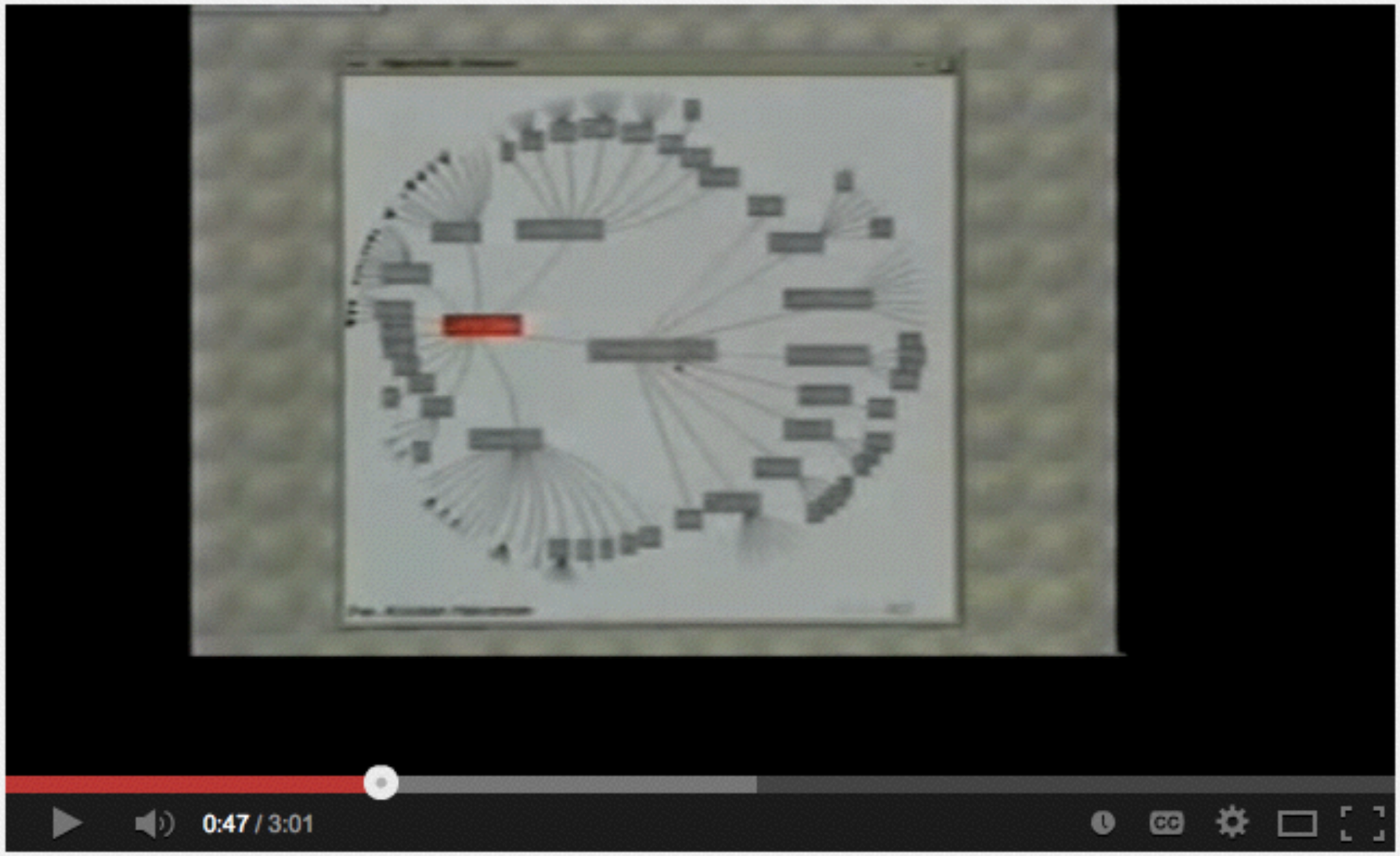
hyperbolic geometry



Hyperbolic Tree Browser -- 1995

Ramana Rao

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6,603

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distortion concerns

- **unsuitable for relative spatial judgements**
- **overhead of tracking distortion**
- **visual communication of distortion**
  - gridlines, shading
- **target acquisition problem**
  - lens displacing items away from screen location
- **mixed results compared to separate views and temporal navigation**
- **fisheye follow-up: concern with enthusiasm over distortion**
  - *what* is being shown: selective filtering
  - *how* it is being shown: distortion as one possibility

L11: Filtering & Aggregation

REQUIRED READING

Chapter 13

Reduce Items and Attributes

13.1 The Big Picture

Figure 13.1 shows the set of design choices for reducing—or increasing—what is shown at once within a view. Filtering simply eliminates elements, whereas aggregation combines many together. Either choice can be applied to both items or attributes.

13.2 Why Reduce?

Reduction is one of four major strategies for managing complexity in visualizations; as pointed out before, these four choices are not mutually exclusive, and various combinations of them are common.

Typically, static data reduction idioms only reduce what is shown, as the name suggests. However, in the dynamic case, the outcome of changing a parameter or a choice may be an increase in the number of visible elements. Thus, many of the idioms covered in this chapter are bidirectional: they may serve to either reduce or

► Changing a view over time is covered in Chapter 11, faceting data into multiple views is covered in Chapter 12, and embedding focus and contextual information together within one view is covered in Chap-