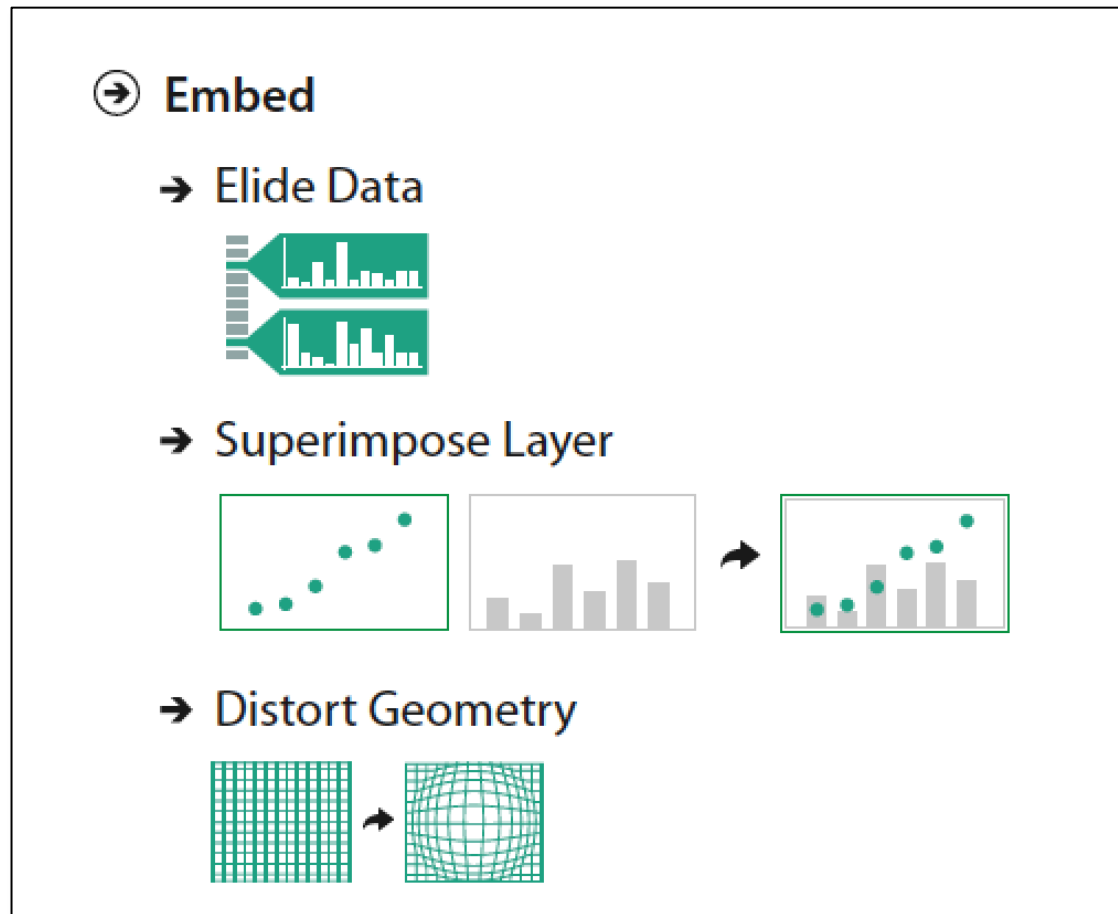
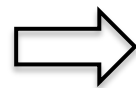
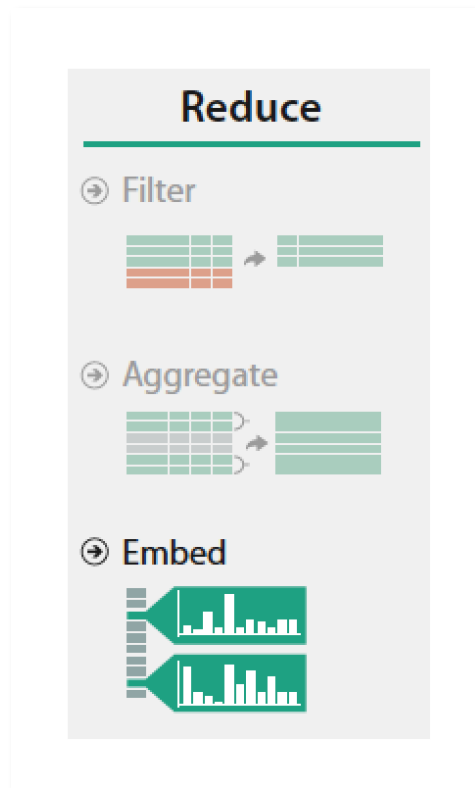


Embed: Focus and Context

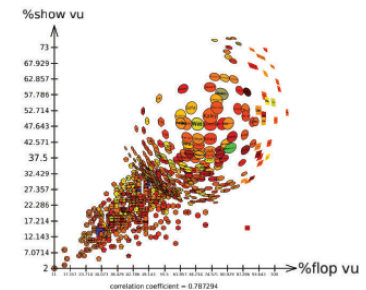
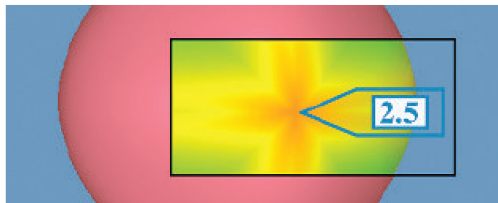
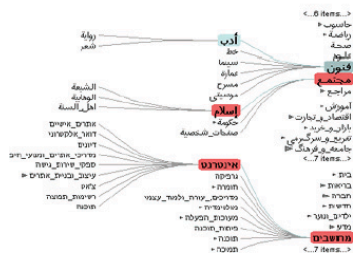
Han-Wei Shen

Embedding Focus within Context



Focus+Context

- Embed focus in a single view that contains more data as the context
- It involves a combination of filtering and aggregation
- It is to assist navigation – to avoid disorientation by providing contextual information
- It is a combination of visual encoding and interaction – visual representation changes dynamically as the user change the focus region
- Methods of F+C
 - Elide: some items are eliminated and aggregated in order to show the focus, plus some context
 - Superimpose: local focus is placed on top of background contextual information
 - Distort: Compress contextual information to make room for magnified focus regions



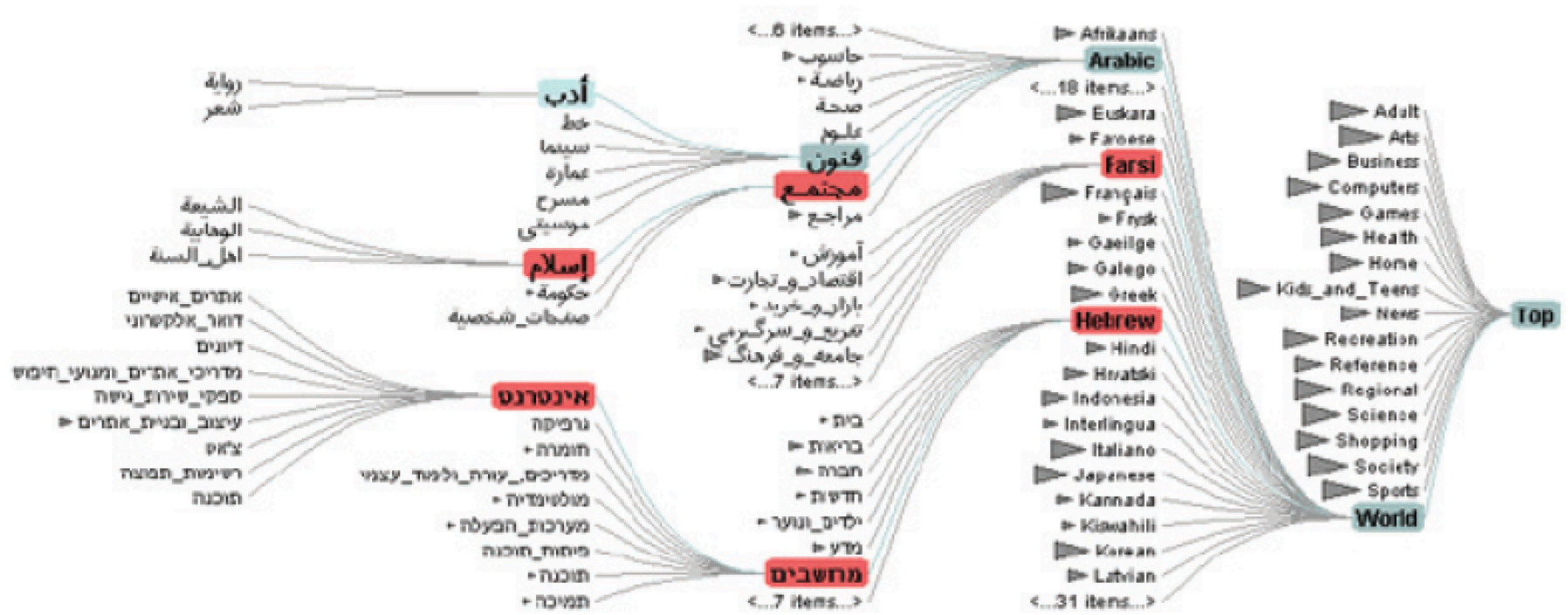
Elide

- Eliminate items that are uninteresting and far away from the focus region
- Aggregate items that are reasonably close to the focus region as the context
- Show the focus region in full detail
- Use a Degree of Interest (DOI) function for a point x to decide:

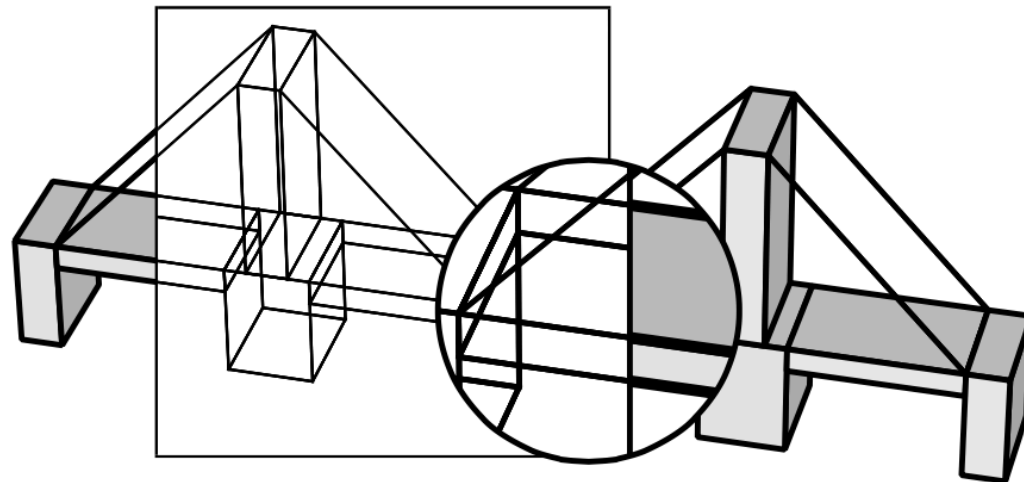
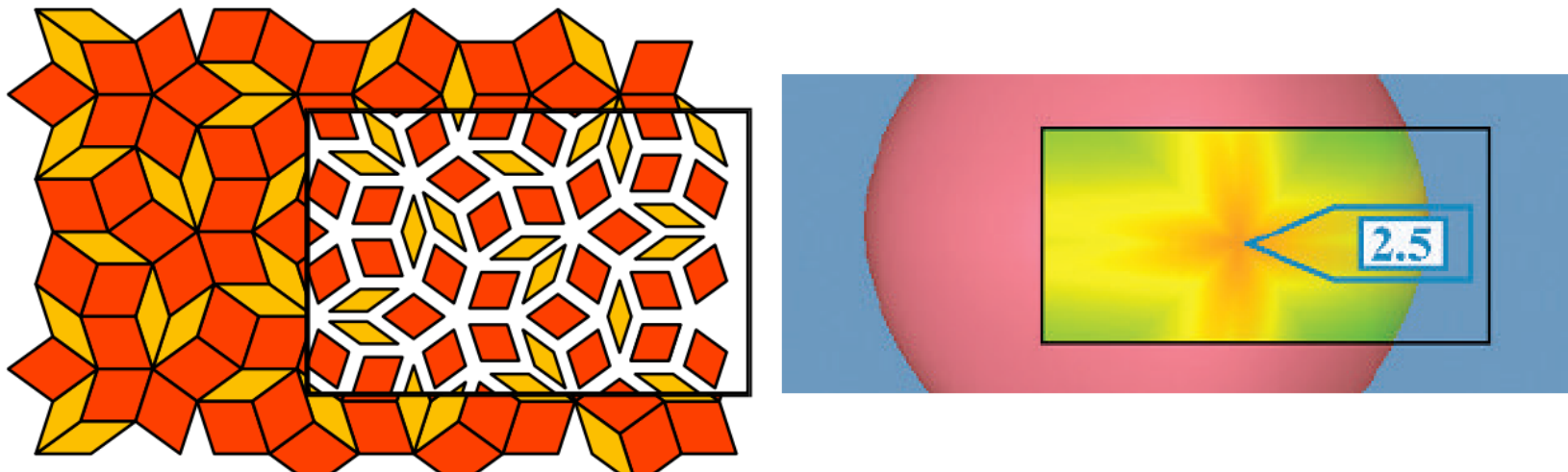
$$\text{DOI}(x) = I(x) - D(x, \text{focus})$$

Where focus is the location of focus point

Elide



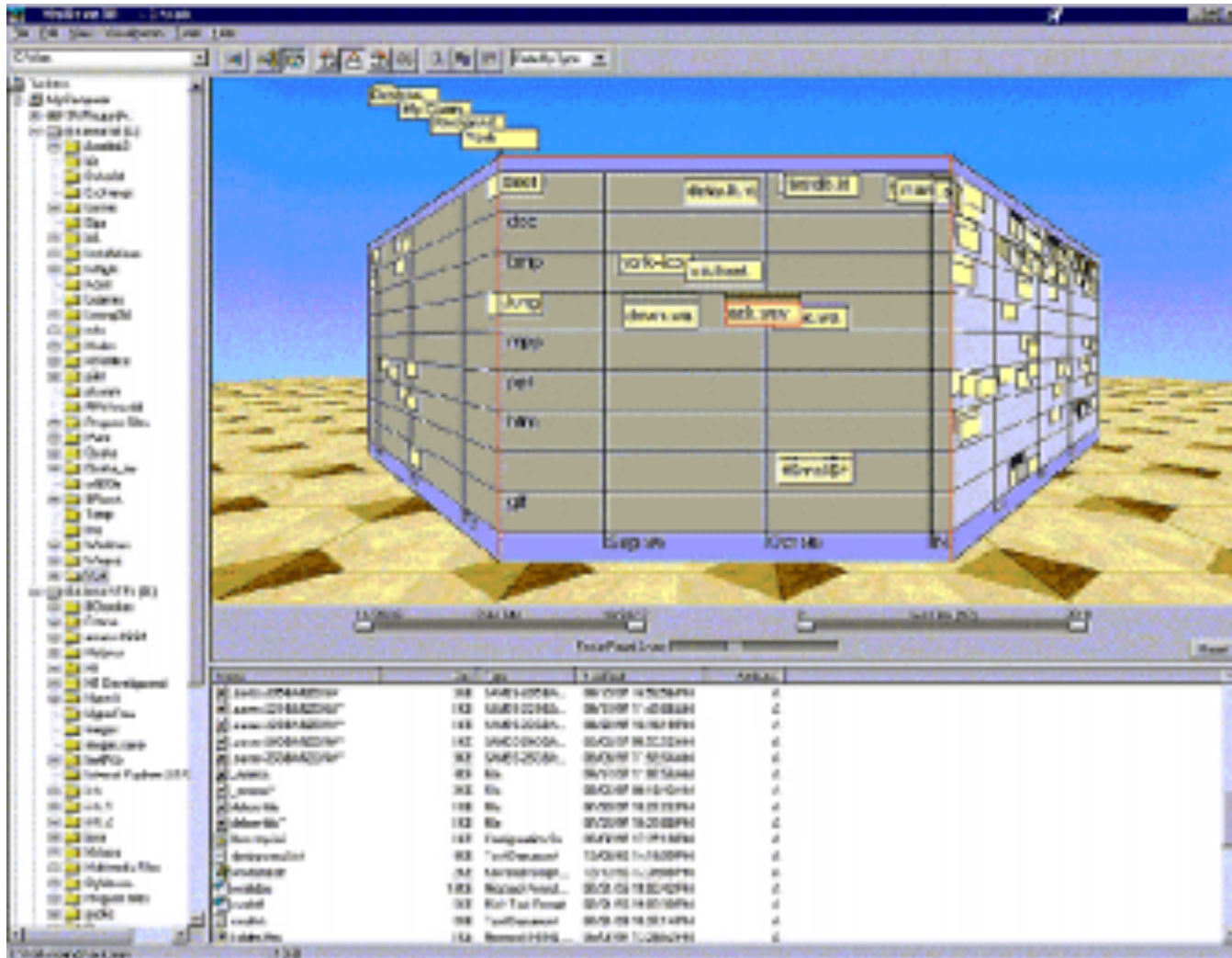
Superimpose



Distortion

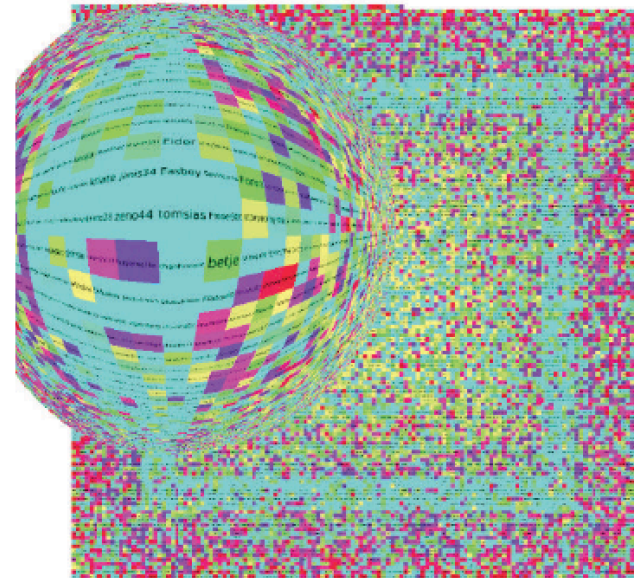
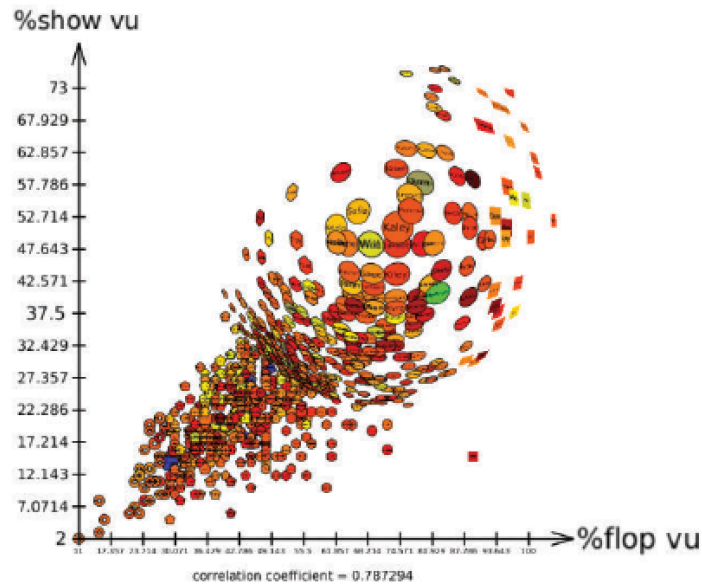
- Integrating focus and context into a single picture using geometric distortion
- Distort the context region to make room for the focus region
- Design choice:
 - Single or multiple focus regions?
 - Shape of focus: circular, rectilinear, etc.?
 - Interaction: movable lens, stretched/squished rubber sheet?

Example: 3D Distortion



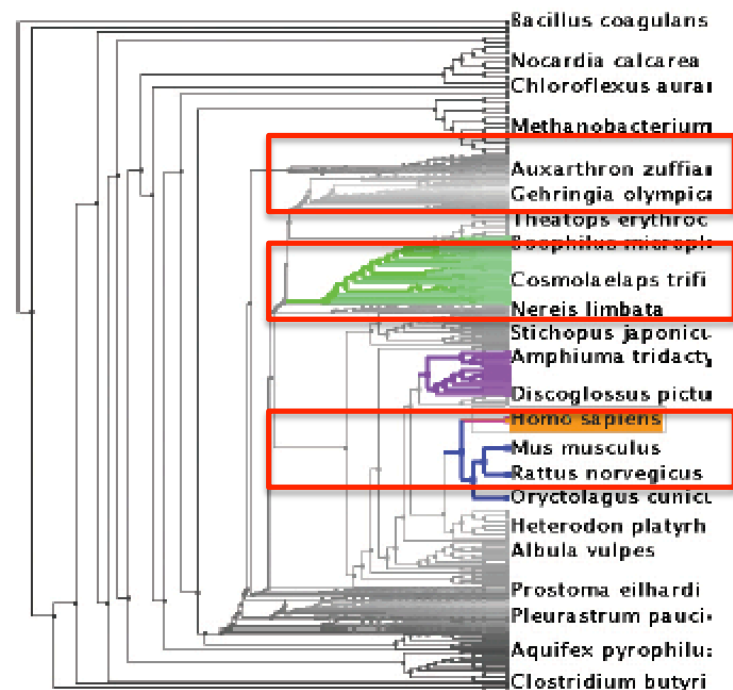
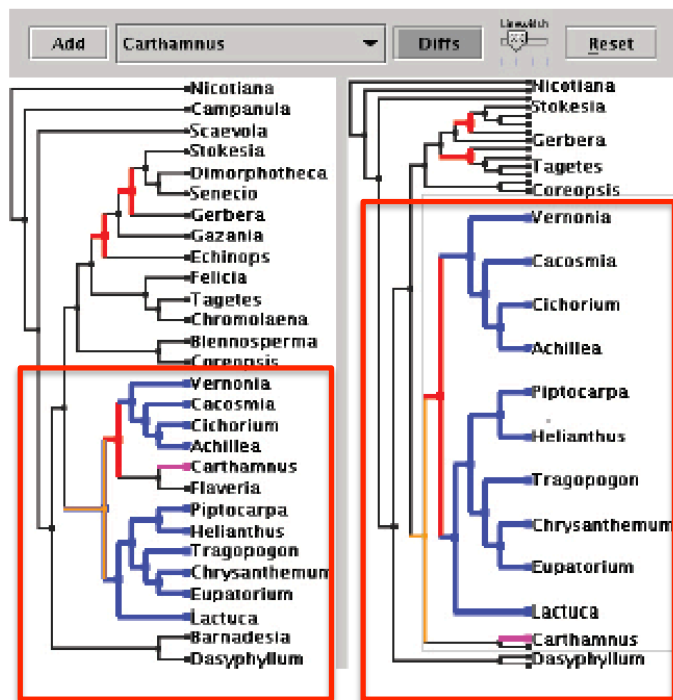
Example: Fisheye Lens

- Radial distortion with a single focus
- Provides a foreground layer that replaces the background, and shows a smooth transition

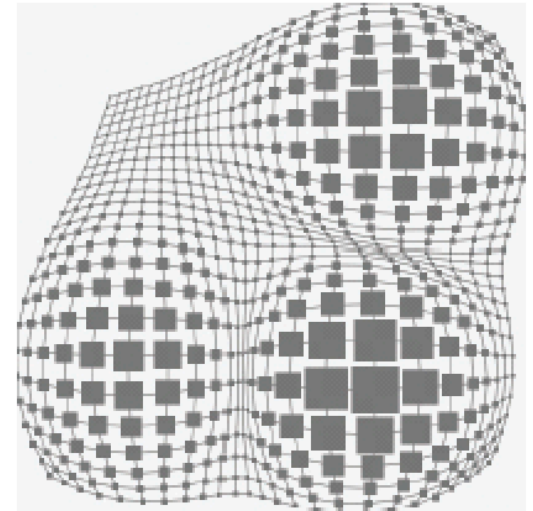
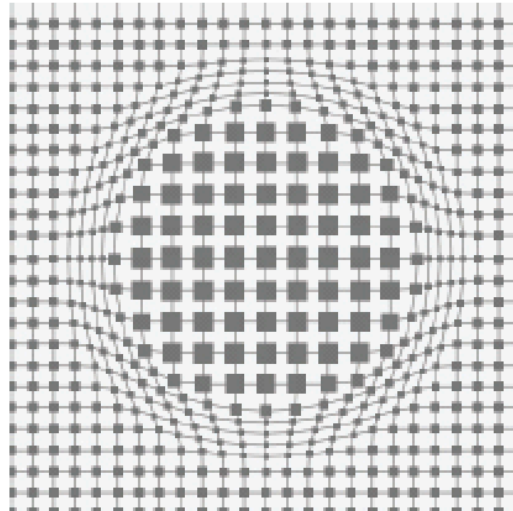
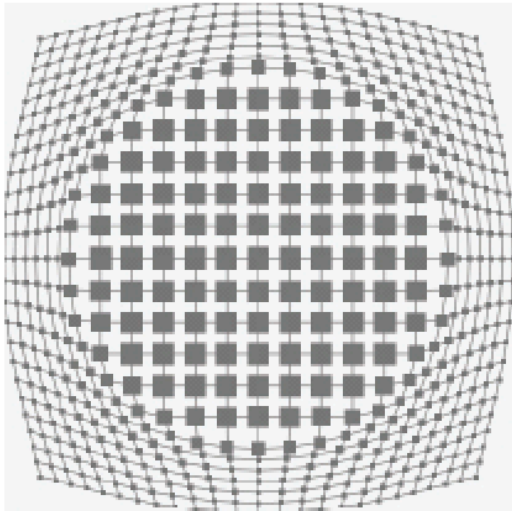


Example: Stretch and Squish Navigation

- The entire scene is considered to be drawn on a rubber sheet



Example: Multiple, Nonlinear Magnification Lens



Distortion: Costs and Benefits

- Distance and length judgment are impaired
 - Better for analysis of topological structures
- Harder to maintain object consistency when the focus changes
- Distortion is problematic for unfamiliar shapes
- A superimposed lens, in contrast, only has two display levels, foreground and background
 - Hence the discontinuous jump