Embed: Focus and Context

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Embedding Focus within Context

Reduce
- Filter
- Aggregate
- Embed

Embed
- Elide Data
- Superimpose Layer
- Distort Geometry
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