Detail and Context

Toolglass, Magic Lenses, TreeJuxtaposer

Nicolai Marquardt

Presentation “Information Visualization”
iLab/GroupLab - University of Calgary, Canada
March 2009
Bier, E.A., Stone, M.C., Pier, K., Buxton, W., and DeRose, T.D. Toolglass and Magic Lenses


See-through Interface: Toolglasses
See-through Interface: Toolglasses

Toolglass sheet  
(not visible)

Application
See-through Interface: Toolglasses

Toolglass sheet (not visible)

Toolglass (non-dominant hand)

Application
See-through Interface: Toolglasses

- **Cursor** (dominant hand)
- **Toolglass** (non-dominant hand)

**Toolglass sheet** (not visible)

**Application**
See-through Interface: Toolglasses

Toolglass sheet (not visible)

Application

Cursor (dominant hand)

Toolglass (non-dominant hand)
Shape or Property Palette

- Click-through buttons
- Adding objects
- Changing properties (e.g., size, color)
- Can be applied to text

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>regular</td>
<td>by holding down a keyboard key with</td>
</tr>
<tr>
<td>italic</td>
<td>spatial modes. Because these spatial</td>
</tr>
<tr>
<td>bold</td>
<td>modes can be changed directly in the</td>
</tr>
<tr>
<td>bold italic</td>
<td>application work area, the cursor and</td>
</tr>
<tr>
<td></td>
<td>the user’s attention can remain on the</td>
</tr>
</tbody>
</table>
Shape or Property Palette
Combining Palette
Grids
See-through Interface: Magic Lenses
See-through Interface: Magic Lenses
See-through Interface: Magic Lenses

Application

Magic Lenses

Scaling lens

Black & White filter
Magic Lenses
Magic Lenses
Combining Magic Lenses

Magic Lenses

Scaling lens

Black&White filter

Application
Combining Magic Lenses
Combining Magic Lenses

Recursive Ambush

Output

Lens 1

Original Model
Combining Magic Lenses

Recursive Ambush

Model-In Model-Out
Combining Magic Lenses

Recursive Ambush

Model-In Model-Out

Parameterize-and-clip
Combining Magic Lenses and Toolglass

Toolglass sheet

Magic Lenses

Application
Combining Magic Lenses and Toolglass
Two-handed interaction with mouse/trackball?

Alternatives for toolglasses?
- Two-handed interaction with mouse/trackball?

- Alternatives for toolglasses?
Motivation: Phylogenetic trees
Motivation: Biologists
Motivation: Biologists

How do these two data sets differ?

OMG, that’s a lot of paper!
Motivation
Interactive system to compare large tree data structures

1. Detection of structural differences
2. Focus and context navigation
3. Guaranteed visibility
Demonstration
Similarity Score $S(m,n)$
Similarity Score $S(m,n)$

$L(m) = \{E,F\}$

$L(n) = \{D,E,F\}$

$S(m,n) = \frac{|L(m) \cap L(n)|}{|L(m) \cup L(n)|} = \frac{|\{E,F\}|}{|\{D,E,F\}|} = \frac{2}{3}$
Best Corresponding Node

$T_1$

$T_2$

$m$

$n$
Best Corresponding Node

\[
\text{BCN}(v) = \arg \max_{u \in T_2} (S(u, v))
\]
Best Corresponding Node

\[ \text{BCN}(\nu) = \arg \max_{u \in T_2} (S(u, \nu)) \]

\[ \text{BCN}(m) = \arg \max_{u \in T_2} (S(u, m)) \]
Best Corresponding Node

\[ BCN(v) = \arg \max_{u \in T_2} (S(u, v)) \]

\[ BCN(m) = \arg \max_{u \in T_2} (S(u, m)) = n \]
Marking Structural Differences

Structural differences: all nodes where BCN is not 1
Marking Structural Differences

Structural differences: all nodes where BCN is not 1

\[ S(\nu, \text{BCN}(\nu)) \neq 1 \]
Marking Regions of Interest
Guaranteed Visibility of Marks

- Outside frustum
  - Overview and context in one view

- Occlusion
  - 2D layout

- Culling at subpixel sizes
Guaranteed Visibility: Culling

Visibility limit
Guaranteed Visibility: Culling

Visibility limit
Research Project: Magic Lenses?

