Discovering the Covered: Ghost-Views in Information Visualization

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A g e n d a

- Motivation
- Background
- General Approach
- Application Examples
- Conclusion & Outlook
Motivation

- Piringer et al. 2004
- Benford et al. 1999
- Theisel et al. 1998
- Tanaka et al. 2003
- Robertson et al. 1991
- Rekimoto et al. 1993
Motivation

- Occlusion is a major problem in 3d-visualization [Card et.al. 1999]
- Two main strategies:

Distortion

Information Hiding

[Sheelagh et.al. 1996]

[Tominski et.al. 2005]
Background

- Technical and medical illustrations

[Diepstraten 2005]

[Li et al. 2007]

[Rautek et al. 2007]

[Viola et al. 2005]
Two-pass rendering:

- Generate an importance map by rendering the objects of interest into a 0/1 texture.

- Use this importance map in the final rendering step to determine whether objects are occluders or not. In case of occlusion, the objects transparency is adapted locally.
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**General Approach**

[phylogenetic dataset $\approx 580$ nodes]
Treemap [Shneiderman 1992]
General Approach

Steptree [Bladh et. al. 2004]
General Approach
General Approach

lookup in fragment-shader
General Approach

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Cut-away

Ghost
General Approach
**General Approach**

A non-binary importance map allows gradual differences.
Application Examples

- Spring-based visualization (principle 2D):
[health data: ≈ 230 districts of northern Germany with 10 different attributes]
[health data: $\approx 230$ districts of northern Germany with 10 different attributes]
[phylogenetic dataset \( \approx 580 \) nodes]
Application Examples

[phylogenetic dataset \( \approx 580 \) nodes]
**Conclusion & Outlook**

- **Ghost-Views** ...  
  ... ensure the visibility of important objects without distortion or global information hiding  
  ... adjust transparency locally  
  ... hide the near context of important objects  
  ... are easy to implement (for InfoVis-purposes)  
  ... are easy to apply to existing 3d-techniques  

- **Outlook**  
  - combination with distortion-techniques  
  - multiple importance-maps  
  - other visual clues than transparency (silhouettes...)
Video

3D spring-based visualization

Ghost-view: on / off
Remark

For high-resolution video and images visit:

http://www.informatik.uni-rostock.de/~malub/