

Evaluating Space-Filling Visualizations for Hierarchical Structures



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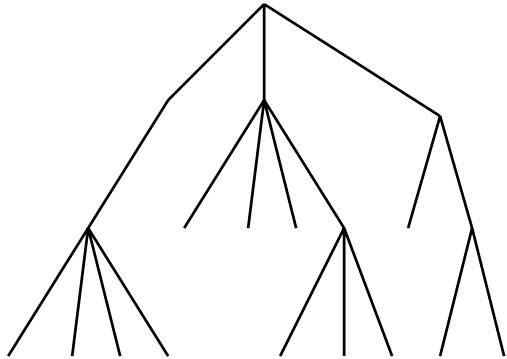
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Representing Hierarchies

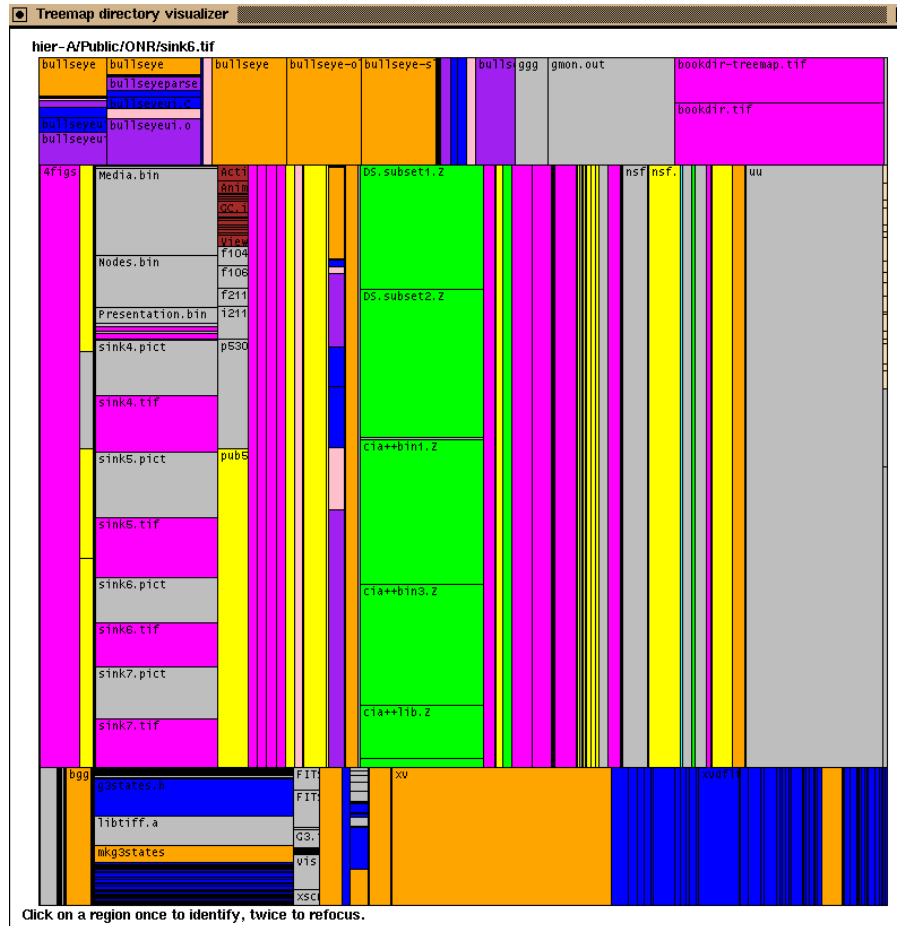


Variety of methods

Space-filling Techniques

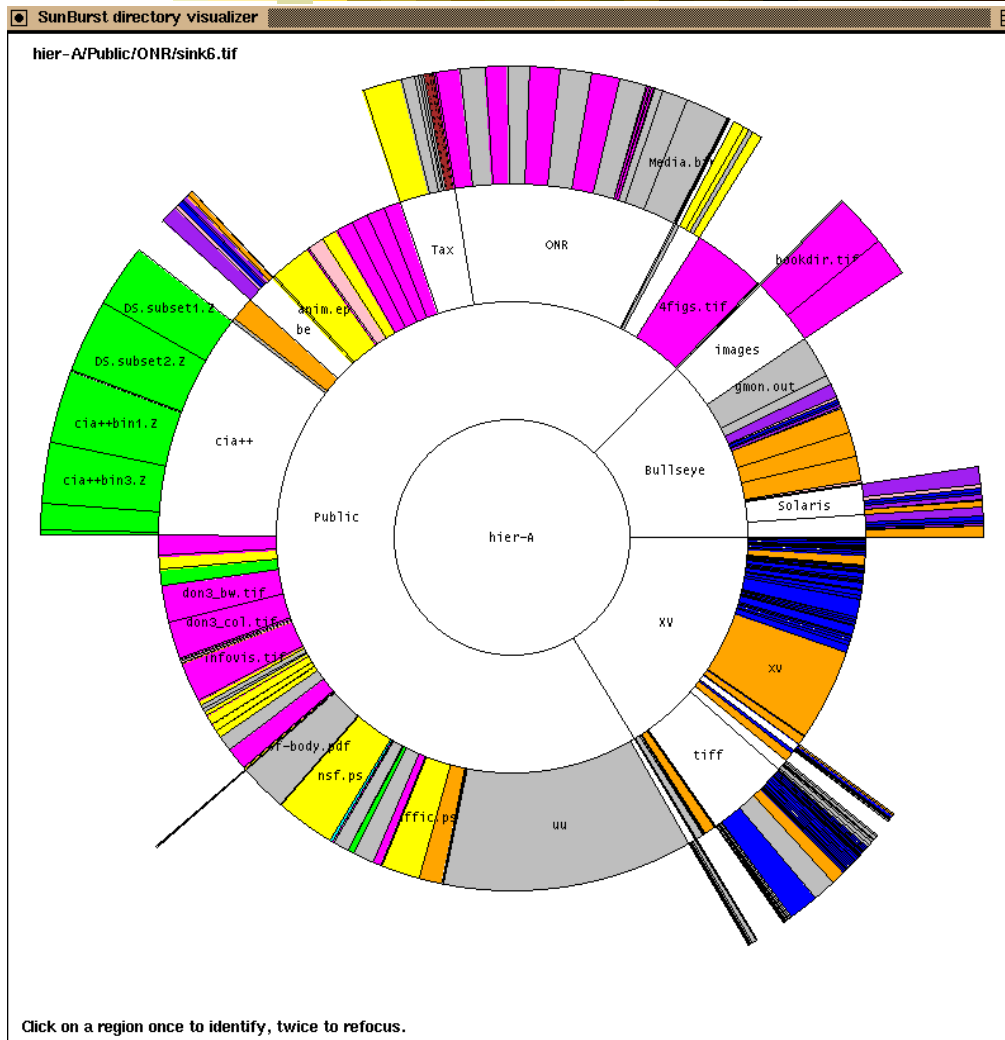
- Use area to represent some variable

Treemap



Johnson
and
Shneiderman

Sunburst



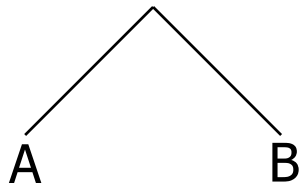
Related work:
Chuah '98
Andrews '98

Experiment

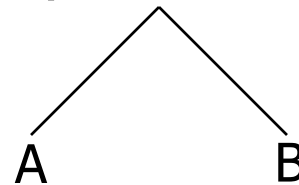


- ⌘ Compare Treemap and Sunburst with users performing typical file/directory-related tasks
- ⌘ Evaluate task performance on both correctness and time

Small Hierarchy
(~500 files)



Large Hierarchy
(~3000 files)



Experiment



⌘ 60 participants

⌘ Participant only works with a small or large hierarchy in a session

⌘ Vary order across participants

SB A, TM B
TM A, SB B
SB B, TM A
TM B, SB A

32 on small hierarchies
28 on large hierarchies

Tasks



- Identification (naming or pointing out) of a file based on size, specifically, the largest and second largest files (Questions 1-2)
- Identification of a directory based on size, specifically, the largest (Q3)
- Location (pointing out) of a file, given the entire path and name (Q4-7)
- Location of a file, given only the file name (Q8-9)
- Identification of the deepest subdirectory (Q10)
- Identification of a directory containing files of a particular type (Q11)
- Identification of a file based on type and size, specifically, the largest file of a particular type (Q12)
- Comparison of two files by size (Q13)
- Location of two duplicated directory structures (Q14)
- Comparison of two directories by size (Q15)
- Comparison of two directories by number of files contained (Q16)

Results



- ⌘ Ordering effect for Treemap on large hierarchies
- ⌘ Small hierarchies:
One comparable, one trend for SB
- ⌘ Large hierarchies:
Statistically significant for SB on 1st use
- ⌘ Subjective preference:
SB (51), TM (9), unsure (1)

Observations



- ⌘ SB appeared to convey structure better
- ⌘ Participants felt TM conveyed size better, but not bore out
- ⌘ Strategies mattered
- ⌘ Many participants were unsure of utility of tools