Hierarchical Data Analysis

Introduction to Tree Maps

Ira A. Fulton Schools of Engineering
Arizona State University

Objective

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Explain hierarchical representation schemes

Space-Filling Representation

- Each item now occupies an area
- Children are contained under the parent

One example: "Icicle plot"

Parts of this slide borrowed from John Stasko's Information Visualization Course Lecture: Hierarchies and Trees 2(Space Filling): http://www.cc.gatech.edu/~stasko/7450/Notes/tree2.pdf

Treemap

- Space filling representation developed by Johnson and Shneiderman
- Children are drawn inside their parent
- Alternate horizontal and vertical slicing at each successive level
- Use area to encode other variable of data items

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Johnson, B. and Shneiderman, B. Treemaps: A Space-Filling Approach to the Visualization of Hierarchical Information Structures. In Proceedings of the IEEE Information Visualization ’91, pages 275–282, IEEE, 1991.

Treemap Algorithm

Draw()

{

1. Change orientation from parent (horiz/vert)
2. Read all files and directories at this leve
3. Make rectangles for each, scaled to size
4. Draw rectangles using appropriate size and color
5. For each directory
   - Make recursive call using its rectangle as focus

}

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Nested vs. Non-Nested

Non-nested Tree-Map

Nested Tree-Map

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Treemap Applications

Can use the Treemap idea in a variety of domains

- File/directory structures
- Software diagrams
- Sports analysis
- Stock Market Data

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Visualizing a Tennis Match

- Analyze, review and browse a tennis match
- Space-filling/treemap-like hierarchy to show a competition tree
- Show match, sets, game points
- Lens can show shot patterns
- Color encodes player

Liqun Jin and David C. Banks, ``TennisViewer: a Browser for Competition Trees,'' IEEE Computer Graphics & Applications, Vol. 21, No. 2 (March/April 1997), pergamon Press, pp. 171-178.

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Tree Map Benefits

- Good representation of two attributes beyond node-link:
  - Color
  - Area
- Not quite as good at representing structure
  - What happens if the tree is perfectly balanced?
  - Can also get long-thin aspect ratios
  - Borders can help on small trees, but take up too much area on large, deep trees

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