Hierarchical Data Visualization

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IAT 814
February 21, 2007
Outline

- Introduction
- Techniques
- Treemap
- SpaceTree
- Comparison
Introduction

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    - Features
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- Hierarchical Data
  - Directory structure
  - Genealogy trees
  - Biological taxonomy
  - Business structure
  - Project structure
- Challenges
  - Visualization of large data
  - Dynamic hierarchy
  - Searching and filtering
Visualization Techniques

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- Treemap


- SpaceTree

Treemap

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- Space-filling method of visualizing large hierarchical data sets
- Usually visualize two dimensional dataset
  - One mapped to the area of the rectangles
  - The other mapped to the color of the rectangles
Treemap Basic Layouts

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Treemap Features

- Three layout options
- User specification of the hierarchy
- Aggregation
- Dealing with imposed variable depth hierarchy
- Dynamic queries and filter
Treemap Example – Project Structure Visualization

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SpaceTree

- Builds on the conventional node link tree diagrams
- Combined with a zooming environment that dynamically lays out branches of the tree to best fit the available screen space
SpaceTree Features

- Several layout options
- Branches that do not fit on the screen are summarized by **triangles**
  - Shading: Total number of nodes in the subtree
  - Height: Depth of the subtree
  - Base: Average width (i.e. number of items/depth)
SpaceTree Features

- Progressive opening of branches by clicking on a node
  - Maximizing the number of levels opened at any time
  - Decomposed tree animation: trim, translate, and grow
- Dynamic queries and filtering

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### Comparison

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<table>
<thead>
<tr>
<th>Treemap</th>
<th>SpaceTree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flexible hierarchy</td>
<td>1. Fixed hierarchy</td>
</tr>
<tr>
<td>2. Single screen visualization of large data</td>
<td>2. Progressive visualization</td>
</tr>
<tr>
<td>3. Size and color coding of attributes</td>
<td>3. Attributes can only be labeled</td>
</tr>
<tr>
<td>4. Unclear hierarchical structure</td>
<td>4. Obviously visible hierarchy</td>
</tr>
<tr>
<td>5. Unconventional tree representation</td>
<td>5. Regular node-edges tree representation</td>
</tr>
<tr>
<td>6. Require user training</td>
<td>6. More intuitive to user</td>
</tr>
</tbody>
</table>