Scalable Tree Comparison using Focus+Context with Guaranteed Visibility

InfoVis 2003 TreeJuxtaposer contest submission

James Slack, Tamara Munzner (University of British Columbia), François Guimbretière (University of Maryland)

http://www.cs.ubc.ca/~tmm/papers/contest03

Phylogenetic Trees
- Differences marked automatically in red
  - Visually highlight exact points of topological change

Phylogenetic Trees: Marking Subtrees
- Selected subtrees can be marked with colour
  - Coloured subtrees aid structural analysis

Classification Trees
- Mammalia subtree (6K nodes)
- Greedy label drawing algorithm, label not drawn if overlap

Classification Trees
- Subtrees can be stretched (rubber sheet)
- Rest of tree compressed, remains in view (tacked borders)

File System Trees
- 4-way comparison of hcil subtree (3700 nodes)
  - Sparse differences are guaranteed to be visible

Classiﬁcation Tree Browsing
- Scalability: interactive browsing with 198K nodes
  - Nodes initially given equal vertical screen space

Classiﬁcation Tree Search
- Search for node with the ﬁnd panel
  - Results relayed instantly as marked nodes

Classiﬁcation Tree Node Movement
- Select subtree, preprocessed set of best nodes selected
  - Forest may result, precalculation in $O(n \log^2 n)$

Weaknesses
- Attributes for nodes not handled
- Trees can not be edited
  - Topology is static
  - Node name is static
  - No undo/playback functionality
- Large memory footprint
  - Unable to load two 200K node trees for comparison

Strengths
- Guaranteed Visibility of marked groups
  - Global overview to start, stretch to details
  - Focus+context (rubber sheet, tacked borders)
- Scalability
  - 4 way comparable: up to 75K nodes per tree
  - 2 way comparable: up to 140K nodes per tree
  - Single tree interactively browsing: up to 550K nodes
- Progressive rendering
  - Draw important animation updates first

Further Information
- TreeJuxtaposer: Scalable Tree Comparison using Focus+Context with Guaranteed Visibility
  - Tamara Munzner, François Guimbretière, Serdar Tasiran, Li Zhang, Yunhong Zhou, SIGGRAPH 2003