

Tree Comparison Contest: TreeJuxtaposer

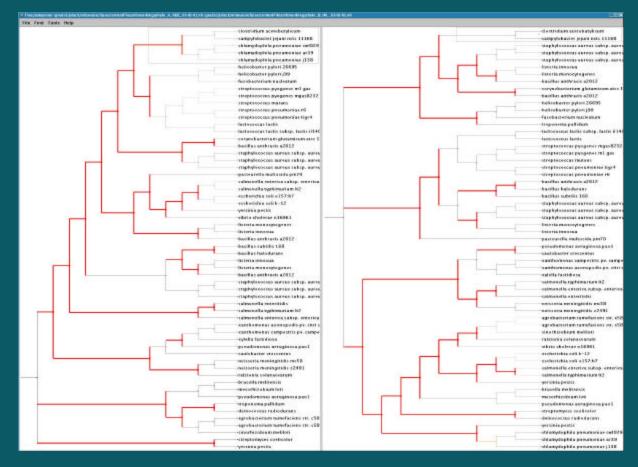
James Slack, Tamara Munzner (UBC) François Guimbretière (Maryland) October 19, 2003

Phylogenetic Trees



Differences marked automatically in red

• Visually highlight exact points of topological change

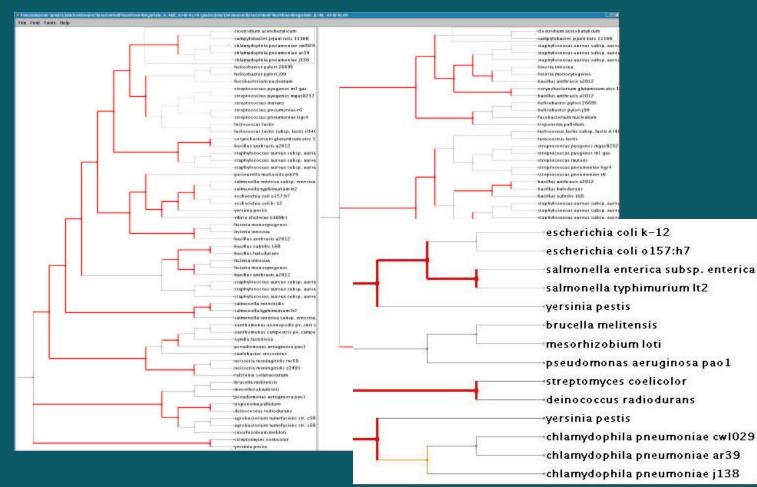


Phylogenetic Trees



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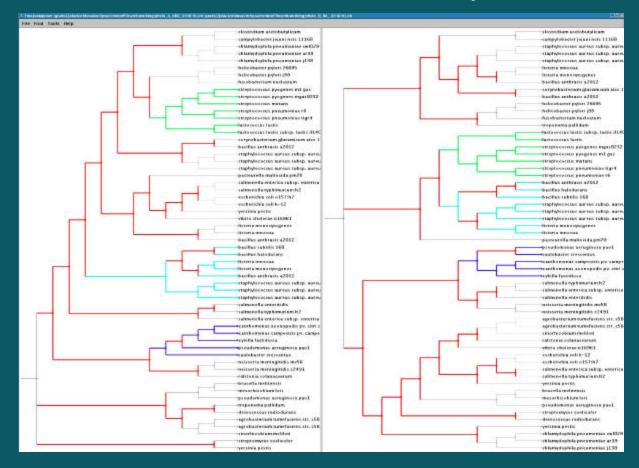


Phylogenetic Trees: Marking Subtrees



Selected subtrees can be marked with colour

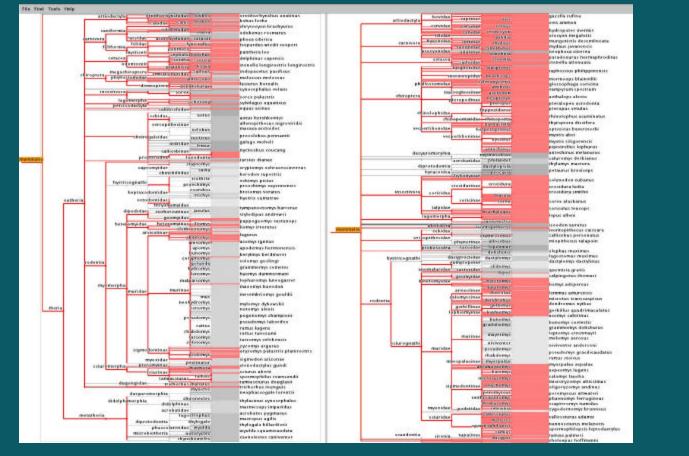
Coloured subtrees aid structural analysis



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Mammalia subtree (6K nodes)

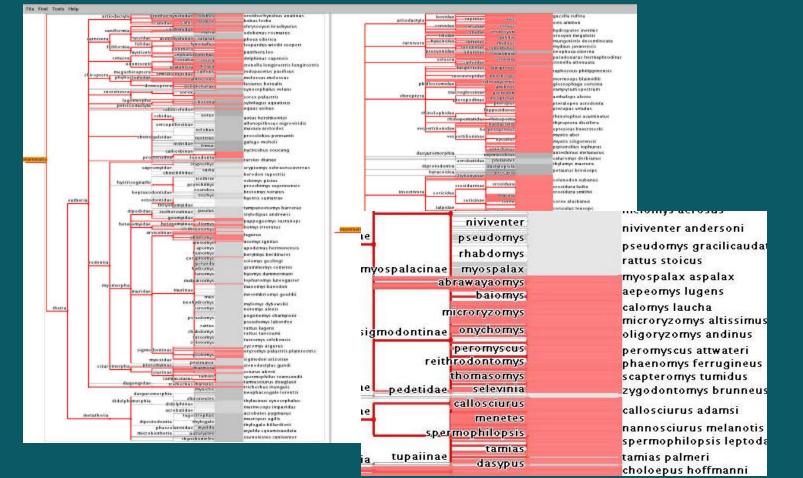
Greedy label drawing algorithm, label not drawn if overlap



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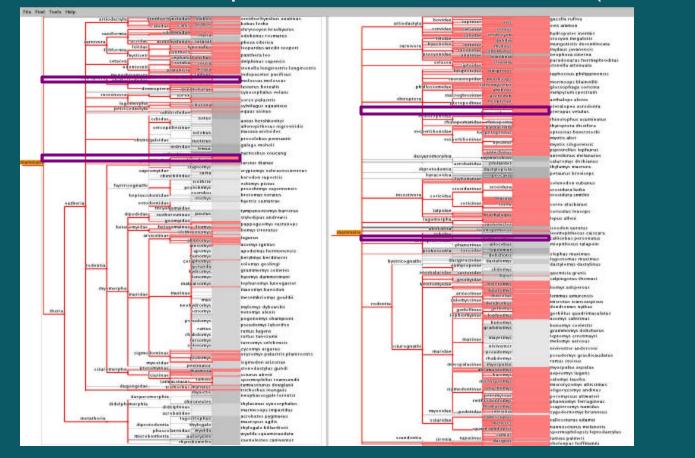
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Greedy label drawing algorithm, label not drawn if overlap



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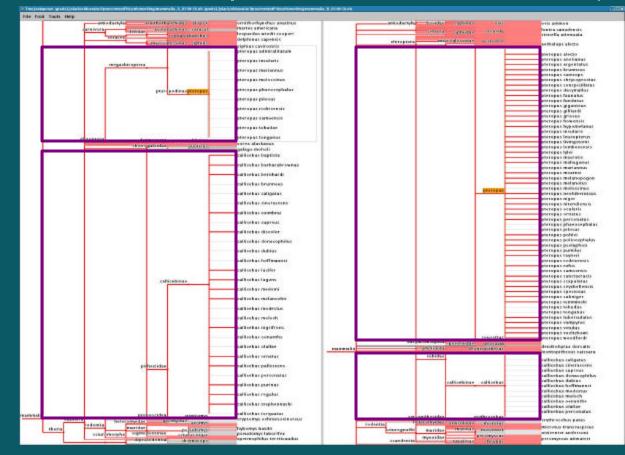
Subtrees can be stretched (rubber sheet)
Rest of tree compressed, remains in view (tacked borders)





Subtrees can be stretched (rubber sheet)

Rest of tree compressed, remains in view (tacked borders)

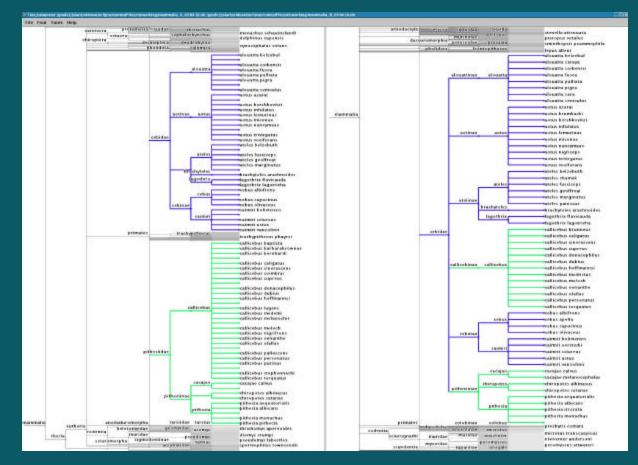


Classification Tree Node Movement



Select subtree, preprocessed set of best nodes selected

Forest may result from best nodes, calculation in O(n log²n)



Classification Tree Browsing



Scalability: interactive browsing with 198K nodes
Nodes initially given equal vertical screen space

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Classification Tree Browsing



Scalability: interactive browsing with 198K nodes
Nodes initially given equal vertical screen space

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- Mouse browsing: spatial highlighting
- Keyboard browsing: topological highlighting
- cousin.mov (0:23)



- Stretch subtrees with resize boxes using mouse
 - Browse to leaf nodes with mouse highlighting
- Traverse children of "mammal" to find ancestor
 - Arrow keys browse through topology
 - Resize ancestor with keyboard command, fine selection
- Progressive rendering for smooth animation
- browsing.mov (1:30)

Classification Tree Browsing: Video 2



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Classification Tree Browsing: Video 2



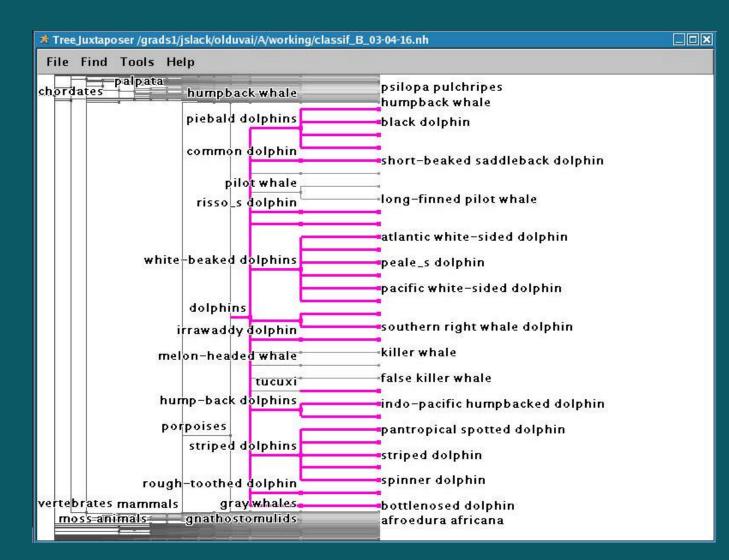
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Search for node with the find panel

- Results relayed instantly as marked nodes
- dolphin.mov (0:57)

Classification Tree Search: Video 3



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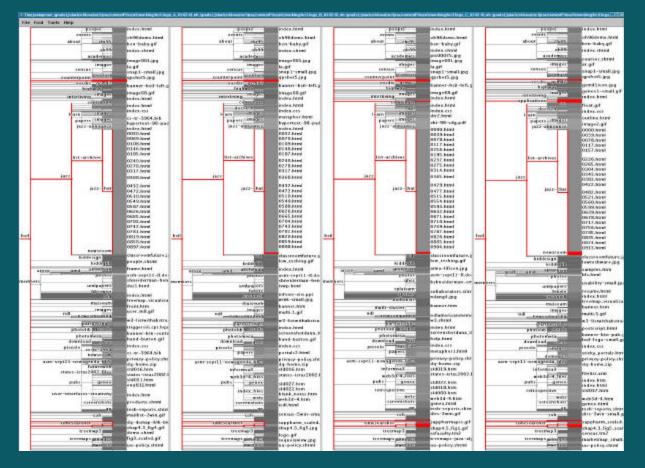
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File System Trees

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4-way comparison of "hcil" subtree (3700 nodes)

Sparse differences are guaranteed to be visible



TreeJuxtaposer Weaknesses

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

TreeJuxtaposer 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



- Difference computation automated, preprocessed
 - Visually highlight exact points of topological change
- Interactive search
 - Real-time visual feedback displayed in context during search
- Linked functionality
 - Highlighting: mouse-over reveals best corresponding nodes
 - Marking: is subtree on A best represented as a forest on B?
 - Navigating: stretch trees simultaneously

Further Information



- TreeJuxtaposer: Scalable Tree Comparison using Focus+Context with Guaranteed Visibility
 - Tamara Munzner, François Guimbretière, Serdar Tasiran, Li Zhang, Yunhong Zhou, SIGGRAPH 2003
- Entry: http://www.cs.ubc.ca/~tmm/papers/contest03
- Visit our interactive poster for demonstration