Improving the Scalability of Interactive Visualization Systems for Exploring Threaded Conversations

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1. PROBLEMS

Much of the web is comprised of forum structured discussion or asynchronous threaded conversations.

The form of the interfaces to these forums can drown out interesting or expert opinions, as well as larger group trends.

Prior forum exploration tools generally don't scale to larger conversations and typically aren't available in an online/ real-time manner.

2. FEATURES

Our work modifies HackerNews through a **Chrome extension** that reorganizes the comment structure of threads into graphical trees.

Our key contribution is a *Forested tree view* that facilitates exploration of larger conversations (see below).

We offer conversation summaries via LDA topic modeling (hosted in the cloud), the ability zoom into subtrees, and exploration via free text search.
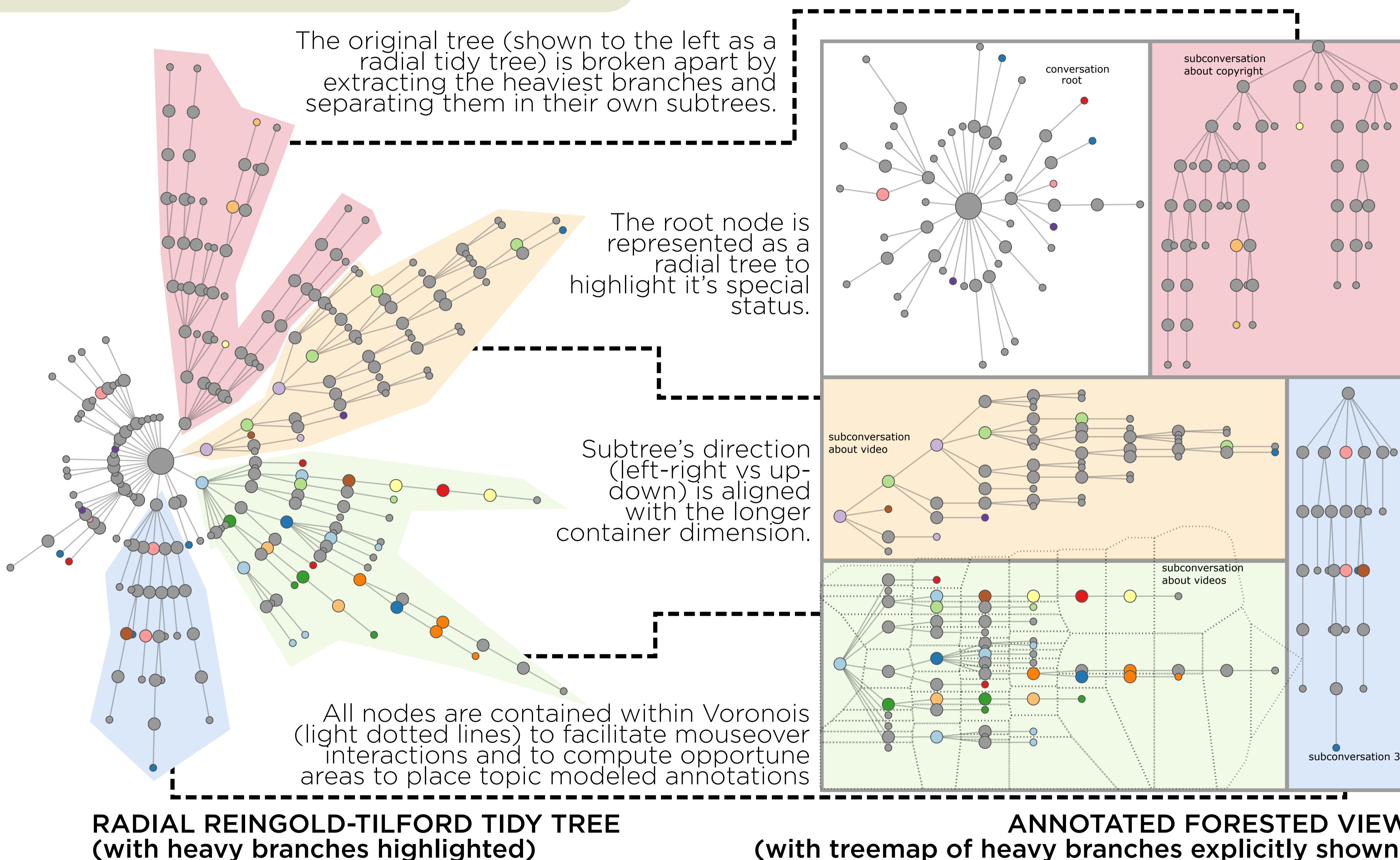
3. RESULTS

Our work scales well and stays responsive on even the largest HackerNews threads.

With our online implementation we are in a good place to conduct a field study which would help determine the real-world utility of this class of tool.

The layout techniques from this work could applied to other tree based displays (such as the scholarship graph) or mobile contexts.

FORESTED TREE VIEW
A visual summary of the technique

The original tree (shown to the left as a radial tidy tree) is broken apart by extracting the heaviest branches and separating them in their own subtrees.

The root node is represented as a radial tree to highlight it's special status.

Subtree's direction (left-right vs up-down) is aligned with the longer container dimension.

All nodes are contained within Voronois (light dotted lines) to facilitate mouseover interactions and to compute opportune areas to place topic modeled annotations

Our knowledge of the problem domain (reading threads is pseudo-fractal, each subtree is at least somewhat understandable independently) allows us to make a radical reorganization of the tree into a collection of trees, a forest.

Voronoi interactions facilitate easy user interaction with a complex structure but also allow for ample space to logically place additional topic models.

RADIAL REINGOLD-TILFORD TIDY TREE
(with heavy branches highlighted)

ANNOTATED FORESTED VIEW
(with treemap of heavy branches explicitly shown)

UI OVERVIEW
A graphical overiew of our application

ARTICLE TITLE & TOPIC MODELING

Clicking one of these topic model tags searches for comments containing that term.

Hovering near a node (via voronoi) selects that comment, all of its ancestors, and all of its immediate children.

Leaves are shown as squares, while internal nodes are circles.

Nodes authored by the most frequent commenters are highlighted with color. This allows for easy identification of back and forth discussion.

Clicking anywhere in the graph view locks or unlocks the current selection (ie it disables hover interactions in the graph view)

GRAPH VIEW

CONVERSATION VIEW

METADATA SUMMARY & SEARCH CONTROLS

This interactive legend of the most frequent commenters, can be clicked to search for comments by user within this thread.

Here the user can enter text to search for users or text within comments.

This scented-widget histogram can be be moused over to filter comments within a time period.

Clicking expand or on a comment adds that comment's children to the current selection.

Clicking this icon searches for comments from users in the current thread.

Clicking this icon zooms into that comments associated subtree.

CONTACT
to learn more about this work visit
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