

Research at the Table

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ABSTRACT

This paper presents ResearchTable, a multi-touch application on a tabletop that enables researchers to explore publication networks. ResearchTable makes use of an interactive network visualization that allows users to navigate or browse through (co-)authorship networks.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces—*Evaluation/methodology*

Keywords

publication networks, multitouch, information visualization, research2.0

1. INTRODUCTION

It has often been proposed to tightly integrate the process of exploring publications, finding, reading, categorizing and storing them in an almost seamless way. This would enable people to re-find, re-read or re-categorize them with the same ease. This sort of idea was already described in 1945: The Memex was described as the perfect desk of a researcher, having all the knowledge of the world readily available [2]. In ResearchTable, we initially focus on the first step: how to ease the process of exploring publications, using current state-of-the-art technologies.

When researchers are less interested to lookup factual data, but rather want to learn and investigate to discover new paradigms and theories found in publications, exploratory search plays an important role. It is therefore important to investigate novel ways to effectively facilitate this [10]. Focussing on this discovery in publication networks, researchers try to find answers to questions as: “How is this domain structured?”, “What or who is related to this?”, “What are niches in my research?”, “Is there validation or uptake of my research?”, “Are there opposite opinions about a certain matter?”, “Where can I find potential partners?”, “Who are the experts to potentially use as test subjects?”, “Can I find intermediate persons in the network to reach unacquainted researchers?”, etc.

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These kind of questions cannot be answered through simple factual search; the “googling-approach” does not suffice if you don’t know what you’re looking for.

Representing data can be done in various textual or visual manners [11][3]. As previous research has pointed out that it is vital to use a suitable representation for exploring a network of (publication) data [12], and inspired by our earlier work on social bookmarks [8] in a visual manner, we had the idea of visualizing the publication networks on a large tabletop display.

2. RESEARCHTABLE

ResearchTable visualizes the search space of a publication network, as it allows for exploiting the human abilities to build a mental model of the search space and let the user decide which related material looks interesting to him or her [14]. To make the exploration experience more profound, the visualization is interactive so that people are able to navigate through it [7].

To visualize the search space, there are plenty of opportunities for information to choose from. We could include (co-)authorship relations between authors and papers, forward and backward citations [4], geospatial information about the affiliations of the authors, textual relationships based on concept extraction techniques, etc.

Authorship relations between authors and papers are a good starting point. Authorship “carries” trust and relevance, so authorship can be a good base to find unknown relevant authors and their papers. Co-authorship is the most formal manifestation of intellectual collaboration in scientific research. It involves the participation of two or more authors in the production of a study, which leads to a scientific output of a greater quality or quantity than could be achieved by an individual [1]. Also, citations can occur without the authors knowing each other and can span across time, but co-authorship implies a much stronger social bond [9]. The publications themselves form the glue of the network visualization, as they provide context on the cause of a relationship between authors.

Figure 1 presents a detailed view of the (co-)authorship network as a node-link diagram, where authors and papers form the nodes of the diagram, and the authorship relationships are represented by the edges of the diagram. Using a node-link diagram renders relations explicit and allows for visual

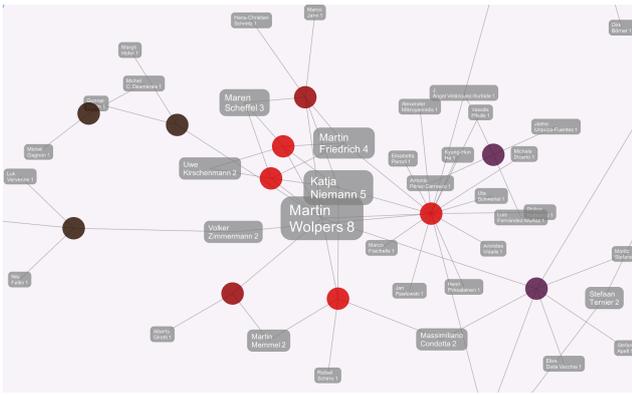


Figure 1: Detailed view of related authors. The grey nodes are authors; the bigger they are, the more papers they have published. The colored nodes represent papers.

navigation across the network [7], which plays a key role in the exploratory search process.

User interaction with ResearchTable is enabled by multi-touch gestures that allow navigation from authors to papers and vice versa. Techniques for drawing graphs based on force-directed placement and virtual physical models have proven successful in producing good layouts [15][5] and have been used in ResearchTable.

A search feature with an on screen touch keyboard completes the navigational possibilities, because users tend to engage in multiple kinds of search in parallel, and some activities may be embedded in others. For example, lookup activities are often embedded in learning or investigative activities [10]. Searches can be performed over either the authors names or the title of the papers. When the user taps on a result, the corresponding node in the network grows temporarily, to act as a landmark in the visualization.

3. CONCLUSION AND FUTURE WORK

In general, the fundamental issue is to understand in a deeper way how we can support the work of researchers with the technology that is available and how we can evaluate that our efforts make a difference. The research presented in this paper tries to move that agenda forward with available tabletop technology.

More specifically, in the current state, two versions of ResearchTable¹ have already been developed and the first usability evaluations have been performed. Some preliminary feedback on the usefulness has been gathered. With this demonstration, we want to evaluate the usefulness of two different philosophies frequently used in visual information seeking. The first is called Ben Schneidermann’s mantra : “Overview first, zoom and filter, then details-on-demand”[13]. The second philosophy was formulated by Jeffrey Heer : “Start from what you know, then grow”[6]. We want to find out which of the two philosophies can be applied best in this particular use case, as this is not immediately clear. This also poses a nice opportunity to re-validate these existing fundaments in a more up-to-date setting.

We found that the best event to evaluate the ResearchTable

¹<http://www.youtube.com/watch?v=iDX1FZx0D4>

would be an academic conference, like Hypertext. Such an event attracts researchers who want to learn about new and ongoing work in their field. Some attendees, usually young researchers, have difficulties finding out which new publications are relevant to them, and what presentations they should attend.

We believe we can provide the conference attendees an added value by giving them the chance to explore all publications of all Hypertext conferences through a modern user interface.

4. REFERENCES

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