Conference Navigator 2.0: Community-Based Recommendation for Academic Conferences

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ABSTRACT
As the sheer volume of information grows, information overload challenges users in many ways. Large conferences are one of the venues suffering from this overload. Faced with several parallel sessions and large volumes of papers covering diverse areas of interest, conference participants often struggle to identify the most relevant sessions to attend. The Conference Navigator 2.0 system was created to help conference participants go examine the schedule of paper presentation, add most interesting papers to individual schedule, and export this schedule to a calendar application. In addition, as a social system, the Conference Navigator 2.0 collects the wisdom of the user community and make it available through community-based recommendation interface to help individuals in making scheduling decisions.

Author Keywords
Information overload, community-based personalization

ACM Classification Keywords
H5.4. Information interfaces and presentation (e.g., HCI): Hypertext/Hypermedia. H3.3. Information storage and retrieval: Information Filtering.

INTRODUCTION
For generations of researchers, paper and pencil were the tools to plan which sessions to attend at an academic conference. To do it right, the researchers were jumping between the conference program and the proceedings to pick up most interesting papers and arrange them into a schedule without context. However, doing it right was a challenging and time-consuming task especially at large multi-stream events. So, many attendees mastered a much

easier, yet quite reliable approach: follow the community. It means such heuristics as following researchers who work on similar topics or just going to a room, which seems to be most occupied. In 2006, Farzan and Brusilovsky [3] made an attempt to implement this social navigation approach in an adaptive hypermedia system Conference Navigator (CN) and explored this system at a large conference. This paper presents an update of this project. We introduce Conference Navigator 2.0 (CN2), an attempt to re-implement the original system using ideas and tools provided by Web 2.0 movement. At the time of writing, CN2 was deployed at four conferences: are Adaptive Hypermedia (AH) 2008[1], Hypertext (HT) 2009[2], User Modeling, Adaptation, and Personalization (UMAP) 2009[3], and 4th European Conference on Technology Enhanced Learning (EC-TEL) 2009[4]. The use of the system at several real conferences allowed us to analyze usage patterns and collect user feedback, which are also summarized in the paper.

COMMUNITY-BASED PERSONALIZATION
The key idea of Conference Navigator is community-based personalization. By community we mean a relatively small group of people with common interests in respect to the domain of the system. Community-based personalization has been explored in a few search, browsing, and recommender systems [1; 2; 9]. In an academic conference context, a community is a group of people interested in the same, relatively narrow research topic. Depending on its size and focus, a conference can have from a few to many dozens communities. Each attendee may be a part or one or more of these communities. The use of community-level personalization places CN and CN2 between traditional social navigation systems (which offer the same guidance to all system users) and recommender systems (which adapt to individual users). In other words, CN and CN2 provide personalization on a group level [5].

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[1] http://www.ah2008.org/

[2] http://www.ht2009.org/

[3] http://umap09.fbk.eu/

[4] http://www.ectel09.org/

COMMUNITY-BASED CONFERENCE NAVIGATOR

CN2 was an attempt to redesign a community-based conference navigator as a Web 2.0 system. For an individual user, CN2 serves as a conference schedule planner service, which allow to browse the conference program and plan persona schedule. The system supports the users with social guidance, which is provided through bookmarks of communities and individual attendees. CN2 is built using the Google Web Toolkit (GWT) package[5]. The GWT provides a new paradigm of web usage perspective. It provides the easier way to implement a web-based application to have the same look-and-feel as usual desktop applications. GWT gives CN2 its multi-tab look-and feel.
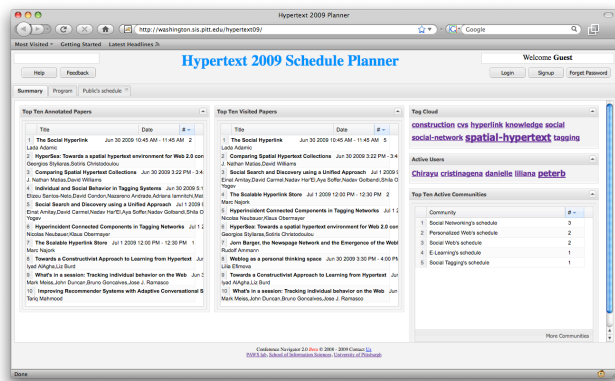

Figure 1 The Hypertext 2009 Conference Summary

Conference Summary

The conference summary tab plays the role of a home page in CN2. It consists of 5 small gadgets: "Top Ten Annotation Papers", "Top Ten Viewed Papers", "Tag Cloud", "Active Users", and "Top Ten Active Communities". The top ten annotated papers gadget counts a number of bookmarks users make and shows top ten of the list. The top ten viewed papers gadget does similar thing but counting users visits to papers. Tag cloud gadget presents the cloud of tags users make bookmarks on papers and add tags to their bookmarks. Tag cloud also provides the folksonomy of the whole conference. Active users gadget provides a cloud of users who create their schedules in the system. The last one, top ten active communities gadget, represents top ten of communities counting bookmarks contributed to that community by users.

Program Browser

The program browser presents the entire program of the conference divided into 2 parts. The upper part shows the abstract of the conference and the lower presents the program detail, which is separated by the day of each session. For each day tab, the panel provides the table of all sessions ordered by time. Also, on the upper right corner,

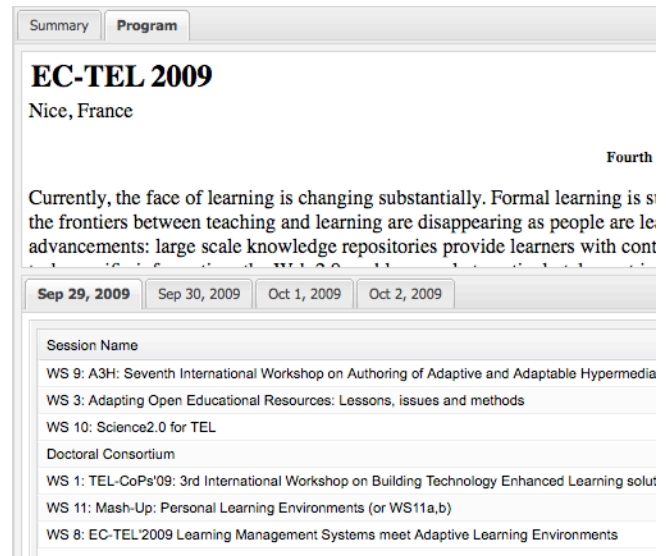the system provides a link to export a conference program to an iCal file.

Figure 2 Program Browser

When users browse on each session by clicking on the session record. Like program detail tab panel, the session tab panel consists of 2 parts: the upper part shows the abstract or detail of that session and the lower part shows the table of papers ordered by the time presenting. To view the detail of each paper, click on a paper record row to show Paper Panel in another tab.
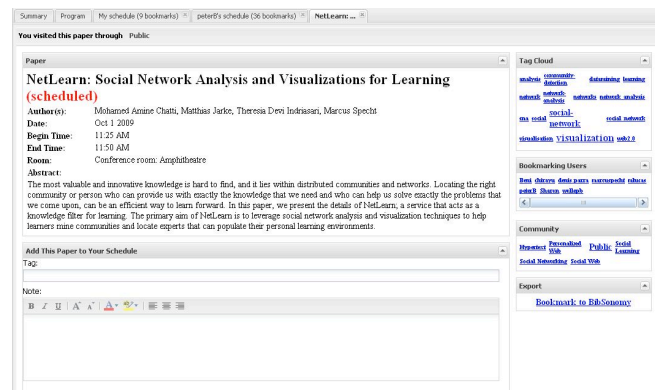

Figure 3 Paper Panel

Paper Panel

The Paper Panel has 2 columns. The left one consists of 2 parts: the upper part shows the paper detail and the lower part provides the list of notes of other users. The right column provides the bookmark, annotate, and contribute feature. Note for the bookmark, annotate, and contribute feature, the system initiated an amount of communities the experts thought they were relevant to the conference. User can add more communities in case there was not in the list. This feature would let users bookmark a paper, add tags, leave a note, and also contribute a paper to their

communities. For HT'09 and EC-TEL'09, the system integrated more feature that let users export their papers to Bibsonomy social bookmarking and publication sharing system [4].
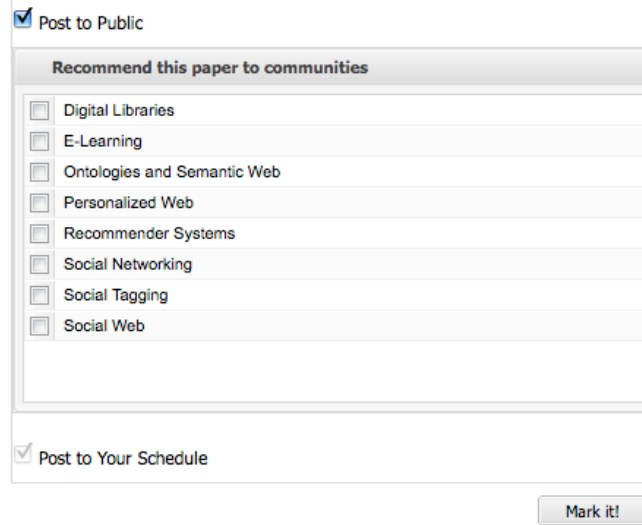

Figure 4 Bookmark, Annotate, and Contribute Feature

Schedule Panel

There are 2 type of Schedule Panel: User Schedule Panel, and Community Schedule Panel. Schedule Panels provide a detailed schedule in detail in the left column and some overview information in the right one.
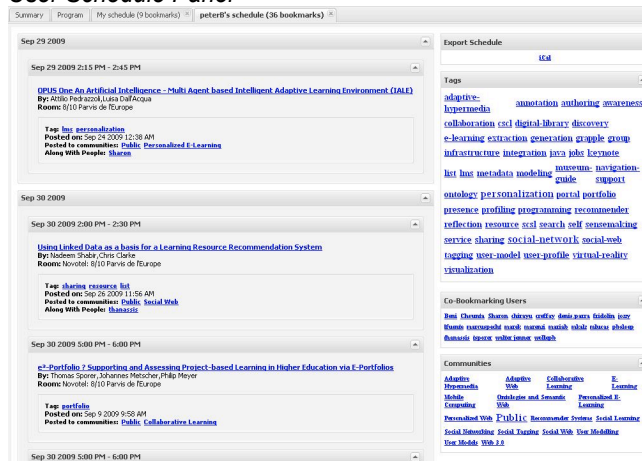
User Schedule Panel

Figure 5 User Schedule Panel

Papers in both kinds of schedules are sorted by date and time. Paper box in the user's schedule shows user's note, tags, and communities to which the paper was posted. User's own schedule also has a "Delete" button on lower right of the paper box to let you remove your marking. The right column provides several "tools": a link to export the schedule as an iCal-format calendar file, a tag cloud, a list of co-bookmarking users, and a list of related communities.

While user and community schedules are very similar, their use is very different. User's own schedule is a one's plan of session attendance, which is used to quickly choose where to go in each timeslot. A community schedule is primary a recommendation tool, which serves to attract user attention to papers interesting to one of his communities of interest. Given a schedule-oriented nature of the conference, this recommendation is provided not as a ranked list, but is integrated in the conference timeline, so that a user can see which papers are interested to the community in each time slot. At the same time, to ensure that most community-valuable papers are not missed, the community schuedule panel also provides a list of top 10 annotated papers in this community. The role of individual schedules of other users, which are also accessible in the system, is less evident. As developers, we consider it mostly as an awareness and communication tool, however, it is quite likely that schedules of recognized experts could have been used as a source of recommendation as well.
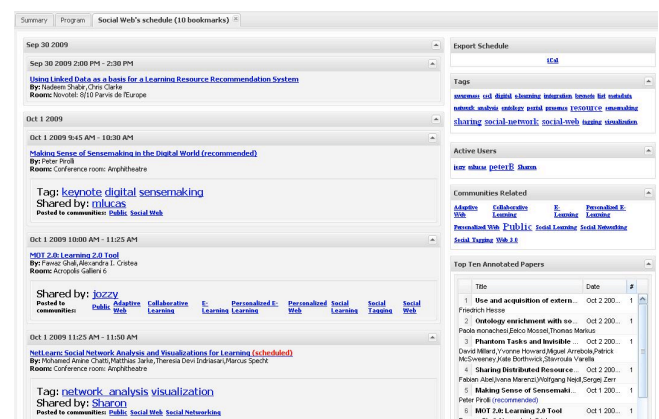

Figure 6 Community Schedule Panel

PRELIMINARY EVALUATION AND RESULT

CN2 was deployed at four medium-sized academic conferences: AH'08, HT'09, UMAP'09, and EC-TEL'09. Out of these, AH'08 and UMAP'09 were single-stream 3-day conferences, HT'09 was 2-stream, 2-day conference, and ECTEL'09 was a 4-stream, 2-day conference. The total number of papers in the schedule of these conferences ranged from 97 to 149. For each of these conferences, all papers and posters, as well as a reasonable fraction of workshop papers were added to the system's schedule. The participants were informed about the system before the start of the conference through the conference Web sites, as well as during the conference through session announcements. All user actions were logged. To evaluate the system, we solicited user feedback through a questionnaire. The request to fill in the questionnaire was sent by e-mail to all participants, who created a CN2 account and used the system for browsing and finding talks.
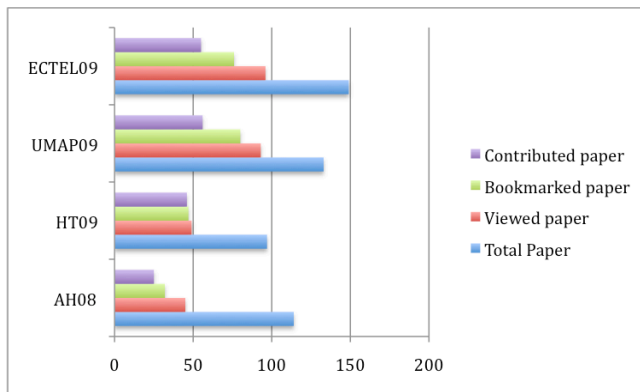
Figure 7 Paper Access Data

Log analysis

To judge how extensively the system was used in our trials, we analyzed system's logs. The action-level analysis of CN2 logs showed that users explored a considerable fraction of all papers through the system: 39.47% (45 out of 114), 50.51% (49 out of 97), 69.92% (93 out 133), and 64.43% (96 out of 149) for AH'08, HT'09, UMAP'09, and EC-TEL'09, respectively. The data hints that the conference size does impact system's usage. The conferences with larger number of papers (UMAP'09 and EC-TEL'09) encouraged the users to bookmark a larger fraction of papers. We can hypothesize that the larger the conference is, the harder for a user is to keep track of all interesting paper, and the larger is the value of a schedule planner. Our discussions with attendees at several events confirm this observation.

An analysis of the users' bookmarking behavior provides some evidence in favor of system's usefulness in discovering good papers. When users viewed papers, they have an option to bookmark them. At AH'09, HT'09, UMAP'09, and EC-TEL'09 users bookmarked 71.11% (32 out of 45), 95.92% (47 out of 49), 86.02% (80 out of 93), and 79.17% (76 out of 96) of papers respectively.

The users' participation in the community-based recommendation mechanism was also considerable. At AH'09, HT'09, UMAP'09, and EC-TEL'09 users choose to contribute 78.13% (25 out of 32), 97.87% (46 out of 47), 70% (56 out of 80), and 72.37% (55 out of 76) of all bookmarked papers respectively to at least one of their communities.

The analysis of the logs on the user level also demonstrated that multi-stream conferences provided a stronger motivation for creating individual schedules by bookmarking papers (vs. just browsing the schedule). While at AH'08, HT'09, UMAP'09 the percentage of users engaged in bookmarking was 65.22% (15 out of 23), 78.26% (18 out of 23), and 62.07% (18 out 29) respectively, at EC-TEL'09 almost all registered users – 96.23% (26 out of 27) - decided to invest times into making schedules. This observation was also confirmed in our

discussions with attendees. A number of them pointed that a single-stream event does not provide strong motivation to invest into learning and using a schedule planner.
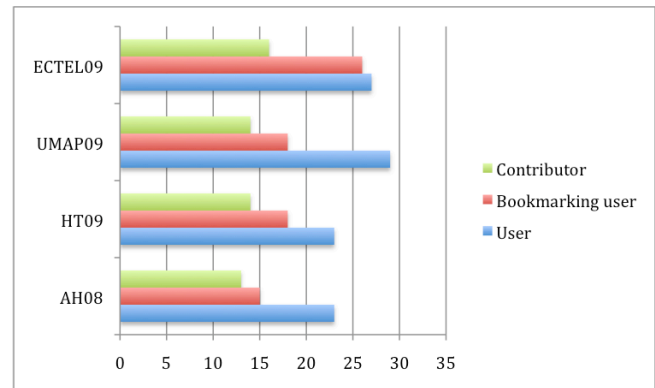
Figure 8 Participants

In contrast, the percentage of users who contributed bookmarks to their communities was more stable and less affected by the complexity of the conference: 86.67% (13 out of 15), 77.78% (14 out of 18), 77.78% (14 out of 18), and 61.54% (16 out of 26) for AH'09, HT'09, UMAP'09, and EC-TEL'09, respectively. Note that unlike the action of bookmarking a paper, which was useful for creating an individual schedule, the action of contributing a paper to the community had value to the community, not to the contributing user. In this context, the fact that a relative large fraction of users became community contributors is very encouraging. It provides evidence that our community-fuelled recommendation approach does work.

Questionnaire

The questionnaire distributed to the conference participants was designed to evaluate the community-based features of the system. The questionnaire included 12 short questions for AH'08, 15 for HT'09, 13 for UMAP'09, and 13 for EC-TEL'09. A number of questions vary from the features we implemented more for specific conference.

Social Annotations Usefulness and Attractiveness
A set of questions was asked about the usefulness and attractiveness of social annotations. 80% of participants found the social annotations easily noticeable. 75% agreed that social tags were useful. 55% were neutral that social comments were useful. Generally, they found the social annotations quite useful in planning the schedule.

Navigational Tools/Gadgets Usefulness
The next set of questions asked about usefulness of each navigational tools/gadgets in the conference summary and personal schedule. For the conference summary, the users agreed that the presence of top ten of annotated and visited papers were useful. Also, they strongly agreed that tag cloud was useful. The reaction to the presence of active users and top ten of active communities was neutral. In

personal schedule, 75% of users agreed that tag cloud was useful. 70% of them agreed that indicating co-bookmarking users was useful. At the same time, the reaction to the presence of related communities was neutral.

Calendar Exporting Features
Another set of questions focused on the exporting feature and ability to hide some information. We provided the option to export a paper to BibSonomy at HT'09 and EC-TEL'09. Surprisingly, this user reaction on the usefulness of this option was neutral. The attitude to exporting the schedule to iCal feature was also neutral, probably because not many users were using iCal. More interesting was the contrast between a very positive reaction to the ability to hide comments and a neutral reaction to the ability to hide tags. It shows that unlike commenting, tagging is considered by most users as a community-oriented action.

Comments/Suggestions to Conference Navigator
The last question was left open allowing the users to comments or suggestions. Interesting is that a number of comments asked for a mobile version of the system. For example, a HT'09 users wrote: "*I was also using a mobile device that didn't support the AJAX portal. For the next version, it would be useful to have a version compatible with mobile devices*", and "*Provide a version for download on the mobile phone, since I didn't use much of it while at the conference*". An EC-TEL'09 pointed: "*The conference planner needs to be available in advance of the conference, as when I go, I will have made up at least 50% of my schedule already. I would prefer an iPhone app to a website*". Some users complained about the performance of the system, for example, one from UMAP'09 said, "*Performance could be improved - loading the page sometimes was a drag*" and one from EC-TEL'09 said, "*The software is very slow and thus using it is not easy*". Some users complained that the number of users in the system was too small, "*I think the system may have been useful, but the small user group making use of the system limited this usefulness ...*".

CONCLUSION & FUTURE WORK
The current work presents our design for a community-based conference navigator system that collects the wisdom of the community in order to guide individuals making decisions about attendance at papers presented at a large conference. We have presented the design and an evaluation of the system. We plan to implement with other approaches such as content-based filtering [6], collaborative filtering recommendation [8], tag-based recommendation [7] and so on. We are working on improving the performance of the system since users complained about the slow response. Another goal is to create a mobile version of the system, because using the system on laptop only was not convenient for many users.

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