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Recommendation of scholarly venues based on dynamic user interests



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ABSTRACT

The ever-growing number of venues publishing academic work makes it difficult for researchers to identify venues that publish data and research most in line with their scholarly interests. A solution is needed, therefore, whereby researchers can identify information dissemination pathways in order to both access and contribute to an existing body of knowledge. In this study, we present a system to recommend scholarly venues rated in terms of relevance to a given researcher's current scholarly pursuits and interests. We collected our data from an academic social network and modeled researchers' scholarly reading behavior in order to propose a new and adaptive implicit rating technique for venues. We present a way to recommend relevant, specialized scholarly venues using these implicit ratings that can provide quick results, even for new researchers without a publication history and for emerging scholarly venues that do not yet have an impact factor. We performed a large-scale experiment with real data to evaluate the current scholarly recommendation system and showed that our proposed system achieves better results than the baseline. The results provide important up-to-the-minute signals that compared with post-publication usage-based metrics represent a closer reflection of a researcher's interests.

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1. Introduction

In addition to the variety of challenges researchers face from the rising number of scholarly events and venues, the important task of identifying relevant publication opportunities is further complicated due to the expansion and overlap of what were previously discrete specializations. More and more collaboration is taking place between disciplines in the research landscape, which is leading to decreased compartmentalization overall. Increasingly complex academic sub-disciplines and emerging interdisciplinary research areas, though certainly a net gain for the community as a whole, compound this problem. In such a sophisticated research environment, researchers are finding it challenging to remain up to date on new findings, even within their own disciplines (Kuruppu & Gruber, 2006; Murphy, 2003). Furthermore, “context-drift” in scholarly communities is becoming more prevalent as researchers expand, evolve, or adapt their interests in rapidly changing subject areas.

Generally, researchers become aware of scholarly venues related to their research interests by word of mouth from lab members, departmental colleagues, and members of other scholarly communities; through online searches for scholarly

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material; and from rankings of venues and publishers' reputations (Buchanan, Cunningham, Blandford, Rimmer, & Warwick, 2005; Chu & Law, 2007). In the past, these approaches have yielded satisfactory results, as there were relatively few venues related to any given field. However, in today's multifaceted, diverse, and interdisciplinary scholarly environment, researchers can become acquainted with newly available and relevant specialized venues only by spending considerable time and effort explicitly searching for venues that align with their research interests.

It is also essential for funding agencies to become aware of new avenues of research across fields in order to determine future allocations. Further, new interdisciplinary research areas lead to greater challenges for research institutes as they strive to understand dynamic information needs and information-seeking behaviors. Information specialists need prompt and seamless measurements of researchers' readings in order to make decisions on venue subscriptions, instead of relying blindly on the venue's impact factor or on users' explicit requests. For example, Springer provides its users with a form for recommending journals to librarians (Springer, 2015), but this feedback represents only the interests of the individuals who submit recommendations, rather than providing a picture of the entire constituency's needs.

Many rankings of scholarly venues have been created and used to help researchers become more aware of specific scholarly communities. However, knowing that very prestigious journals, such as *Science* and *Nature*, are considered top venues for multidisciplinary fields does not help researchers seeking more specialized venues and communities. Moreover, traditional citation analysis cannot provide quick, adaptive results, especially for new scholarly venues that do not yet have an impact factor.

A number of online services provide collections of venues in an attempt to alleviate some of these problems. For example, the HCI Bibliography (Perlman, 1991) is a specialized bibliographic database on Human-Computer Interaction.¹ AllConferences and Lanyrd are global conference and event directories.² ConferenceAlerts,³ EventSeer,⁴ and WikiCFP provide notifications of upcoming academic events based on keywords.⁵ ConfSearch (Kuhn & Wattenhofer, 2008) enables researchers to search for computer science conferences using keywords, related conferences, and authors. ConfAssist (Singh, Chakraborty, Mukherjee, & Goyal, 2016) classifies conferences as top-tier or not.

However, in this era of big data, retrieving relevant results by manually searching and browsing online is no longer the only approach to discover new information, not is it generally the most efficient approach. Studies have been conducted in an effort to offer techniques capable of accelerating scholarly discovery, such as summarization, visualization (Gove, Dunne, Shneiderman, Klavans, & Dorr, 2011), and collaborative information synthesis (Blake & Pratt, 2006). Recommender systems have been introduced to filter the overwhelming amount of data by using various data analysis techniques to alleviate information overload (Shenk, 1997; Speier, Valacich, & Vessey, 1999). Recommender systems are already entrenched in the digital landscape, as they provide millions of online users with continually updated suggestions for news, books, restaurants, tourism, movies, and television programs.

With the proliferation of publications, researchers are utilizing academic social networks and reference management systems in order to find, store, and manage references (Farooq, Song, Carroll, & Giles, 2007). Social and online reference management systems enable users to bookmark references to research content, as well as tag, review, and rate research content within their profiles. Scholarly tools such as these play an essential role in the organization of personal article collections and the generation of bibliographies across the research landscape today. Scholarly communities are sharing these digital reference libraries, and this open sharing encourages the formation of new research groups. Such online personal collections or repositories also accurately reflect researchers' current and past reading, and indicate changes in their interests over time, making these datasets prime targets for recommendation analytics.

In previous work (Alhoori, 2016; Alhoori & Furuta, 2011), we found that several of the participating researchers expressed a notable desire to be aware of new and well-established scholarly venues and events related to their shifting research interests. In this paper, we build a personal measure for evaluating venues based on user-centric altmetrics and analysis of readings, rather than relying on conventional citation-based metrics. Then, we augment the researchers' awareness and recommend semantically related scholarly venues based on their interests. In creating this measure, we draw on data from CiteULike,⁶ a well-known social reference management system.

This paper is structured as follows: In Section 2, we discuss related work. In Section 3, we describe an approach for measuring an implicit rating for scholarly venues by monitoring researchers' behavior. In Section 4, we explain the data collection and the experiments. In section 5, we present and discuss the results.

2. Related work

Recommender systems streamline and augment a person's decision-making process, especially when inadequate information is available with which to make an informed decision (Resnick & Varian, 1997). One well-known recommender

¹ <http://www.allconferences.com/>

² <http://lanyrd.com/>

³ <http://www.conferencealerts.com>

⁴ <http://eventseer.net/>

⁵ <http://www.wikicfp.com/>

⁶ <http://www.citeulike.org/>

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