SIGIR 2006 DOCTORAL CONSORTIUM

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Categories and Subject Descriptors
H.3 Information Storage And Retrieval H.3.0 General, K.3.2 Computer and Information Science Education

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Keywords: Information retrieval.

INTRODUCTION
The third SIGIR Doctoral Consortium is being run as part of SIGIR 2006 in Seattle, Washington. The purpose of the Consortium is to provide doctoral students with a forum, in which to discuss their PhD thesis proposal with experienced information retrieval (IR) researchers and other doctoral students. An important motivation in establishing the Consortium was to enrich the level of interaction between students and experienced IR researchers, and especially for those students from developing research groups. The Consortium also provides an opportunity for students to establish a supportive community of other doctoral students at the same stage as themselves.

Student participation is based on a submitted paper, which was reviewed by the Consortium Program Committee (CPC). In this third year of operation, we received 17 submissions, of which 9 were accepted. Student participants study in four countries, and present a broad range of perspectives on our field.

The process for submitting, selecting and publishing Consortium papers is as follows. Prospective student attendees submitted a four page technical paper, together with a one page "case for attending" prepared by the student and his/her advisor. Each submission was reviewed by two CPC members, based on technical considerations and on the perceived benefit of attendance. Abstracts of the accepted papers are included below as part of this paper. Students were also encouraged to submit posters or full papers based on the Consortium paper to the main SIGIR Conference, and some students took advantage of this opportunity for wider dissemination of their work.

The event itself takes place on the Tutorials Day of the SIGIR Conference. The format of the day is: short presentations of the papers with discussion in plenary session; detailed discussion between each student and two members of the CPC; and social interaction over lunch.

Financial support for student travel was generously provided by the ACM SIGIR. The SIGIR Conference Chair kindly agreed to cover the running costs of the Consortium. We also acknowledge Springer Science+Business Media for supporting the "Doctoral Consortium Award".

The Doctoral Consortium is a permanent event within the annual SIGIR Conference, and is contributing to the development of new researchers in the field, and hence to the growth of the international IR community. The Consortium is evolving based on our experiences in running the event, and on feedback from the participants and the community.

Finally, as Co-Chairs, we would like to express our profound thanks to the members of the Consortium Program Committee for their efforts in reviewing both papers and abstracts, and for participating in the Consortium.

They are:

Bruce Croft, *U. Massachusetts, USA*
David Hawking, *CSIRO, Australia*
Doug Oard, *U. Maryland, USA*
Stephen Roberton, *Microsoft Research, Cambridge, UK*
Mark Sanderson, *University of Sheffield, UK*
Carolyn Watters, *Dalhousie University, Canada*
Ross Wilkinson, C*SIRO, Australia*

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STUDENT ABSTRACTS

The Importance of Topic Shift in XML Retrieval

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Abstract:
A retrieval unit for content-oriented XML retrieval is an XML element that not only contains information relevant to the users request, but can also provide the right level of granularity. This work aims at exploiting the content, logical structure, and semantic decomposition of XML documents, to determine the right level of granularity in XML retrieval. XML documents can be semantically decomposed through the application of a linear topic segmentation algorithm. Based on this decomposition and using the hierarchical nature (i.e., the logical structure) of XML documents, this research defines a new measure, topicality, to reflect the number of topic shifts in an XML element and investigates the applications of the so-called topicality in content-oriented XML retrieval. The investigation makes use of the INEX data sets and allows to determine whether topicality constitutes an additional source of evidence and how and in which type of ad-hoc retrieval tasks it can be used to determine proper retrieval units for XML retrieval.

Towards More Accurate Email Classification

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Abstract:
Email is a typical example of a personal document collection which is often organised according to user preferences. The use of email is rapidly increasing, which leads to difficulties in its management. It takes email users much time and cognitive effort to file their emails. This research aims to improve the accuracy of email classification, which is automatically categorising emails into user-defined folders.

Email classification is a multi-faceted classification problem: the topic of each email folder is highly subject to individual preferences and often changes over time. New email folders are constantly being created, which results in a lack of training documents because these folders usually contain only a small number of emails.

The proposed research starts by investigating how email users use folders to categorise their emails and how this changes over time. We then turn to address the issue of lack of training documents by examining existing techniques and introducing a novel classification algorithm which combines the strengths of *k*-Nearest Neighbour and centroid-based classification. In order to address the dynamics of email classification environments, we will investigate the re-training issues of text classifiers and explore the possibility of incorporating time information into email classification. To validate our experimental results, an email classification prototype will be implemented and assessed by evaluation metrics such as precision, recall and the *F*-measure and a number of statistical analyses including the paired-t test, Bonferroni correction and ANOVA.

Searching People Sharing Similar Interests from the Web

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Abstract:
On WWW, there are very limited ways of finding a group of people sharing similar interests or background. The easiest approach is to store a profile for each web user in a well-organized social matching database, such as Match.com, which is unlikely to implement. Another option is to utilize search engines where users can browse through the search results to see who author the web pages of their interests, but this approach is ineffective and time consuming. .

The framework and algorithms proposed in this study are based on the assumption that a person's personal website can be viewed as his/her own selective representation of himself/herself, in terms of interests and background. Given a person, to find similar people from the Web, the two major research problems are person representation and matching persons. The matching process will take person representation into consideration to allow the same representation to be used when composing the query. In other words, if persons can be represented by their own websites, then the search query (a person) can be represented as a personal website of a person as well. So the ultimate research question becomes: given a person's website, how can the system find other people's personal websites semantically related to the provided website? Under the proposed framework, the main proposed algorithm will integrate the textual content and hyperlink information of all the pages belonging to a personal website for representing a person and matching persons. It also exploits the site structure and characteristics of personal websites. Other algorithms are also explored and compared to the main proposed algorithm.

Cluster-Based Retrieval from a Language Modeling Perspective

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Abstract:
The most common approach to cluster-based retrieval (CBR), which was proposed in 1970s, is to retrieve one or more clusters in their entirety to a query. Research in this area has suggested that "optimal" clusters exist that, if retrieved, would yield very large improvements in effectiveness relative to document-based retrieval (DBR). However, no real retrieval strategy has achieved this result. Except for precision-oriented searches on very small data sets, DBR is found to be generally more effective. There has been a resurgence of research in CBR in the past few years

including our own efforts in this area. The general approach is to use clusters as a form of document smoothing. Studies have shown that clusters can indeed be used automatically to improve retrieval performance on modern test collections and the language modeling framework is an effective probabilistic retrieval framework for studying CBR. The reported results are encouraging but there is still large room for improvement as compared to what optimal clusters could potentially produce if they were retrieved.

In the proposed research, I will examine the optimal and real performance of CBR with the goal of identifying the characteristics of optimal clusters. I intend to develop a set of techniques that will address several aspects of CBR, including systematic modeling of document-cluster relationships, different ways of representing clusters for retrieval, and possibly a new retrieval model that is more suitable for CBR. The analysis and evaluations will be performed on substantially larger data sets than used in previous studies. Preliminary experiments on TREC test collections demonstrate the promise of this research.

User-Centered Adaptive Information Retrieval

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Abstract:
Information retrieval systems are critical for overcoming information overload. A major deficiency of existing retrieval systems is that they generally lack user modeling and are not adaptive to individual users; information about the actual user and search context is largely ignored. For example, a tourist and a programmer may use the same word ``java'' to search for different information, but the current retrieval systems would return the same results.

In the proposed research, we will study User-Centered Adaptive Information Retrieval (UCAIR), which aims at capturing and exploiting user context in the retrieval process. We propose a decision theoretic framework for optimizing an interactive retrieval system through implicit user modeling. In the proposed new retrieval paradigm, the user's search context plays an important role and the inferred implicit user model is exploited immediately to benefit the user. We also propose several context-sensitive retrieval algorithms based on statistical language models to combine user context information with the current query for better ranking of documents. Using these techniques, an intelligent client-side web search agent will be developed, which can perform eager implicit feedback, e.g., query expansion based on previous queries and immediate result reranking based on clickthrough information. We will study how to use TREC data set to create a test collection with search context information for quantitatively evaluating the proposed algorithms. We will also design and conduct user study to further investigate the effectiveness of these algorithms in real applications.

Personal information retrieval

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Abstract:
A personal information retrieval tool, offering a unified search interface to all data sources available to a user and operating with some degree of knowledge of the user's preferences and context, seems desirable in light of the vast amount of information available in electronic form. Such a tool however raises challenging research questions in areas include source discovery and selection, result merging and presentation, making use of context, and evaluating the tool's success or failure.

New algorithms for server selection, which need little knowledge of server holdings, have proved useful in a ``natural'' testbed based on web tasks and data. A new technique has also been developed and tested for evaluating IR systems, or components, in a context-laden, dynamic environment with private information sources and queries. Future plans include using these new techniques to compare methods for result merging and presentation, and for exploiting context.

Probabilistic Relevance Models for Collaborative Filtering

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Abstract:
Collaborative filtering aims at predicting the user interest for a given item based on a collection of user profiles. In general, it is formulated as a self-contained problem, apart from classic approaches for text retrieval, e.g. RSJ models and language models.

We propose Multiple Valued Relevance Models (MVRMs), which extend current probabilistic relevance models of text retrieval to the related problem of collaborative filtering. Besides the instant benefits gained from the current advances in these text retrieval models, the MVRMs also give us the theoretical insights of the problem of collaborative filtering. For instance, the derived *user generation* and *item generation* models show that the previous user-based and item-based approaches are only two different factorizations with different independence assumptions. Most importantly, the derived *user-item generation* model provides a unified probabilistic framework to combine the two factorizations. Our results obtained so far indicate that the proposed models are indeed more robust against data sparsity and give better recommendations.

Under the framework established from the proposed models, we plan to address the following interesting problems. Firstly, to tackle data sparsity, we will explore smoothing techniques. Secondly, to deal with different scenarios in recommender systems and further complete the models, we will conduct an investigation on the possible integration of other text retrieval techniques (e.g. query expansion, relevance feedback). Thirdly, since our methods are general models for co-occurrence data, it is

also worthwhile seeking the possible usage of the models beyond collaborative filtering, e.g. unifying the document and query generation in text retrieval by applying the proposed user-item generation model.

Retrieval of Opinions and Attitudes in Weblogs and Emails

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Abstract
Informal text genre such as emails, mailing lists, Usenet, weblogs, and speech embodies human opinions and/or attitudes related to a topic. There are numerous applications where retrieving opinions and attitudes in informal text is critical. Users such as politicians, policy makers, police, journalists, survey researchers, sociologists, and individuals may want to retrieve aggregate and individual attitudes and opinions about a topic, and the polarity and strength of attitudes. This proposed research is motivated by these tasks. Most previous studies on the computational approaches to sentiment, opinion, attitude, affect, and emotion have treated these concepts as the same and have applied linguistic and machine learning techniques to compute a semantic orientation of a document by summing up the semantic orientations of all words or sentences in the document, and then to classify product reviews, movie reviews, news articles, and Web pages into subjective vs objective, positive vs negative categories, etc. However, opinions and attitudes are different concepts, and they have different structures, functions, and values. Therefore this research proposes to apply a user-centered system design approach to distinguish attitudes from opinions in the context of weblogs and emails, to address the interaction between topical terms and attitudinal terms in queries, and to apply cross-language retrieval techniques to support the retrieval of opinions and attitudes about a topic expressed in foreign languages.

LitLinker: A System for Searching Potential Discoveries in Biomedical Literature

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Abstract:
The explosive growth in biomedical literature has made it difficult for researchers to keep up with advancements, even in their own narrow specializations. While researchers formulate new hypotheses to test, it is very important for them to identify connections to their work from other parts of the literature. However, the current volume of information has become a great barrier for this task, and new automated tools are needed to help researchers identify new knowledge that bridges gaps across distinct sections of literature.

To address this problem, we propose a knowledge discovery system called LitLinker that incorporates knowledge based methodologies, natural language processing approaches, statistical methods and information extraction algorithms to mine the biomedical literature for new, potentially causal connections between biomedical terms. The goal in this research is to develop a new type of information retrieval approach that both will help researchers bridge gaps across specializations and will improve their ability to identify new research directions. In this paper, we will discuss the main design challenges of LitLinker and present our proposed solutions. We will also describe our fully automated quantitative evaluation methodology that can be run over multiple examples and our user centered evaluation plan designed to measure the overall performance of LitLinker from medical researchers' perspectives.

Tutorials

Conducting Interactive IR User Studies
Diane Kelly & David Harper

The Study and Practice of Personal Information Management
William Jones & Jacek Gwizdka

Introduction to Web IR
Ricardo Baeza-Yates & Andrei Broder & Prabhakar Raghaven

Statistical Language Models for IR
ChenXiang Zhai

Machine Learning for IR
Yi Zhang & Rong Jin

Introduction to Web Advertising
Andrei Broder & Prabhakar Raghaven

Using the Lemur Toolkit for IR
Trevor Strohman & Paul Ogilvie

XML Information Retrieval
Mounia Lalmas & Ricardo Baeza-Yates

Workshops

Adversarial Information Retrieval on the Web (AIRWeb 2006)

Organizers: Tim Converse, Brian D. Davison, Marc Najork

AIRWeb 2006 connects researchers and practitioners that are passionate about the on-going efforts in adversarial information retrieval on the Web, such as web spam, link-bombing, comment spam, splogs, referrer spam, search engine optimization, and more.

URL: http://airweb.cse.lehigh.edu/

Evaluating Exploratory Search Systems (ESS 2006)

Organizers: Ryen White, Gheorghe Muresan, Gary Marchionini

Exploratory Search Systems (ESS) support learning and investigation. They can be effective in situations where: searchers struggle to formulate queries, they must navigate complex information spaces, the search task requires browsing and exploration, or system indexing is inadequate. This workshop gathers researchers to discuss the formative and summative evaluation of ESS.

URL: http://umiacs.umd.edu/~ryen/eess

Faceted Search

Organizers: Andrei Z. Broder, Yoelle S. Maarek

Faceted search enables users to navigate a multi-dimensional information space by combining text search with a progressive narrowing of choices in each dimension. It has become the prevailing user interaction mechanism in e-commerce sites and is being extended to deal with semi-structured data, continuous dimensions, and folksonomies. The workshop will discuss all aspects of faceted search, from underlying technology to user interfaces and commercial use.

URL: http://facetedsearch.googlepages.com/

Geographic Information Retrieval (GIR06)

Organizers: Ross Purves, Chris Jones

This workshop will address all aspects of Geographic Information Retrieval - that is the provision and evaluation of methods to identify geographic scope, retrieve and relevance rank documents or other resources from both unstructured and partially structured collections on the basis of queries specifying both theme and geographic scope.

URL: http://www.geo.unizh.ch/~rsp/gir06

New Directions In Multilingual Information Access

Organizers: Fredric C. Gey, Noriko Kando, Carol Peters, Chin-Yew Lin

This workshop will summarize the current state of research and development in multilingual information access, including among others, cross-language information retrieval, cross-language question answering, multilingual, multi-document summarization. Practical issues in implementing large-scale multilingual digital libraries will be a focus.

URL: http://ucdata.berkeley.edu/sigir2006-mlia.htm

Open Source Information Retrieval (OSIR 2006)

Organizers: Michel Beigbeder, Wray Buntine, Wai Gen Yee

The goal of the Open Source Information Retrieval Workshop (OSIR) is to bring together practitioners developing open source search technologies to share their recent advances, and to coordinate their strategy and research plans. The intent is to foster community-based development, to promote distribution of transparent Web search tools, and to strengthen the interaction with the research community in IR.

URL: http://www.emse.fr/OSIR06/

Personal Information Management: Now that we're talking, what are we learning?

Organizers: William Jones, Nicholas Belkin, Ofer Bergman, Robert G. Capra III, Mary Czerwinski, Susan Dumais, Jacek Gwizdka, David Maier, Manuel A. Pérez-Quiñones, Jaime Teevan

Good research relating to Personal Information Management (PIM) is being done in several disciplines including database management, human-computer interaction, artificial intelligence and, certainly, information retrieval. This two-day workshop will continue momentum towards building a community of researchers doing PIM-related research.

URL: http://pim.ischool.washington.edu/pim06home.htm

Stylistics for Text Retrieval in Practice

Organizers: Shlomo Argamon, Jussi Karlgren, Ozlem Uzuner

This workshop will focus on the practical craft of style analysis in natural language texts. Participants are expected to bring with them a method for applying stylistic analysis to information access tasks. Before lunch, methods are discussed in session; after lunch, demonstrated in practice.

URL: http://www.lingcog.iit.edu/style2006

XML Element Retrieval Methodology

Organizers: Andrew Trotman, Shlomo Geva

XML-IR evaluation experiments have shown improvements in retrieval precision, while at the same time raising new questions about methodology, application, use, and so on. For example, how should we assess the success of XML-IR systems in relation to the suitability of user models, tasks, and interfaces? This workshop will allow researchers to present and discuss their ideas, to form new collaborations, and to help define research community experiments on a scale that cannot be carried out even by relatively large individual groups.

URL: http://www.cs.otago.ac.nz/sigirmw/

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