InformeR

British Computer Society Information Retrieval Specialist Group

Introduction

Welcome to the Spring issue of the Informer whose release date coincides with the forthcoming 24th BCS-IRSG European Colloquium on IR Research to be held in the heart of the buzzing city of Glasgow. For details of the colloquium and information on last minute registration, check out the website at http://www.cs.strath.ac.uk/ECIR02/.

In this issue of the InformeR we are running an article, the second in the planned series, on IR research groups throughout the world. This time the group at Dortmund University in Germany is to be featured.

Our industry report focuses on View Based Systems Ltd who have recently developed and installed an IR system for the National Health Service. Interestingly the theory behind the system had been presented at a previous BCS-IRSG colloquium and this is a good example of the successful transfer of developed technologies from research to commercial systems. The next issue of the InformeR will continue this series of Industry Reports with an article focusing on the IR activity of Reuters Limited.

A report on the outcome of IR research which had been funded by the last round of grants awarded by the Council for Museums, Archives

Glasgow – The Friendly City

and Libraries is given by Ian Ruthven of Strathclyde University. Further issues of the InformeR will run additional reports on recently completed IR research projects the output of which should be of interest to many InformeR readers.

In the next issue Andrew MacFarlane the BCS-IRSG's very own *webmeister* will be reporting back from the 25th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, which is being held in Tampere, Finland.

The next issue of the InformeR sees the start of a new series of articles which features a number of well known figures within the IR research community looking back and reflecting on some of - what they consider to be - the most significant landmarks in the development of IR. Keith van Rijsbergen will present the first article in the series.

Finally, if you have any comments, positive or negative (though positive ones are especially solicited!), then please get in touch with the editorial team. We are keen to hear your views on the InformeR and are also on the lookout for any news or contributed articles from our readership.

Hope to see you in Glasgow in March!

Regards,
Mark Girolami
Editor

Contents

IR Group Focus –

Dortmund University

University of Dortmund

Department of Computer Science

Information Retrieval Group

In this edition of the Informer we look at one of the many Information Retrieval groups on the continent, the Information Retrieval group at the University of Dortmund. Headed by Professor Norbert Fuhr, they are interested in a variety of applications of Information Retrieval, but lately have been focusing their attention to digital libraries, XML retrieval, and multimedia retrieval. In this article we present the history, the people and some of their current projects.

History and research topics of the Dortmund IR group

The Dortmund IR group started in 1991, when Norbert Fuhr was appointed Professor at the Computer Science Department of the University of Dortmund. In the same year, the specialist IR group of the German informatics society (GI) was founded. The charter of this specialist group defines Information Retrieval as a discipline which deals with uncertainty and vagueness in all kinds of information systems. Following this broad concept, the Dortmund IR group is mainly interested in extending IR models and methods for dealing with problems beyond the classical text retrieval task. In particular, the combination of concepts from IR and database systems is an ongoing theme of the work in Dortmund, with applications such as relational databases, multimedia information systems, distributed digital libraries, and XML documents.

As theoretic background for the new types of applications, the group combines Norbert Fuhr's earlier work on probabilistic IR models with logic-based approaches. A major outcome of this work was the development of probabilistic Datalog during the ESPRIT project FERMI (1994-1997), which focused on retrieval methods for multimedia documents. Based on this model, the retrieval engine HySpirit was implemented, which offers flexible and efficient retrieval mechanisms even for large data sets. Subsequently Dr. Thomas Rölleke a former member of the group, commercialized the HySpirit retrieval engine, founding a start up company bearing the same name in 1999.

During the mid-90's, there was a move towards multimedia information systems and digital libraries (DLs) becoming an important area of application. Since 1995, the group has focused on developing techniques in this field. Some of the other areas that the group has recently worked and is currently working on include:

Networked IR

In the projects MeDoc (1995-1997), Interdoc (1998) and MIND (2001-2002), the group works on the development of new probabilistic models for resource selection and result fusion, addresses the issue of heterogeneity with respect to the database schemas and retrieval methods, and extends these approaches for retrieving multimedia data.

XML retrieval

The goal of the projects CARMEN (1999-2001) and CLASSIX (2002-2004) is the development of IR methods for XML documents. A major result is the development of the query language XIRQL and its implementation within the new retrieval engine HyREX, which is also used in CYCLADES project (2001-2003) for the retrieval of records from Open Archives.

User-oriented retrieval methods

Based on the ideas of Bates et al., the DAFFODIL project (2000-2004) develops a new front end for federated digital libraries that supports high-level search activities in an adaptive and proactive way.

Evaluation of Digital Libraries

Within the DELOS Network of Excellence (2000-2002), Norbert Fuhr leads the working group "Digital Library Test Suite" aiming at the development of evaluation methods and test beds for digital libraries. In cooperation with the FOCUS project (2000-2002), a test bed for full text retrieval of XML documents will be developed this year.

The members of the Dortmund Information Retrieval

Group Leader

Professor Norbert Fuhr

In 1991, Norbert became the first chairman of the then newly founded German Informatics Society – Specialist IR Group

IR Group Members

Mohammad Abolhassani

Gudrun Fischer

Gudrun is hopping between the thousands Open Archive data islands of CYCLADES!

Norbert Gövert

Norbert works on HyREX, but also enjoys Charles Schulz's Peanuts!

Kai Großjohann

Claus-Peter Klas

Henrik Nottelmann

Henrik will be attending the ECIR 2002 – Are you?

Projects

Continuing from their successes in the past, the Dortmund IR group are now working on a plethora of projects. Some of these include: a classification and intelligent search engine for information in XML format (CLASSIX), the development of effective methods for dealing with the retrieval of structured documents (FOCUS) and the development of distributed agents which facilitate user friendly access of digital libraries (DAFFOFIL). Following we present a few details about four of their major projects; HyREX, MIND, DAFFODIL, and CYCLADES.

The HyREX Project

The HyREX project is an ongoing effort (funded as part of other project like e.g. CARMEN, CYCLADES and CLASSIX) for developing an IR engine for XML documents. The main collaborators from the Dortmund Information Retrieval group are Mohammad Abolhassani, Norbert Fuhr, Norbert Gövert, and Kai Großjohann.

The current W3C activities for the development of a standard query language for XML (XQuery) are targeting towards database-oriented applications and thus do not consider the needs of IR. In contrast, the Dortmund group focuses on document-oriented XML applications, where retrieval must take into account the intrinsic imprecision and vagueness of IR.

For this purpose, the query language XIRQL (XML IR Query Language) has been developed, which extends the XPath part of the (proposed standard) query language XQuery by the following features:

Weighting and ranking

Whereas XQuery supports Boolean retrieval only, XIRQL allows for weighting document terms as well as query terms. For the former, it is assumed that the weight of a term depends on its context (the definition of these contexts is given as part of an extended DTD). The underlying probabilistic model treats all term occurrences within the same index node as a single probabilistic event. Query processing produces a Boolean combination of these basic events, for which the correct probabilities can be computed (following the concept of event expressions from probabilistic Datalog).

Relevance-oriented search

Traditional IR queries specify only the requested content, but pose no restrictions on the structure of the result. In this case, the IR system should be able to retrieve the most relevant parts of XML documents by choosing the most specific element(s) that satisfy the query.

Data types and vague predicates

Since XML allows for a fine-grained mark up of elements, there should be the possibility to use special search predicates for different elements of various data types (e.g. person names, dates, technical measurement values, names of geographic regions). For each data type, the system must provide appropriate search predicates, most of which should be vague (e.g. phonetic similarity of names, approximate matching of dates, and closeness of geographic locations).

It ain't cool if it ain't marked up!

Structural relativism

XML query languages allow for conditions with respect to the structure of the documents to be retrieved. In order to support uncertainty and vagueness for this type of conditions, appropriate methods ignore the difference between elements and attributes, searching for elements of a specific data type (e.g. search in all elements containing person names) or by exploiting hierarchies over element names defined in an ontology.
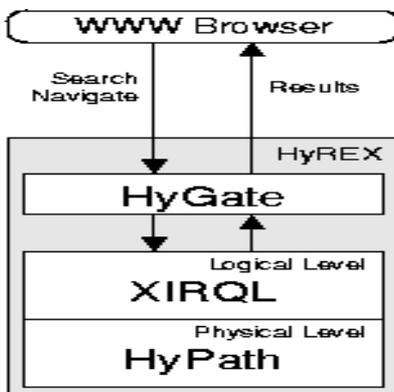
The architecture of HyREX

In contrast to XIRQL, XQuery offers additional operators for aggregation and restructuring of results. Further research will focus on appropriate extensions of XIRQL, i.e. probabilistic versions of the corresponding XQuery operators.

The XIRQL language is implemented within the HyREX (Hypermedia Retrieval Engine for XML) system. Its system architecture is similar to that of database management systems. Thus, there is a clear separation between the logical and the physical level.

At the logical level, XIRQL queries are transformed into a path algebra. A path describes the sequence of document nodes leading from the root of an XML document root to a specific element. The path algebra contains operators for manipulating sets of paths that describe intermediate results in query processing. After mapping a XIRQL query into a path algebra expression, the query optimization step transforms this expression into an equivalent one which (hopefully) can be processed more efficiently. Since users typically want to see the top ranking elements only, retrieval strategies focusing on these elements will be investigated.
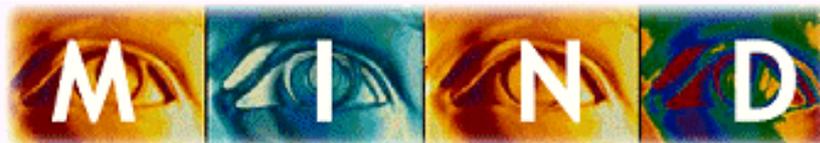
The connection between the logical and the physical level is formed by the vague predicates, which take a value and/or structure conditions as arguments and return a list of paths as result. In order to perform efficient retrieval, appropriate index structures have to be available at the physical level. Whereas classical inverted lists support value conditions only (indicating occurrence/weights of terms), XIRQL queries may also contain conditions referring to element names and/or indexes as well as to sequence and aggregation of elements. Since inclusion of the necessary information in the inverted list entries will lead to large storage overheads, appropriate compression schemes are investigated.

The development of a user interface to an XML IR engine poses a number of new challenges. HyREX currently supports only a simple Web browser interface where users may enter XIRQL queries and receive ranked lists of answers. For query formulation, several variants based on the concept of query by example are under consideration; as an example, either the DTD, the logical structure or the final layout of a specific document can be used. Visualization of results has to cope with the fact that different matches may occur within the same document, where even a match may contain others; here variants of tile bars and tree maps are studied.

Open Source software of the HyREX is available from http://ls6-www.cs.uni-dortmund.de/ir/projects/hyrex/.
The current version allows for efficient retrieval of XML document collections up to the gigabyte range.

MIND

The MIND is a Resource Selection and Data Fusion system for Multimedia International Digital Libraries. The project began in early 2001 and is due to be completed by mid 2003. It is sponsored by EU FP5 and involves several other institutes including the University of Strathclyde, the Universita di Firenze, the University of Sheffield and Carnegie Mellon University.

The all seeing mind's eye!

Norbert Fuhr and Henrik Nottelmann lead development of the project at the University of Dortmund.

The MIND project addresses problems associated with the emergence of thousands of heterogeneous multimedia Digital libraries distributed internationally on multiple platforms. Users typically have problems with resource selection, as they are unaware of the contents of each individual library in terms of quantity, quality, information type, provenance and likely relevance. When a set of relevant libraries has been selected, the user must organize and interpret the information in a common format and environment. This is performed through visual evaluation and ad hoc integration, which forces users to restrict their attention to a small subset of the information retrieved.

MIND attempts to assist users to know where to search, how to query different media, and how to combine information from diverse sources.

The University of Dortmund's Information Retrieval Group addresses the issues of resource selection and heterogeneity:

Resource selection

The basis is a decision-theoretic framework (developed by Dortmund) which will be refined within this project. Each database has assigned costs (covering retrieval quality, communication time, and monetary costs). Given a query (containing the number of documents to retrieve), the task is to compute (for efficiency, this number should be zero mostly) for every database the number of documents to retrieve from that database. Of course, the sum should equal the user-specified number of documents to retrieve, and the overall costs should be minimized.

Heterogeneity

The existing databases differ in terms of content and structure (schema) of its documents (e.g., they can distinct "editor" and "author"). Thus, the user query (specified against a global schema) must be translated for every database into a query fitting the database schema. This query transformation is based on uncertain predicate logic rules which will be learned from an example set.

DAFFODIL picks the best from a bouquet of digital libraries.

DAFFODIL

The DAFFODIL project (Distributed Agents for User-friendly Access of Digital Libraries) develops an agent-based front end for federated digital libraries. Based on the ideas of Bates et al., strategic support for information searches is provided by offering multiple ways for accessing literature; standard metadata search can be enhanced by invoking a thesaurus, browsing through a classification leads to documents of a selected category, the author network tool displays coauthor relationships in a graph, citing/cited publications of a given document are retrieved via the references tool, and the journal and conference tools support browsing through the respective tables of contents. In specific search situations, proactive agents suggest the invocation of these methods to the user, and the system is able to adapt its behavior to the user's preferences. In the near future, components for personalization and collaboration will be integrated in the DAFFODIL system. You can try it out at http://www.daffodil.de/!

CYCLADES

The Cyclades project aims to provide an open collaborative virtual archives environments. To be completed in mid 2003, Gudrun Fischer and Norbert Fuhr are working in partnership with Consiglio Nazionale delle Ricerche-Istituto di Elaborazione dell'Informazione, (IEI-CNR), European Research Consortium for Informatics and Mathematics ERCIM, Foundation for Research and Technology (FORTH) and Fraunhofer-Gesellschaft.

The CYCLADES logo!

The standards defined by the Open Archives initiative (OAi) provide uniform access (by defining a gatherer interface) to open, heterogeneous and distributed digital archives. The CYCLADES project aims at developing services on top of the OAi standard that support single users and user groups in their work with OAi conform archives. These services will include information retrieval

in distributed archives, searching and browsing in multi level hypertext, collecting relevance feedback and on-line annotations, and user profiling.

Architecture

The architecture consists of five main processes:

Access Service – which enables the harvesting and indexing of Metadata, the storage and retrieval of metadata records and the archival of such information.

Search & Browse Service – in the form of multilevel hypertext searching and browsing .

Collaborative Work Service – which facilitates the collaboration between individual scholars, members of project groups, and wider communities, via the use of Shared workspaces, Hierarchy of folders and Rating and annotation.

Collection Service - which allows structuring the information space and the provision for topic-based virtual archives.

A Filtering & Recommendation Service Recommend records to users, communities, and collections and filters query results based on their respective profiles.

Selected Publications

Fuhr, N.; Gövert, N. (2002). Index Compression vs. Retrieval Time of Inverted Files for XML Documents. (Submitted for publication.)

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Fuhr, N. (2000). Probabilistic Datalog: Implementing Logical Information Retrieval for advanced Applications. In: *Journal of the American Society for Information Science 51(2)*, pages 95-110.

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Further Information

For further information about the Dortmund Information Retrieval group or the projects they are involved with contact:

Professor Norbert Fuhr
Email: fuhr@cs.uni-dortmund.de

Or visit the group's website:
http://ls6-www.cs.uni-dortmund.de/ir/

View-Based Systems
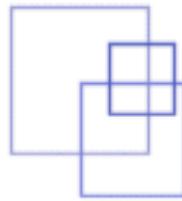
Have you got the look?

Industry Section

In this section, Dr. Steve Pollit, presents a brief article on the Implementation of View Based Systems for the National Health Service. Steve has been developing the idea with colleagues over the past couple of years. He is now implementing this system as the Technical Director of View Based Systems Ltd in collaboration with the University of Huddersfield

View Based Systems

Attendees at the Cambridge IR Colloquium in April 2000 (and others!) may be interested to know that the theory and design principles presented in the paper, "Navigating N-Dimensional Information Space with Data and Documents through View-Based Searching" by Steve Pollitt and Amanda Tinker, have since been extended and implemented for Workforce Planning in the National Health Service.

This approach to information retrieval provides workforce profiling and forecasting as part of an NHS Workforce Development system that leads to education commissioning, to create newly qualified staff and continuing professional development, to enhance the knowledge and skills of existing staff.

The system, originally commissioned by what is now the West Yorkshire NHS Workforce Development Confederation, is in use in Trusts across West and North East Yorkshire including one of the largest hospital complexes in Europe, Leeds Teaching Hospitals. Each Trust uploads data from their Human Resource System into a relational database and can view their total workforce by Staff Group, Service Area, Location, Contract Size (Whole Time Equivalent), Age, Gender and other attributes. The staff profiles can be viewed for snapshots for each planning year since 1999.

Questions such as "What is the age profile of Registered Nurses in the Cardiology Service" can be answered by a few clicks of the mouse and typing the odd letter or two: Select the Staff in Post object - select the current planning year – select the view "by Staff Group" - focus the view to "Registered Nurses" using a pull-down list - select the "by Service Area" view - focus the view to Cardiology using the pull-down list - Select the "by Age" view. At each stage the user can see profiles with statistics on the number of Whole Time Equivalent staff there are in each category on the different views.

In addition to the "Staff in Post" object the user can view "Trust Joiners" and "Trust Leavers" by Joiner Source, Leaver Destination and Reason for Leaving as well as the attributes listed above. Trust Staff Planning Managers can forecast new service developments and the anticipated staff losses and recruitment, registering reasons for service developments and recruitment and retention issues for individual staff groups. The number of staff groups has grown from 40 to 400 since the first implementation as the scope of the system has extended to include medical and non-medical health care staff and to accommodate improved differentiation of staff groups, such as for Diagnostic Radiography which requires a breakdown to CT Scanning, MRI and Ultrasound.

The common platform makes it possible to aggregate the data and provide Workforce Development Confederations with a staffing profile and forecasts for the Trusts they represent. Workforce Planners in Confederations have an additional view "by Trust" that enables them to achieve both an overall perspective on the workforce and to examine profiles at Trust level.

The profiling system has been developed using a generic view-based searching tool-kit and we are keen to see applications in other areas. Research and Development is being undertaken by Amanda Tinker at the University of Huddersfield as part of a PhD, applying view-based searching techniques to the University's Library OPAC using the deconstruction of the Dewey Classification Scheme to derive useful views onto the library database.

The system has come a very long way since the original efforts with CANSEARCH in the early 1980's, MenUSE and VUSE (remember Martin P Smith?) in the early '90s and HIBROWSE in the mid to late '90s. It has evolved to take on better ideas and principles and is now, at last, being exercised in the real world.

The approach is a very long way from free text query submission and ranking and has only received token interest at IRSG Colloquia and SIGIR demonstrations in the past. I hope we can interest more researchers and practitioners in the power of view-based searching with a fresh examination of its capabilities in the future.

Dr Steve Pollitt
Technical Director
View-Based Systems Ltd

For more information about view based systems visit http://www.view-based-systems.com. Alternatively, anyone interested in exploring partnerships for mutual benefit may contact Dr. Steve Pollitt via steve.pollitt@view-based-systems.com.

Project Section

Retrieval through explanation: an abductive inference approach to relevance feedback

In this project we examined the problem of relevance feedback: using relevance information from a user to automatically change the system's representation of a search. What we were particularly interested in was techniques that incorporated some notion of a user's search behavior. Specifically we used the notion of explanation: the system used information on the user's search behavior and the documents they marked relevant to form an explanation of what the user is interested in. This overall aim translated into three main objectives:

Objective one: Indexing

Traditional RF algorithms base query modification on terms, and the choice of which terms to use in a new query is based on the frequency of a term's appearance in relevant and non-relevant documents. Although this approach has facilitated the development of many successful RF models it does not capture the fact that a user's relevance assessments are not only based on a term's appearance within a relevant document. Rather relevance is a factor of what concepts the terms represent, the relations between these concepts, how users interpret them and how they relate to the information in the document.

What we want for RF, therefore, are representations of terms that help RF algorithms distinguish useful terms based on how the terms are used within relevant documents. For example a document may only be relevant if the terms appear in a certain context, if certain combinations of terms occur or if the main topic of the document is important.

In this phase of the project we investigated a set of term and document weighting schemes. Each of these weighting schemes reflected some aspect of how a term was used within a document or collection, or measured some aspect of a document's content such as its complexity.

We used these weighting schemes in a number of experiments. The experiments are detailed in [1] but can be summarized as follows:

- combining multiple sets of weighting schemes can improve retrieval effectiveness over using a small set of weighting schemes. However, this combination of

evidence approach is variable: it is difficult to predict one good set of weighting schemes to use for all collections, for all queries within a collection or for all query terms. That is, combination of evidence has the potential to be effective but is difficult to use consistently in practice.

- using relevance information can lead to the selection of good evidence. By analyzing the difference between the relevant and non-relevant documents for a query we can select which weighting schemes are good for individual query terms. That is, we can determine which aspects of a term's use are most likely to indicate relevant material.

- by selecting good weighting schemes for each query term we move RF from simply selecting terms to a process of selecting terms and selecting what features of terms indicate relevance.

Objective two: RF algorithms

In Objective one we concentrated on how a term should be represented in a modified query. In Objective two we examined how to choose the terms for query modification. We used the notion of abductive explanation, where an explanation is a description of a set of known events. In RF the known events are the documents a user has marked as being relevant. Therefore we seek methods of describing a set of relevant documents, where each description is a possible new query.

Abductive reasoning provides many ways of describing a set of complex objects such as documents. Each of these methods of describing objects – each type of explanation – priorities some

feature(s) of the relevant documents. For example, explanations may emphasise what features (terms) are common within the relevant documents, or what make the relevant documents different from the non-relevant documents. Each type of explanation corresponds to a different method of modifying a query. In [3] we showed that different types of explanations perform better for some queries than others. In other words we showed that different queries are more suited to different types of query modification (different types of explanation).

In [2, 4] we showed that user search behaviour could act as the basis for deciding which type of explanation is appropriate for individual queries. User search behaviour included information such as the number of documents a user assessed as being relevant and how many of the retrieved documents were examined by the user. This stage showed, albeit in a limited way, that how a user interacts with an IR system can be used to help the system decide what function RF should perform.

Objective three: RF at the interface

The final phase of the project examined how we could make RF a more intuitive process. RF is often presented as a black-box: users provide relevance information and the system modifies the user's query with little indication on why, or how, the query has been modified.

The use of explanations, Objective Two, allow us to present the user with information on why a query has been modified. The system selects the type of query modification (explanation) based on features of the user's interaction with the system. Therefore we can use these features to help the user understand what the system is trying to achieve. For example, the system may tell the user that it is trying to broaden the query (due to the lack of relevance evidence from the user) or that it is adding only a few terms to the query (if the user has marked many documents relevant).

In addition, the use of multiple weighting schemes, Objective One, allows us to present the user with information on how the new query terms are used when retrieving a new set of documents. For example the system can tell the user that they are looking for documents that contains a lot about a particular term, for any document that contains a term, or only documents where the term is related to the main topic of the document. The multiple weighting schemes allow the system to be more precise as to what kind of documents the new query will retrieve.

In our experiments we showed that this form of interaction led to more use of RF and was a consistently popular feature of our system, [Rut01, RLVR02b]. We also showed that incorporating user search behaviour into the process of ranking terms for query modification gave better search terms.

Summary

This project was specifically aimed at better integrating the user into the process of relevance feedback. The three main conclusions were that RF algorithms should consider more of the features that users consider when assessing relevance (Objective One), that user search behaviour is a useful indicator of what type of RF is appropriate for a search (Objective Two), and that users want and need more accessible methods of employing RF in real searches (Objective Three).

References

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Ian Ruthven
University of Strathclyde

Grants Awarded

The following grants have been recently awarded to fellow IR researchers. (If we have missed you out let us know and we'll gladly include your project in the subsequent editions, just send in the details.)

Concept-based Interactive Query Expansion Support Tool (CIQUEST)

Professor Micheline Beaulieu from the department of Information Studies at the University of Sheffield has been awarded an EPSRC Grant to the value of £80,518. The project is to be completed in September 2002.

Abstract

The project will investigate a concept-based approach to provide user support for query formulation and reformulation in searching large-scale textual resources such as those of the World Wide Web. Given that users generate broad and brief queries and then encounter difficulties in refining initial queries on the basis of items retrieved, the proposal is to explore methods for the automatic generation and organisation of concept structures derived from retrieved documents.

The work will further develop a novel approach to clustering document sets which produces a visualisation of hierarchical menus which offers a highly compressed and comprehensible overview of the underlying documents. The focus will be on improving the concept identification process, based on co-occurrence information by applying information extraction utilities and will also seek to widen the range of concept relationships through various text analysis techniques. The validation and effective visualisation of the generated concept structures will be a prime concern. A user interface will be built to incorporate the display and navigation of the concept structures to support interactive query expansion (IQE). It is envisaged that the concept tool will assist searchers in selecting relevant documents as well as selecting potential terms for query expansion. It could thus serve as a viable alternative or complementary approach to IQE based on relevance feedback. A major emphasis is to include user participation in all the elements under investigation and to take full account of user searching behaviour as well as retrieval effectiveness in the approach to evaluation. By operating on retrieved documents the concept tool can be regarded as a front end to a search engine and will be tested on documents retrieved by different Web engines as well as ranking systems such as Okapi and Inquery. It is anticipated that the project will also contribute to the evaluation methodology for interactive systems and in particular to the design of interactive experiments.

Further information about the project can be obtained from http://www.shef.ac.uk/uni/academic/I-M/is/home.html.

Effects of spatial-semantic interfaces in visual information retrieval: three experimental studies

Dr Chaomei Chen from the Department of Information Systems and Computing at Brunel University has been awarded an EPSRC Grant to the value of £51,295.

Abstract

Despite the proliferation of information visualisation techniques in the design of visual information retrieval systems, little is known about the effects of these techniques on users' search strategies and on their performance in information retrieval. Furthermore, it is not known whether there is a significant interaction between a particular visual representation and a range of cognitive abilities of individual users. Answers to these questions will have profound implications for the design and use of information retrieval systems.

The proposed research aims to investigate the effects of some of the most influential spatial-semantic interfaces for information retrieval. Notable examples of such interfaces include cone trees, multidimensional scaling models, associative networks, and self-organised feature maps. The research will analyse both quantitative and qualitative data regarding changes in users' search strategies and their performance across a range of visual information retrieval interfaces. The project will build a testbed for subsequent experimental studies which will include a number of data sets, such as the entire ACM Hypertext conference proceedings and a sub-set of the TREC document collection. The project will encompass three experimental studies with representative spatial-semantic interfaces:

- multidimensional scaling models,
- associative networks, and
- self-organised feature maps.

For further details about the spatial semantic interfaces in visual information, visit http://www.brunel.ac.uk/~cssrccc2/.

Image indexing and retrieval in the compressed domain

From the School of Computing at the University of Glamorgan, Professor Jianmin Jiang has been awarded a grant of £89,250. The project is due to be complete by October, 2002.

Abstract

Data compression is used to save computer storage space but also, more importantly, can be used to improve the efficiency of information retrieval and processing, since unnecessary redundancy has been removed in the compressed data. However, current image information systems store original images as pixel data. As the amount of storage required increases, data compression becomes essential. In such cases, the only possible way of using data compression to reduce the size of the database is to compress the population of images separately after each original image is analyzed and indexed. Decompression is then required before any automatic retrieval can be performed.

This project will investigate a number of original ideas to develop an image indexing and compression algorithm through which automatic image retrieval can be directly operated in the compressed data domain without any decompression being involved. In other words, data compression is embedded inside the indexing and retrieval algorithm and hence concealed from end users. This approach would not only save the cost of storage space for an automatic image indexing and retrieval system, but would also improve its efficiency in terms of search speed, retrieval accuracy and convenience of use.

An image database will be constructed to provide a research platform and algorithms will be developed for image indexing using multiple keys in the compressed data domain. The effectiveness, efficiency and usability of the system will be evaluated.

For more information about image indexing and retrieval in a compressed domain visit http://www.comp.glam.ac.uk/pages/staff/jjiang/.

Up and Coming Events

24th BCS IRSG European Colloquium on IR Research

Glasgow, Scotland, UK

March 25-27, 2002

The colloquium on information retrieval research provides an opportunity for both new and established researchers to present papers describing work in progress or final results. The Keynote speaker is Professor Richard Belew from the University of California. Colloquium is jointly sponsored by the BCS-IRSG, CEPIS and Memex Technology Ltd.

Fees

Fees are €205 (£130) for members of the BCS and/or associated societies, and €235 (£150) for non-members.

Further Details

For further details regarding the location and travel, the programme of events, the committee, etc visit the Colloquia's website at: http://www.cs.strath.ac.uk/ECIR02

Don't miss this year's European Colloquium on Information Retrieval – Three days of non-stop IR and if that isn't enough, I know plenty of great pubs.

The 25th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval

Tampere, Finland.

August 11-15, 2002

SIGIR2002 is the major international forum for the presentation of new research results and the demonstration of new systems and techniques in the broad field of information retrieval (IR). The Conference and Program Chairs invite all those working in areas related to IR to submit original research contributions, posters, and proposals for tutorials, workshops, and demonstrations of systems.

SIGIR 2002 welcomes contributions related to any aspect of IR, but the major areas of Interest are listed below:

- Formal Models, Language Models, Search Strategies, Fusion/Combination
- Machine Learning for IR, Text Data Mining, Clustering, Text Categorization
- Cross-lingual Retrieval, Multilingual Retrieval, Machine Translation for IR
- Topic Detection and Tracking, Content-Based Filtering, Collaborative Filtering, Agents
- Web IR, Citation and Link Analysis, XML and Metadata, Digital Libraries
- Video and Image Access, Audio and Speech Retrieval, Music Retrieval
- Text Representation and Indexing, Information Extraction, Lexical Acquisition, Natural Language Processing for IR
- Performance, Compression, Scalability, Architectures, Distributed Search, Mobile Applications

- Interfaces, Visualization, Interactive IR, User Models, User Studies
- Summarization, Question Answering
- Evaluation, Building Test Collections, Experimental Design and Metrics

Important Dates

April 19, 2002
Notification of acceptance for all submissions

May 24, 2002
Final camera-ready copy due

June 11, 2002
Registration dead-line, normal rate

August 11-15, 2002
Conference dates

CALL FOR PAPERS

Joint Conference on Digital Libraries 2002

Portland, Oregon, USA

July 14-18, 2002

The Joint Conference on Digital Libraries is a major international forum focusing on digital libraries and associated technical, practical, and social issues. JCDL enhances the tradition of conference excellence already established by the ACM and IEEE-CS by combining the annual events that these professional societies have sponsored on an annual basis, the ACM Digital Libraries Conferences and the IEEE-CS Advances in Digital Libraries Conferences. JCDL encompasses the many meanings of the term "digital libraries", including (but not limited to) new forms of information

institutions; operational information systems with all manner of digital content; new means of selecting, collecting, organizing, and distributing digital content; and theoretical models of information media, including document genres and electronic publishing. Digital libraries are distinguished from information retrieval systems because they include more types of media, provide additional functionality and services, and include other stages of the information life cycle, from creation through use. Digital libraries also can be viewed as a new form of information institution or as an extension of the services libraries currently provide.

The intended community for this conference includes those interested in such aspects of digital libraries as infrastructure; institutions; metadata; content; services; digital preservation; system design; implementation; interface design; human-computer interaction; evaluation of performance; evaluation of usability; collection development; intellectual property; privacy; electronic publishing; document genres; multimedia; social, institutional, and policy issues; user communities; and associated theoretical topics. Participation is sought from all parts of the world and from the full range of disciplines and professions involved in digital library research and practice, including computer science, information science, librarianship, archival science and practice, museum studies and practice, technology, medicine, social sciences, and humanities. All domains - academe, government, industry, and others - are encouraged to participate as presenters or attendees.

Sponsors

Jointly sponsored by Association for Computing Machinery (ACM), Special Interest Group on Information Retrieval (ACM SIGIR), Special Interest Group on Hypertext, Hypermedia and the Web (ACM SIGWEB), the Institute for Electrical and Electronic Engineers Computer Society (IEEE Computer Society) and the Technical Committee on Digital Libraries (TCDL) in cooperation with The American Society for Information Science & Technology (ASIST)

Important Dates

April 8, 2002
Final submissions due

July 14-18, 2002
Conference dates

Further Details

For information about the format of submissions, content and length visit the JDCL website www.jdcl2002.org.

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CALL FOR PAPERS

CIVR '2002 – European Conference on Image and Video Retrieval

London, UK

July 18-19, 2002

Image and video storage and retrieval continues to be one of the most exciting and fastest-growing research areas in the field of multimedia technology. However, opportunities within the UK for the exchange of ideas between different groups of researchers, and between researchers and potential users of image retrieval systems, are still limited. The Challenge of Image Retrieval series of conferences was originally set up to bridge the gap between the different communities with an interest in image retrieval.

This conference, the fourth in the series, aims to provide a European-wide forum for the discussion of challenges in the fields of image and video retrieval. A unique feature of this conference is the high level of participation from practitioners. Applications papers and presentations suitable for a wide audience are therefore particularly welcome. Topics of interest include but are not limited to:

- Query models, paradigms and languages for image/video retrieval
- Content-based indexing, search and retrieval of images
- Feature extraction and representation
- Visual perception and image/video retrieval
- Image/video search and browsing on the Web
- Similarity measures between images/video
- Semantic retrieval of images and video
- Pattern recognition techniques for image classification and retrieval
- Evaluation of image and video retrieval systems
- Studies of information-seeking behaviour among image/video users
- HCI issues in image/video retrieval
- Database architectures for image/video retrieval
- High performance image/video indexing algorithms
- Novel image data management systems and applications
- Image data management for multimedia systems
- Further areas of interest are security and rights management pertaining to visual data.

Sponsors

CIVR is sponsored by The Institute for Image Data Research from the University of Northumbria, The British Computer Society Information Retrieval Specialist Group, The British Machine Vision Association, The Institution of Electrical Engineers and The Leiden Institute of Advanced Computer Science

Keynote Speaker

David Forsyth
David is an Associate Professor in Computer Science at the University of California, Berkeley. He has recently co-authored a book called Computer Vision – A Modern Approach. The book is available from his web site (www.cs.berkely.edu/~daf), along with numerous papers, which include titles such as "The Joy of Sampling" and "Finding Naked People".

Important Dates

April 10, 2002
Notification of acceptance

May 1, 2002
Camera-ready full paper

July 18-19, 2002
Conference dates

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CALL FOR PAPERS

The 6th European Conference on Research and Advanced Technology for Digital Libraries

Rome, Italy

September 16-18, 2002

ECDL 2002 is the 6th conference in the series of European Digital Libraries conferences. ECDL has become the major European forum focusing on digital libraries and associated technical, practical, and social issues. ECDL 2002 is continuing the tradition already established by the previous conferences in meeting the needs of a large and diverse constituency, which includes practitioners, researchers, educators, policy makers and users.

The focus of ECDL 2002 is on underlying principles, methods, systems and tools to build and make available effective digital libraries to end users. Integration of methods, services, systems and interoperability across different data structures, metadata and components are key issues that will be addressed by ECDL 2002. This annual event is going to be combined with a number of satellite scientific events, sponsored and organized by the DELOS Network of Excellence on Digital Libraries, an initiative funded by the EU FP5 Information Society Technologies programme,

which aims at contributing to the creation of a European digital library research community, encompassing all the various technology and application fields.

ECDL 2002 scientific program Submissions on all topic areas are welcome and will receive full and equal consideration. Submissions may be full or short papers, posters, panels, tutorials, or workshops. Although submissions are not restricted in topic or scope, we expect that they will fall into one or more of the following broad areas.

Research. Significant research results on all aspects of digital libraries, focusing on integration of methods, interoperability across different services, data and metadata structures and algorithms, information and text mining, knowledge and multimedia content management, validation also through implementation and use, as well as evaluation.

Policy. Discussion of significant policy issues related to the design, operation, and economics of digital libraries.

System. Systems issues in the design, implementation, and operation of building digital libraries, preferably based on prototypes and strongly backed by practical experience.

Experience/Evaluation. Analysis of actual implementations of end user interaction with digital libraries in different application areas, possibly including contributions from the Humanities, Semiotics, and other areas.

Fundamentals. Studies associating digital libraries with previous areas of thought and discourse. This explicitly includes topics within the realms of Library/Information Science and Philosophy. However, contributions in this area, as with the other areas, must be accessible to the range of conference attendees, including the more practical outlook of system developers.

ECDL 2002 provides a forum for discussing applications of digital library concepts and techniques in areas not yet considered part of the Digital Library world such as Education and Health Care applications, Digital Earth, Sky, Law, Art and Music, Humanities, Social Sciences, Environmental Monitoring, Natural Sciences, and Historical and Scientific archives.

Location

Pontificia Università Gregoriana Piazza della Pilotta, 4 00187 Roma

The conference will be held at the Pontifical Gregorian University, Rome. This magnificent building, built along the same lines as the old Roman Colleges of the 16th century, is situated in one of the most suggestive and tranquil parts of the historic center of the city. Some of the more famous landmarks nearby are the Trevi Fountain, Spanish Steps, Pantheon, Piazza Navona and Colosseum, to name only a few. Positioned in the heart of the most fashionable shopping and dining spots in Rome, the location offers a rich array of fine restaurants, bars, hotels, stylish shops and antique stores.

Important Dates

May 1, 2002
Deadline for ALL the proposals

May 15, 2002
Notification of acceptance for tutorials and workshops

June 15, 2002
Notification of acceptance for papers, panels, and posters

July 1, 2002
Camera ready papers from the authors

September, 16-17, 2002
Conference Dates

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National Research Council, Italy

Programme Committee
Please, see website for Programme Committee.

Opportunities

Chairs in Computer Science / Artificial Intelligence and Senior Lectureship in Computer Science

Applications are invited for:

- Chair in Computer Science (Ref: CA0212)
- Chair in Artificial Intelligence (Ref: CA0213)
- Senior Lectureship in Computer Science (Ref: CA0214)

Enquires from existing research groups or teams are particularly welcome.

The Department currently has six main research groups: Advanced Computer Architectures, Artificial Intelligence (AI), High Integrity Systems Engineering, Human-Computer Interactions, Programming Languages and Systems, and Real-Time Systems. The AI group is the largest of these, and is particularly active in Machine Learning, Inductive Logic Programming, Representation and Automated Reasoning, Constraint Satisfaction, Natural Language Processing, Logical Deduction and Computational Linguistics, and Multi-Agent Systems. The person appointed to the chair in AI would be expected to lead the AI group.

The Department of Computer Science was rated 5* in the RAE of both 1996

and 2001 and 'excellent' in the TQA of 1993. It carries out research and teaching at an international level often in collaboration with academic and industrial partners world-wide.

The posts include some teaching responsibilities; expertise in Requirements Engineering or other branches of Software Engineering would be an advantage for the SL post.

For the Senior Lecturer appointment salary will be within the range £34,158 - £38,603 per annum. The Professorial salary is by negotiation.

Informal enquiries can be made to:

Professor Alan Burns
Head of Department
Ph: +44 (0)1904 432779
Email: alan.burns@cs.york.ac.uk.

For further information about the Department please see: http://www.york.ac.uk/.

Research Staff Positions at NEC USA's C&C Research Laboratories

NEC USA's C&C (Computers & Communications) Research Laboratories has R&D openings at our San Jose, CA location in the scope of: Internet Content Delivery Systems/Software.
These positions offer benefits and opportunity for conducting advanced R&D. The research aims at exploring new business opportunities and supporting NEC internal product development. We are looking for researchers and engineers who are specialized the following areas:

- Distributed computing

- P2P computing
- Networking
- Web related technologies
- Databases
- Information retrieval
- Content delivery networks
- Streaming media
- Video conferencing
- Electronic commerce applications

Available positions include:

- Research Staff Members (a Ph.D. degree is required)
- Research Associates
- Post-doctoral/Visiting Research Scientists
- Interns and co-op students

Please email your resume to resume@ccrl.sj.nec.com

Alternatively, you can also mail or fax your resume to:
HR Manager
NEC USA, Inc., C&C Research Laboratories
110 Rio Robles, MS SJ100
San Jose, CA 95134
E-mail: resume@ccrl.sj.nec.com
Fax: (408) 943-3099

Medical Informatics Fellowship Training at Oregon Health & Science University.

OHSU offers a two to three year research training fellowship program in medical informatics. Candidates must be US citizens or permanent residents, and possess a doctoral degree (M.D., Ph.D, or other doctoral degree). Support for the program comes mainly from the National Library of Medicine but also from the Department of Veterans Affairs and other sources. The overall goal of the program is to give fellows the research training and experience that will prepare them to enter the academic community and

undertake programs of independent medical informatics research, or to take leadership positions in the growing number of hospital and/or commercial efforts in medical informatics. Fellows are expected to select a faculty mentor who will help them outline a curriculum and a program of research; the fellow then will focus on and complete a significant research project, and present their research results orally and in writing.

There are many opportunities for classroom learning in the program. Fellows are encouraged to take courses in the curriculum of the Master of Science in Medical Informatics, as consistent with their research and career goals, but they may choose whether or not to be formally degree-seeking candidates. Besides the MS degree, fellows have the option to pursue a Master of Public Health with a specialization in health informatics. Accepted fellows who choose to pursue the MS degree in medical informatics are automatically admitted to that program; separate application is required for the MPH program. Fellowship applicants who wish to be considered for admission to the informatics MS degree program even if not accepted for fellowship support should indicate this in their application.

Courses taught by OHSU faculty cover introductory and advanced medical informatics topics, as well as computer science, research methods, quantitative methods & statistics, introduction to clinical medicine and management topics. The division also provides a weekly seminar, with a combination of inside and outside speakers. Fellows may also take part in a seminar series for fellows in the Division of General Internal Medicine and advanced coursework in computer science and other

relevant topics taught at nearby universities.

The OHSU medical informatics fellowship program formally began in 1992 and is directed by Kent A. Spackman, M.D., Ph.D. The master's degree program is directed by William Hersh, M.D. More than fifty Portland-area faculty are affiliated with the program and are potential mentors to fellows. Active research areas include bioinformatics, information retrieval, computer-based patient records, clinical terminology, clinician information needs, and health care information technology management.

For more information about the fellowship program, including an application form, visit our Web site at:
http://www.ohsu.edu/bicc-informatics/fellowship/.
Preferential consideration will be given to applications received by February 1, 2002.

Kent Spackman, M.D., Ph.D.
Director
Email: spackman@ohsu.edu

PhD Studentship in Multimedia Information Filtering

The Multimedia Communications Department of the Institut EURECOM (Sophia-Antipolis, France) is offering a PhD Studentship within a European project on Interactive Television. The project will focus on the use of Mpeg7 descriptors for the personalization of information to the end-user. The research will involve studying techniques for Video Indexing, Information Filtering, Adaptive Processes etc... Strong background in Mathematics (probabilities and statistics), Computer Science and Networks

(Internet) is required. The Institut EURECOM is an education and research centre which has been created by the Ecole Polytechnique de Lausanne (EPFL) and Telecom Paris. It is located on the famous "French Riviera" and is devoted to excellence in education and research. Its activities are organized in Corporate, Mobile and Multimedia Communications. More information is available at: http://www.eurecom.fr/ and http://bmgroup.eurecom.fr/

The studentship will be available from March 2002, for a duration of 3 years. Candidates should send the CV, letter and the name of two references to:

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