



ABCDE



## Scientific Report

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Period of the fellowship	01/11/2011 to 31/10/2012



## I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

The research conducted during the fellowship period can be summarized in three broad categories: (i) recommendations, (ii) preference-based query personalization and (iii) keyword search.

### Recommendations

#### *Group Recommendations*

Recently, recommendation systems have received significant attention, with most of the proposed methods focusing on personal recommendations. However, there are contexts in which the items to be suggested are not intended for a single user but for a group of people. For example, assume a group of friends or a family that is planning to watch a movie or visit a restaurant. In our work, we propose a model for group recommendations that exploits recommendations for items that similar to the group members users liked in the past [C1, C5]. We do not exhaustively search for similar users in the whole user base, but we pre-partition users into clusters of similar ones and use the cluster members for recommendations. We efficiently aggregate the single user recommendations into group recommendations by leveraging the power of a top-k algorithm.

#### *Contextual Group Recommendations*

In [C4], we address the problem of contextual recommendations for groups. We exploit a hierarchical context model to extend a typical recommendation model to a general context-aware one that tackles the information needs of a group. We base the computation of contextual group recommendations on a subset of preferences of the users that present the most similar behavior to the group, that is, the users with the most similar preferences to the preferences of the group members, for a specific context. This subset of preferences includes the ones with context equal to or more general than the given context.

#### *Time-aware Recommendations*

Usually, the recommended items are identified without taking into consideration any temporal information. In [C2], we argue that time-aware recommendations need to be pushed in the foreground. We introduce an extensive model for time-aware recommendations from two perspectives. From a fresh-based perspective, we propose using a suite of aging schemes towards making recommendations mostly depend on fresh and novel user preferences. From a context-based perspective, we focus on providing different suggestions under different temporal specifications.

#### *Generalized Constraints for Recommendations*

In [C3], we introduce the problem of forming an appropriate group of users to recommend an item when constraints apply to the members of the group. We present a formal model of the problem and an algorithm for its solution. Finally, we identify several directions for future work.

### Preference-based Query Personalization

In the context of database queries, computational methods for handling preferences can be broadly divided into two categories. Query personalization methods consider that user preferences are provided as a user profile separately from the query and dynamically determine how this profile will affect the query results. On the other hand, preferential query answering methods consider that preferences are explicitly expressed within queries. The focus of [Ch1] is on query personalization methods. We first describe how preferences can be represented and



stored in user profiles. Then, we discuss how preferences are selected from a user profile and applied to a query.

## Keyword Search

With the rapid growth of the Web, keyword-based searches become extremely ambiguous. To guide users to identify the results of their interest, in [51], we consider an alternative way for presenting the results of a keyword search. In particular, we propose a framework for organizing the results into groups that contain results with similar content and refer to similar temporal characteristics. Moreover, we provide summaries of results as hints for query refinement. A summary of a result set is expressed as a set of popular keywords in the result set. Finally, we report evaluation results of the effectiveness of our approach.

## II – PUBLICATION(S) DURING YOUR FELLOWSHIP

During the tenure of the fellowship, my research work has resulted in: 1 book chapter publication, 5 conference publications, and 1 paper that is currently under review. These publications are presented in detail below.

### Book Chapter

*Ch1. G. Koutrika, E. Pitoura and K. Stefanidis. Preference-based Query Personalization. In B. Catania, L. Jain (eds.), Advanced Query Processing, Springer, 2012. ISBN 978-3-642-28322-2*

### Conferences

*C1. I. Ntoutsis, K. Stefanidis, K. Norvag and H-P. Kriegel. Fast Group Recommendations by Applying User Clustering. In Proc. of the 31st International Conference on Conceptual Modeling (ER 2012), October 15-18, 2012, Florence, Italy.*

*C2. K. Stefanidis, I. Ntoutsis, K. Norvag and H-P. Kriegel. A Framework for Time-aware Recommendations. In Proc. of the 23rd International Conference on Database and Expert Systems Applications (DEXA 2012), September 3-7, 2012, Vienna, Austria. [Selected for inclusion in a special issue of Springer journal Transactions on Large Scale Data and Knowledge Centered Systems (TLDKS)]*

*C3. K. Stefanidis and Evaggelia Pitoura. Finding the Right Set of Users: Generalized Constraints for Group Recommendations. In Proc. of the 6th International Workshop on Personalized Access, Profile Management and Context Awareness in Databases (PersDB 2012), in conjunction with the VLDB 2012 Conference, August 31, 2012, Istanbul, Turkey.*

*C4. K. Stefanidis, Nafiseh Shabib, K. Norvag and John Krogstie. Contextual Recommendations for Groups. In Proc. of the 1st International Workshop on Non Conventional Data Access (NoCoDA 2012), in conjunction with the ER 2012 Conference, October 15, 2012, Florence, Italy.*

*C5. I. Ntoutsis, K. Stefanidis, K. Norvag and H-P. Kriegel. gRecs: A Group Recommendation System based on User Clustering. In Proc. of the 17th International Conference on Database Systems for Advanced Applications (DASFAA 2012), April 15-18, 2012, Busan, South Korea.*



## Paper under review

*Sl. O. Gkorgkas, K. Stefanidis and K. Norvag. A Framework for Grouping and Summarizing Keyword Search Results.*

## III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

*Participation in the 31st International Conference on Conceptual Modeling (ER 2012), October 15-18, 2012, Florence, Italy.*

*Participation in the 1st International Workshop on Non Conventional Data Access (NoCoDA 2012), October 15, 2012, Florence, Italy.*

*Participation in the 23rd International Conference on Database and Expert Systems Applications (DEXA 2012), September 3-7, 2012, Vienna, Austria.*

*Participation in the 11th Hellenic Data Management Symposium (HDMS 2012), June 28-29, 2012, Chania, Crete, Greece.*

*Participation in the 17th International Conference on Database Systems for Advanced Applications (DASFAA 2012), April 15-18, 2012, Busan, South Korea.*

*Participation in the ERCIM 2011 Seminar, November 10-11, Berlin, Germany.*

## IV – RESEARCH EXCHANGE PROGRAMME (REP)

During the fellowship, I had the opportunity to visit two research centers as part of the research exchange programme (REP). In both cases, I gave a talk about my research and I received valuable feedback that helped me improve my work. More importantly, new collaborations have emerged that will hopefully lead to joint research in the near future.

The first visit was at INRIA Saclay in the OAK Team for Database Optimizations and Architectures for Complex Large Data, which is headed by the INRIA Senior Researcher Ioana Manolescu. The visit took place in the period of January 27 to February 3, 2012. During the stay, I was able to give a presentation about my research results in the area of personalized data management. I was also able to learn the current research conducted in the OAK Team and exchange research ideas with professors, postdoctoral researchers and PhD students there. Additionally, I have initiated and try to establish research cooperation with people in the group in order to pursue research directions of common interest.

The second visit during the exchange programme was at the Information Systems Laboratory of the Institute of Computer Science of the Foundation for Research and Technology (FORTH) in Heraklion, Greece, headed by Prof. Dimitris Plexousakis. This visit took place in the period of September 24-28, 2012. I gave a talk on modeling and managing issues of contextual preferences and their integration in keyword search and publish/subscribe data delivery. I managed to start cooperating with Prof. Vassilis Christophides and we are currently working on a topic related to linked open data.