

Preface

Communities have built collections of information in a collaborative manner for centuries. Around 250 years ago, more than 140 people wrote l'Encyclopedie in 28 volumes with 70,000 articles. More recently, Wikipedia has demonstrated how collaborative efforts can be a powerful method of building a massive data storage. It is known that Wikipedia has become a key part of many corporations' knowledge management systems for decision making.

Wikipedia is only one example brought about by Web 2.0 with the goal of creating communities of users. We have witnessed global member-built mediadata storage such as Flickr and YouTube, and other social networking applications such as Friendster, Facebook, and LinkedIn, also share information between members in a large unstructured information pool.

While Web 2.0 has many benefits, there are many more opportunities to be unleashed. Imagine if we could use information gathered by many people for critical decision making. There is great potential for creating and sharing more structured data through the web. To make it more regulated and more realistic, the data will be limited to the community scale rather than the global scale, for example, an academic research community and a community of doctors in a particular region. Each community can create a large database in which each member can contribute information freely and can use the information with higher levels of confidence.

This book addresses the need for comprehensive research sources in community-built databases. This book does not only focus on one database area or one domain; rather, the chapters discuss various aspects of research in and the development of community-built databases, providing information on advanced community-built database research and also indicating which parts of research can benefit from further investigation.

It is expected that this book will provide comprehensive reading material for a wide ranging audience and has the potential to influence readers to think further and investigate areas that are novel to them.

The first chapter of the book reemphasizes the need for community-built databases. Ayanso et al. present the use of Web 2.0 technologies to enhance information creation, dissemination, and collaboration among knowledge communities. The concept of the social web is explained and several real cases are provided, including

cases in health care, research communities, and software development. The challenges of the social web, as well as the collaborative knowledge repository, are detailed. This introductory chapter opens up further research topics, some of which are provided in the next chapters.

Cerquitelli et al. highlight the fact that current user-generated content includes not only textual information, but also multimodal material. The authors review different collections of user-contributed media by using popular online communities such as YouTube, Flickr, and Wikipedia. Several issues related to the maintenance of different types of data are provided. Finally, the chapter gives insight into possible research issues for community-contributed media collections.

Part II commences with a chapter on Social Network Analysis (SNA) in Community-Built Databases by Snasel et al. The authors describe various SNA techniques that can be used to determine the quality and success of a community-built database. Fundamental aspects of social networks are identified, including the representation, the visualization, and the measures for SNA. Following this, the authors conduct several experiments using real data that demonstrate how knowledge on social aspects can be used to leverage functionalities of community-built databases, such as for recommender systems.

Online Recommender Systems have attracted wide interest from web community researchers in the last few years. In the paper by He and Chu, a novel design model that can be used to extend the functionalities and the performance of current recommender systems is proposed. The authors propose the Social-Network-based Recommender System (SNRS) as the architecture of their model that utilizes information from social networks for decision recommendation. The information includes the users' preferences, item likability, and homophily. Furthermore, the performance of SNRS is extended through semantic filtering applied on the source social network data. In addition, trust issues in SNRS have also been addressed in this paper. The recommender system is developed and experiments are conducted in a social network formed by a large group of graduate students.

In the next chapter, Papadopoulos et al. investigate the use of collaborative tagging systems for detecting similarities in online communities. The authors provide relevant studies in a collaborative tagging system along with community detection and its applications. On the basis of their studies, the authors propose methods to identify tag communities, which are groups of tags that are either semantically close to each other or share some usage context. The experiments are conducted using real-world tagging systems, namely, BibSonomy, Flickr, and Delicious. The performance of the proposed method is compared against an established method, the former showing superior results.

In the next chapter, Tamine et al. investigate the use of social context to model information retrieval and collaboration in a scientific research community. The shift from personal context to social context in information retrieval is explained as the motivation of the work. The formalization of social information retrieval that has quantitative and qualitative model components is provided in the paper. For experiments, the authors use an online scientific documents dataset with citations and coauthor analysis as the social context.

The next four chapters cover the issue of community-built database design and storage. We start with the chapter by Badia, which aims to accommodate social interaction on existing relational database technologies. The author briefly describes basic terminologies of current database technology and explains how they cannot be used efficiently to support user-created content and user interaction activities. To achieve this, the paper proposes the concept of private views, which is a dynamic layer between the database and the users. Issues in the organization, querying, sharing, and maintenance of private views are explained in detail. Comparison to existing work demonstrates that the current proposal has more ability to capture social interaction using existing database technology.

In the next chapter, Rozewski and Kusztina identify an ontological model to represent the knowledge network inside a collaborative system, such as community-built databases. The proposed ontological model incorporates not only technical aspects of the collaborative system, but also the psychological, cognitive, and social aspects. The ontological model is implemented into an e-learning case study using the Wiki mechanism for the knowledge repository.

A popular design model for collaborative communities is through a graph database, such as that discussed in the next chapter by Soussi et al. The dynamic nature and rich representation capabilities enable a graph database to be used for unstructured data and semistructured data, which commonly appear in collaborative communities. As a preliminary, the authors describe the current graph database model and query languages. As their research contribution, the paper proposes methodologies to extract social network information from relational databases to graph databases.

In the last chapter of this part, Uden discusses semantics in a collaborative data repository such as Wiki. The use of semantic technologies enables the formalization of the interrelationships of concepts and the automation of the interpretation process by machines. The author clearly identifies the current state of semantics utilization into Wiki, such as Wikipedia. Some examples of current applications are explained in detail and the author concludes the paper by envisioning the future of Semantic Wiki.

The next part on the future of community-built database research and development commences with a chapter by Cortizo et al., which examines the potential of mobile devices, such as the mobile phone, to even further facilitate the use and development of community-built databases. The current and future characteristics of mobile devices in terms of physical hardware, operating and application software, and supported services are discussed. The authors use these characteristics to envision their idea of using mobile phones at the heart of community-built databases. Not only can mobile phones be used as an interface to separate databases, they can also be used as mobile database tools. The chapter concludes with several future scenarios that clearly demonstrate the potential and the importance of mobile phones to future research in and the development of community-built databases.

In the next chapter, Vodanovich et al. explore the design of community-built databases for a targeted audience, the youth. This work is motivated by the need to assist the well-being of youths through various means, including the use of

technology. The authors first introduce the concept of youth well-being. Next, they present how various youth community-built databases (YCD) have emerged recently. Their analyses of the concepts of youth well-being and the existing databases enable the authors to identify problems and issues in YCD design and development. A conceptual design and framework for YCD is proposed, which embodies four dimensions, namely web interaction, social collaboration, semantic integration, and community governance.

With another target audience in mind, the next chapter by Mesiti et al. investigates an environment that can assist people with special needs to collaborate in and produce data for community-built databases. The authors summarize the latest software targeted at people with special needs. They also review software accessibility and usability models for this target audience. They contribute to a new usability model for a collaborative environment catering for people with special needs, for example, they provide a wiki-based e-learning environment, called VisualPedia.

We conclude this book with a chapter on trust in collaborative information systems by Javanmardi and Lopes. From the previous chapters, we hopefully have demonstrated the need for and the benefits of collaborative work in community-built databases. In a collaborative system, all users must have confidence to contribute and use the information. This chapter discusses a reputation model as the means to ensure information quality in collaborative information systems. To achieve this, the authors propose models that associate the users' reputation with the quality of the content that she or he provides. As proof of concept, an empirical study is conducted using Wikipedia.

These chapters by no means encompass all the issues in community-built database research and development. However, they demonstrate the vastness of this research area. It is inevitable that sooner or later, we will need to collaborate with people from different domains to ensure this research area grows.

Finally, the editor hopes this book will contribute to research in and the development of community-built databases and collaborative information systems, both by academia and by industry practitioners.

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