World Wide Web (2014) 17:589–593
DOI 10.1007/s11280-013-0216-6

Faceted search, social networking and interactive semantics

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Received: 13 March 2013 / Revised: 2 April 2013
Accepted: 17 April 2013 / Published online: 10 May 2013

1 Introduction

The most popular and basic techniques for accessing the Web are browse and search. Faceted search, also called faceted navigation or faceted browse, is a third technique that enables users to access Web pages from different facets. A faceted search system can display different facets of the same set of Web pages at different steps in a search. Faceted search is also a way to deal with the size of Web contents since it can locate the sought for content through multi-step refinements on classifications from multiple facets [2, 5, 9]. Faceted search has been adopted in many applications such as e-learning, e-business, online library, and general search engines. However, research on its fundamental theory is neglected. Many important problems are still open, such as the underlying theory for organizing resources from multiple dimensions, the generation of appropriate interactive query process, and adaptive interfaces. Research on the fundamental model and associated theory is critical for the development of faceted search.

Classification and link are the most basic intelligent mechanisms for managing objects and structuring space. Making use of classification and link is the natural way to manage Web resources. Multi-dimensional classifications, called Resource Space Model, have been used to manage various resources [13–16]. It is the theory, model and method that can organize Web resources for faceted navigation.

Classifications form and evolve with the evolution of society. Humans use words to indicate classifications to realize effective interaction [12]. Manually classifying Web resources is a straightforward approach to organize resources for faceted navigation. To generate facets automatically is the key to efficient faceted navigation. In Web navigation applications, to extract the appropriate words that indicate classifications is the key to generating facets for automatically faceted Web navigation.

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Links reflect explicit or implicit relations, which allow people to distinguish one individual from another in the world. A semantic link network model is constructed to reflect basic semantic relations in the world [10, 17].

Using simple queries to obtain the required contents through an appropriate interaction process is important in faceted search. When we put the faceted search into society, users may interact with each other during search. Interaction is the basis for generating and evolving semantics. With the development of mobile devices, interaction (through those devices) becomes an important means of social interaction. Mobile devices will be able to sense the context of interaction. To explore the interactive semantics will help understand the intrinsic principles of effective interaction [11].

Interactions in society weave and evolve various social networks. Social networking is a basic intelligent behavior that evolves a society. To know the effect of social networking helps information systems to provide intelligent services for people [10, 17].

2 Scientific issues

Faceted search, interactive semantics and social networking are closely related research topics, emphasizing different aspects of interactions between humans and information. Linking faceted search, interactive semantics and social networking can help us understand and make use of the interactions in the complex space consisting of both cyberspace and social space.

Figure 1 depicts searching, interaction and social networking in social space and cyberspace. Information is generated, transformed and propagated in social space through various social networks. Cyberspace senses information in the social space. Reorganization of information is the key to realize faceted navigation. Humans interact with cyberspace to obtain required information from and contribute information to that space. Understanding and making use of the semantics that facilitates the interactions is the key to improve interactions.

The following are relevant scientific issues:

(1) The space model for multi-dimensional classifications, including its normalization theory and operation languages.
(2) Automatically generating classifications, adapting classifications, uncertain classifications, capturing resources, searching in the classification space according to users' interests, and creating an adaptive index for multi-dimensional classifications.
(3) Interactive semantics, interactive models and adaptive interfaces for faceted search/navigation/browsing.
(4) Linguistic principles or implications of interactive semantics [6, 7].
(5) Faceted search and navigation in social networks.
(6) New applications that are based on multi-dimensional classifications, e.g., in knowledge services, information extraction, and natural language processing.
(7) Psychological and philosophical principles of classifications and social networking.
(8) Real-world social networking methods, including semantic community discovery, measure, and evolution.
(9) Knowledge sharing and services through social networks.
(10) Effect of operations on social networks, and the principles of social network evolution.
(11) Assessment methods for effective faceted search, interaction, and social networking.

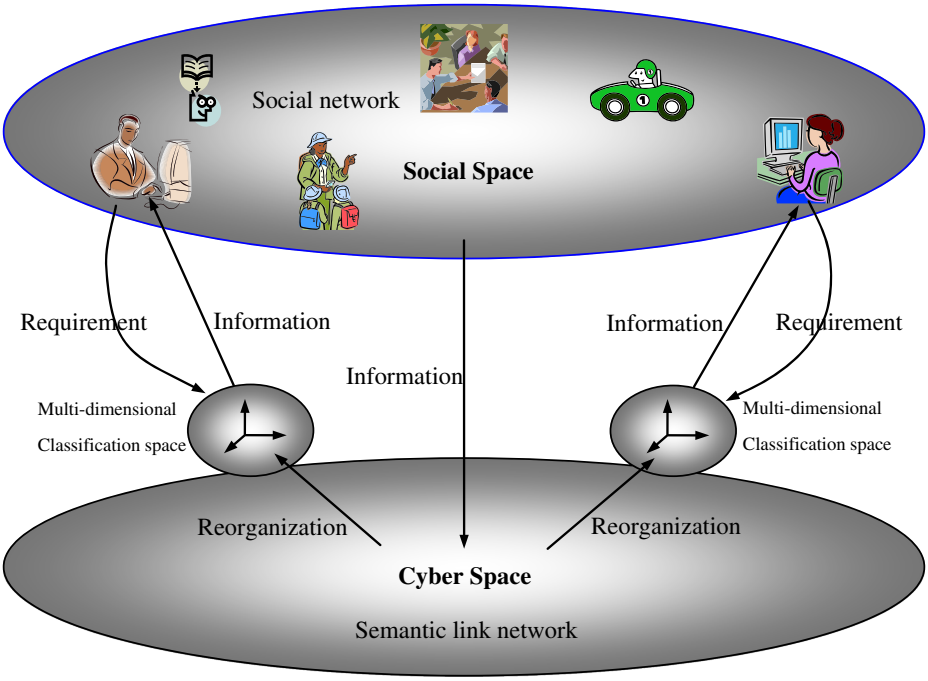

Figure 1 Search, interaction and social networking in a complex space

3 Organization of this issue

This special issue includes five papers covering faceted navigation and social networking.

The paper titled 'Faceted navigation on text based on human reading process' studies faceted navigation by extracting facets in text and considering the human reading process [8]. It is a challenge to handle the explosion of the volume of available texts on the Web. To understand how humans read articles and extract meaning is the basis for improving the efficiency of reading articles. The underlying semantic links between language units of different granularities reflect basic semantics. The sentence is the basic language unit for accurately indicating semantics and the original idea of semantic lens was proposed in [11]. By defining the dependent set of sentences and constructing semantic link networks based on sentences, a textual semantic lens is built for helping readers comprehend articles. The semantic lens inputs an article, and outputs various semantic views on the article with multiple functions. Integrating with the semantic link networks of articles, the semantic lens can help people efficiently read large-scale articles.

The paper titled 'Exploration on Efficient Similar Sentences Extraction' presents an efficient approach to measuring semantic similarity between sentences [1]. It addresses the efficiency issue, i.e., for a given sentence collection, how to discover the top-k semantic similar sentences to a query efficiently. Strategies and algorithms are introduced to compute these similarities. Experiments are carried out for evaluation.

The rest papers are on social networking.

Humans are living in the world with various kinds of small-world and scale-free social networks. The paper titled 'Emergence and Navigation of Social Information Networks in Metric Spaces' proposes a range intersection model to explore the topology evolution and

information navigation in metric spaces [4]. It models the network as a set of nodes in a distance metric space where each node has an ID and a certain range of neighbor information in the metric space. Different from previous models, this paper assumes that the network formation does not depend on either the knowledge of node degree or the distance between nodes. Different distributions of range radius will lead to different network topologies. The network evolution is modeled in terms of the network size and the individual node information range using the range intersection model. A set of simulation experiments show the properties of topology and navigation in the evolving process. It shows that the scale-free property, the high cluster property, short diameter, and high navigability can be achieved in the model.

The paper titled 'Know by a Handful the Whole Sack: Efficient Sampling for Top-K Influential User Identification in Large Graphs' aims to find the top-K influential individuals to maximize the influence spread within a social network. The authors propose a power-law exponent supervised Monte Carlo estimation method with experimental verifications [3].

Interactive semantics has not been studied in depth in this issue, and this topic awaits future exploration.

4 Summary

Things can be viewed from different facets, and all entities are related. Multi-dimensional classifications and social networking are two fundamental aspects of these relations. Understanding the semantics of various interactions can help improve interactions. Linking faceted search, social networking and interactive semantics can deepen our understanding in research on the interactions between humans and information, and create new research directions. This special issue tries to establish this link, and we hope that it can help accelerate research and development towards the future Web.

Acknowledgments This work was supported by the National Science Foundation of China (61075074) and the research funding from Nanjing University of Posts and Telecommunications.

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