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EDITORIAL

Semantics, knowledge and grids

1. INTRODUCTION

Semantics, knowledge and grids represent three streams of studying humans and cyberspace that humans create and interact. Relevant research concerns all areas of computing, especially web semantics, artificial intelligence, and advanced computing infrastructures. This special issue selected eight papers reporting relevant research and applications from the 9th International Conference on Semantics, Knowledge and Grids.

Semantics is a fundamental issue of computing. Various symbol systems have been developed to represent semantics. An important idea is to distinguish social semantics from natural semantics like mathematics and to build social semantics through interaction processes [1]. An interactive system and its semantic image co-evolve to render interactive semantics. The process of building and explaining semantic image can be based on an evolving structure incorporating multidimensional classification space and self-organized semantic link network [2].

Knowledge is a fundamental issue of philosophy and artificial intelligence. Human can map the representation of the external world into the representation in mind, and map the internal representation into the knowledge space through generalization. Computers are limited in ability to realize this mapping because of the fundamental differences in structure, function and social characteristics. It is necessary to study an indirect mapping from the external representation into a cyber knowledge space by modelling human cognition [3].

The cyber-infrastructure, along with its resources (including users and various connected devices), constitutes a vast artificial environment. Harmonious development of its cyber-infrastructure not only enables people to conveniently access, share and process big data but also ensures sustainable development of society [4]. Research on grids refers to advanced computing infrastructures, including grid computing, cloud computing, Internet of things, and cyber-physical system.

Many new challenges and technologies emerge in recent years, especially the big data generated by various devices. Mapping big data into knowledge space is a challenge. It is a challenge to develop an infrastructure to support not only big data management and analysis but also knowledge discovery, sharing and management.

The International Conference on Semantics, Knowledge and Grids is a cross-area international forum on semantic computing, knowledge networking, and advanced computing architectures (including grid, cloud, Web X.0, CPS, Internet of things, social network and big data.). Its mission is to promote cross-area research and accelerate the development of relevant areas. SKG has built its reputation through 10 years' professional organization. The conference invites well-known experts in diverse areas to give keynotes every year. Submissions come from all over the world. The conference proceedings is published by IEEE.

2. PAPERS IN THIS ISSUE

This special issue consists of eight papers that discuss different aspects of the theme of the conference.

The first paper is at the application level of the theme. It surveys recommendation techniques based on offline data processing, with emphasis on new techniques and evaluation measurements, benchmark data sets and available open source tools. Some challenges for future research are outlined [5].

The second paper introduces an approach to deploy service-based applications in the cloud [6], which is regarded as a heterogeneous ecosystem and a new economic model. Techniques on service-based application deployment in Cloud platforms are introduced.

The third paper introduces an approach to predict bus routes or the arrival time of buses in developing countries by integrating sensing ability and social networks to understand and measure the influence between social events and vehicle velocity [7].

Different from previous ranking approaches, the fourth paper introduces an approach to measure information quantity in text with reading aim [8]. It can be used to select appropriate texts for recommendation and summarization.

The fifth paper introduces an approach to discover online hot events through association link network [9], which is a special type of semantic link network. This approach consists of three stages: extract significant features to represent the content of each document from the online document stream, classify the online document stream into topically related events considering event evolution, and create an event detection algorithm based on the association link network.

The sixth paper introduces an approach to discover topic clusters in documents with geographical location [10]. This work is significant as more and more textual documents with geographical locations are published on the Web with the popularity of smartphones with GPS and location-based services like routing, planning, querying, finding and discovering spatial objects are becoming popular. The combination of the probabilistic topic model with clustering algorithms could be an effective way to discover meaningful clusters in different facets and levels of documents with textual and geographical information.

The seventh paper tries to break the limitations of the conventional graph kernels to realize a semantic link network. The effectiveness and efficiency are evaluated by the document classification on public corpora. Empirical results demonstrate that the proposed method can achieve better performance than the traditional topic model-based approaches [11].

The eighth paper reviews the field of semantic web services, compares web ontology language for services, web service modelling ontology and semantic annotations for the web services description language from the views of the service requester, provider and the broker. The comparison helps users to better understand the strengths and limitations of these approaches to formalizing semantic web services and to choose the most suitable solution for an application [12].

3. SUMMARY

The future world will be built on an advanced cyber-infrastructure, which consists of various networks that pervade the nature, society and virtual worlds [4]. The cyberspace will be able to sense human behaviours and provide appropriate services for humans. Discovering the rules that are suitable for cyberspace, social space and physical space is a challenge. Collaborative research on semantics, knowledge and grids is an important way to realize a cyber-physical society where human can work and live with machines harmoniously.

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