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IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

> *IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.*

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is about information processing may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Kecheng Liu Stephen R. Gulliver
Weizi Li Changrui Yu (Eds.)

Service Science and Knowledge Innovation

15th IFIP WG 8.1 International Conference
on Informatics and Semiotics in Organisations, ICISO 2014
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Proceedings

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Volume Editors

Kecheng Liu
Stephen R. Gulliver
Weizi Li
University of Reading
Henley Business School
Business Informatics Systems and Accounting
Whiteknights, Reading RG6 6UD, UK
E-mail: {k.liu, s.r.gulliver, weizi.li}@henley.ac.uk

Changrui Yu
Shanghai University of Finance and Economics
School of Information Management and Engineering
No. 777, Guoding Rd., Shanghai 200433, China
E-mail: yucr@sjtu.edu.cn

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Preface

This 2014 International Conference on Informatics and Semiotics in Organisations (ICISO 2014) was the 15th in a series of international events devoted to the latest research and application of informatics in organisations and organisational semiotics. The aim of the conference is to provide a focal forum for participants from various domains of information management and information systems, computational science, semiotics, finance and accounting, business and enterprise, service science, business and engineering. The conference enables the sharing and exchange of the latest research and practice. ICISO 2014 continued the effort of the international research community in the development of the emergent discipline of informatics and its applications. (See www.orgsem.org for earlier conferences since 1995.)

Service science is a young discipline that has attracted great attention from academia and industry because of the increasing prominence of the service economy, and the need for a scientific approach to guide the study of services. Service, as opposed to product, is regarded as an intangible commodity, which is characterised by extensive use of information and knowledge in the activities that lead to the creation and addition of social, economic, environmental or other value. Typical service industry includes financial services, hospitality, retail, health and education, as well as recent types such as data services, knowledge management and consultancy. In parallel to the service industry, other industrial sectors such as manufacturing, construction and agriculture, having realised the added value from the service associated with the product, have been incorporating service into their value network.

In the current economy, the value network of a large organisation may be connected to suppliers, customers, and many other stakeholders, often in a complex and extensive form spreading over many distributed locations and even multiple jurisdictions. In such a setting, information has two roles: one is that information itself is the valuable commodity to be delivered to the customers; and another role is that information must be effectively managed and used in communication to coordinate the human activities and the movement of materials. For small and medium-sized enterprises the value network may be simpler, information is still important in value creation through, e.g., proper use of information in coordination of production activities, marketing, customer relationship management and supply chain management.

Information is an important resource for any organisation, whether large or small; whether it is from a service or production industry. To understand the nature of information, and how it can be effectively managed and used in organisations, is highly relevant. Following the early events in the series, the key

theme of this conference was on information, service and their interrelationships. Particular emphasis was placed on exploring and understanding, from both theoretical and empirical perspectives, how information enables an organisation to sustain and, furthermore, to leverage competitiveness. In both cases, the organisations will rely heavily on effective management and use of information.

Informatics is the study of information as a resource, which helps a business organisation, often through knowledge management, innovation, and service design, engineering and management. Organisational semiotics, as a discipline of studying signs, information, and human communication in organised contexts, provides an appropriate approach to examine the issues of information management and utilisation from both scholarly and practical perspectives.

ICISO 2014 received 88 paper submissions from 19 countries, which demonstrates the success and global dimension of this conference. From these, 39 were accepted for the main track (44%), and 10 were accepted for inclusion in the workshop. There numbers show the intention of preserving a high-quality forum for future editions of this conference.

The high quality of the papers received imposed difficult choices in the review process. To evaluate each submission, two rounds of paper review were performed by the Program Committee and reviewing panels, whose members are highly qualified independent researchers in the ICISO Conferences topic areas. Moreover, ICISO also featured a number of keynote lectures delivered by internationally well-known experts, namely, Daniel O'Leary (University of Southern California, Marshall School of Business, USA) and Weiguo Patrick Fan (Pamplin College of Business, USA), thus increasing the overall quality of the conferences and providing a deeper understanding of the conferences interest fields.

Two workshops were organised in association with the conference; they provided interactive fora that allowed for a more in-depth discussion of particular areas within the scope of the conference. We would like to thank the workshop chairs for their collaboration in providing this added-value event of ICISO 2014, namely: e-Health, the New Frontier of Service Science Innovation (chaired by Ping Yu, and Ying Su) and International Workshop on Information Engineering and Management (chaired by Mohammad Yamin).

Building an interesting and successful program for the conference required the dedicated effort of many people. We would like to express our thanks to all authors including those whose papers were not included in the program. We would also like to express our gratitude to all members of the Program Committee and auxiliary reviewers, who helped us with their expertise and valuable time. Furthermore, we thank the invited speakers for their invaluable contribution and for taking the time to synthesize and prepare their talks.

Moreover, we thank the workshop and session chairs whose contribution to the diversity of the program was decisive. Finally, we gratefully acknowledge the professional support of the ICISO team for all organizational processes.

March 2014

Kecheng Liu
Stephen R. Gulliver
Weizi Li
Changrui Yu

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Keynotes

The Internet of Signs and the Semiotic Web: Signization Using Big Data and the Internet of Things and Emerging Issues

Daniel E. O'Leary

University of Southern California, USA
Oleary@usc.edu

Roughly 15 years ago the notions of the semantic web were developed (e.g., [2]). At that time it was suggested that the Semantic Web would bring structure to the content of Web pages. The Semantic Web was not seen as a separate Web but one in which information on the Web would be given well-defined meaning. The goal was to be able to better understand and process the data rather than merely display it.

In this paper I investigate "The Internet of Signs" and the "Semiotic Web" and how their development is being facilitated by notions such as "Big Data" and the "Internet of Things." For example, with the "Internet of Things" there are increasing amounts of "big data" available that can provide insights into the "Internet of Signs." Further, the increasing availability of data can facilitate increased development of the "Internet of Signs."

I will examine the relationship between so-called 'Big Data', the 'Internet of Things' (the 'Internet of People and Things,' and the 'Internet of Everything'), and the 'Internet of Signs.' In particular, I investigate how the 'things' in the 'Internet of Things' generate 'Big Data', and how both are used to generate semiotic 'signs'. In addition, I will investigate some extensions beyond those of the data generated from the Internet of Things to include signs available from the analysis of additional alternative media generally considered part of Big Data.

The Internet of Things

As noted by [1], the term the 'Internet of Things', apparently developed in 1999, initially was meant to describe the following situation: Today computers – and, therefore, the Internet – are almost wholly dependent on human beings for information.

The problem is, people have limited time, attention and accuracy – all of which means they are not very good at capturing data about things in the real world. We need to empower computers with their own means of gathering information, so they can see, hear and smell the world for themselves.

As a result, the 'Internet of Things' provides a linked set of computer programs and sensors that do not incur the same limitations of people. Those sensors are responsible for generating huge quantities of data that provide insight into the status of the things, and their relationships with other things and events in the world.

The Internet of Signs

The 'Internet of Signs' indicates that the data generated on the internet from the broad range of sources, including devices in the 'Internet of Things', information from social media (e.g. blogs) and other internet sources (often associated with 'Big Data'), provide 'signs', such as the 'sentiment' toward some issue (e.g. [3]). Those 'signs' generated from information associated with the internet provide an 'Internet of Signs'. The 'Internet of Signs' can be helpful in providing insights and other potential information about events and situations.

In particular, from the perspective of semiotics, rather than concern for an 'Internet of Things' there is concern or interest in what I would call the 'Internet of Signs'. In particular, how does the 'Internet of Things' manifest itself as 'signs' or the 'Internet of Signs' and what are the relationships between the 'things' and signs of 'things'? Ultimately, the relationships between 'things', conceptions of 'things' and symptoms of behaviors can provide a basis to better understand things, entities, events, situations, behaviors and other issues.

The Semiotic Web

Related to the Internet of Signs is the Semiotic Web. Unfortunately, the Semiotic Web, as a parallel to the Semantic Web has received limited direct attention and discussion. The Semiotic Web and the Semantic Web both draw directly on the content of the World Wide Web. The Semiotic Web is similar in concept to the Semantic Web in that it is one whereby information about signs (e.g., sentiment, things, etc.) is becoming increasingly available as greater amounts of information become available.

However, in addition to data from the Internet of Things, the Semiotic Web will need to draw increasingly on other multi-media content to draw out signs for which text is not appropriate or not sufficiently rich. This paper will examine some extensions to the Internet of Signs and the Semiotic Web and examine settings where classic text analysis is not sufficient to "see" the signs related to things, entities, locations, situations and events.

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Social Media Analytics and Its Business Applications – An Overview

Weiguo Patrick Fan

Pamplin College of Business, United States
wfan@vt.edu

Abstract. Social media analytics is concerned with developing and evaluating informatics tools and frameworks to collect, monitor, analyze, summarize, and visualize social media data to facilitate conversations and interactions to extract useful patterns and intelligence. The ubiquity of smart phones and other mobile devices, Facebook and YouTube channels devoted to companies and products, and hashtags that make it easier to instantly and broadly share experiences all combine to create a social media landscape that is rapidly growing and becoming ever more part of the fabric of businesses. As the number of users on social media sites continues to increase, so does the need for businesses to monitor and utilize these sites to their benefit. In this talk, we explore how the explosion in social media necessitates the use of social media analytics; we explain the underlying stages of the social media analytics process; we describe the most common social media analytic techniques in use; and we discuss the ways in which social media analytics create business value. In the end of the keynote speech, a case study of using social media data for product defect discovery is given to demonstrate the business value of social media.

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