

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbruecken, Germany

Leonard Bolc Marek Makowski
Adam Wierzbicki (Eds.)

Social Informatics

Second International Conference, SocInfo 2010
Laxenburg, Austria, October 27-29, 2010
Proceedings

Volume Editors

Leonard Bolc
Polish-Japanese Institute of Information Technology
86 Koszykowa, 02-008 Warsaw, Poland
E-mail: pjwstk@pjwstk.edu.pl

Marek Makowski
International Institute for Applied Systems Analysis (IIASA)
Schlossplatz 1. 2361 Laxenburg, Austria
E-mail: marek@iiasa.ac.at

Adam Wierzbicki
Polish-Japanese Institute of Information Technology
86 Koszykowa, 02-008 Warsaw, Poland
E-mail: adamw@pjwstk.edu.pl

Library of Congress Control Number: 2010936698

CR Subject Classification (1998): C.2, H.5, H.4, H.3, I.2.6, J.4

LNCS Sublibrary: SL 3 – Information Systems and Application, incl. Internet/Web and HCI

ISSN	0302-9743
ISBN-10	3-642-16566-4 Springer Berlin Heidelberg New York
ISBN-13	978-3-642-16566-5 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

springer.com

© Springer-Verlag Berlin Heidelberg 2010
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper 06/3180

Preface

As information technology became ubiquitous, it did not take long for practically minded ICT specialists to realize the technology's potential for supporting and enhancing our social activities. Today, it is a truism to say that information technology has a social dimension and a social impact—it is enough to consider such applications as Facebook, LinkedIn, or Wikipedia. Proponents of the social applications of ICT will go further and claim that information technology is reshaping the way we are doing business, working, learning, playing, and making friends or enemies. They will say that, for example, Wikipedia has the potential to completely change our economy (following Don Tapscott and Anthony Williams, the authors of *Wikinomics*).

Computer science was slower than the social sciences to direct its interests toward the social uses of its products. The concept of social informatics was first invented by Rob Kling, who deemed it as an area of study of information and communication tools in cultural or institutional contexts. However, he was not the only one, as for example ethnographers quickly became interested in the ways ICT influences our culture (consider the studies of YouTube by Michael Wesch). Media science and sociology have been geared up by the seminal works of McLuhan and are ready to tackle the new media created by ICT, as in the work of Manuel Castells. Psychologists quickly became interested in the Internet and computer games. Economists recognized the quickly rising impact of e-commerce and e-business and focused much effort on their analysis.

For some years now, computer scientists have been increasingly interested in the social dimension of ICT. These interests have taken various forms and followed various paths of development. Tim Beners-Lee has proposed what he has called “Web science,” as an area of research of the social impact of the Web and of how the Web can benefit from social concepts. In a seminal article in *Science* (February 2009), representatives of the social network community proposed to consider ICT as a rich source of information that should become the basis of “computational social science.” This concept is based on the work of projects such as “Reality Mining” at MIT that have indeed gathered enormous quantities of data about human behavior that can be used, for example, to drive social simulation. Theoretical computer scientists have also found inspiration in the social sciences, and have created a new area of study: computational social choice theory. Social computing is also an area of interest in the community of artificial intelligence, among Web development professionals, and in other areas of ICT.

What is apparent today is that all of these diverse and fascinating areas of inquiry have one feature in common: they attempt to go beyond the task of merely using ICT as a source of data for social science. The reason for this ambition is that computer science is an inherently practical domain, where practical

applications are what matters most at the bottom line. Thus, computer scientists and ICT professionals alike would like to improve the way ICT realizes social goals, supports social processes or applies social concepts. At the same time, ICT technology can become a source of information relevant for social sciences and for analysis of social phenomena (such as political or marketing analysis).

A very succinct way of describing the relationship between the Internet (in particular, the Web) and society today can be given by paraphrasing Michael Wesch: “the Web is us.” This statement is similar to McLuhan’s famous “the medium is the message.” Computer scientists working in social informatics have been trying to add a corollary to these statements of social scientists: “The Web is us, but we have made the Web.” “The medium is the message, but we have built the medium.” These rephrased statements emphasize an important point: it is in our power to change the Web, the Internet, or any ICT technology. And we should aspire to change them in ways that will improve their social applications.

The two perspectives of study—of social sciences that consider the impact of ICT on social behavior, and of social informatics that considers how ICT can be improved to realize social goals—are two sides of one coin. Social informatics can and must base its research on findings from the social sciences. On the other hand, social science can find applications for its theoretical findings for improvements of ICT technology. These applications already have a real business value today in, for example, software for the support and management of virtual teamwork, available from many major ICT technology companies. Using the Internet as a source of information about social phenomena also has a real business value, as many e-marketing companies attempt to base their analyses on Web mining. The Conference on Social Informatics (SocInfo) has been launched as an attempt to bring together representatives of computer science and the social sciences, recognizing that social informatics is an interdisciplinary domain.

The interdisciplinary makeup of the conference is reflected in the Program Committee that includes both computer scientists and social scientists. All articles submitted for the conference have received reviews from specialists from both domains. Authors of accepted papers also have backgrounds in computer science and the social sciences. This emphasis on balancing the inputs of computer scientists and social scientists is motivated by the desire to make the conference a meeting place between the two disciplines.

SocInfo 2010 and SocInfo 2009 each received a large number of papers concerning social networks. Both theoretical social network analysis and its practical applications for social recommendation are represented at the conference. Another important subject concerns social aspects of virtual collaboration, ranging from social studies of computer supported collaborative work, to the study of enhancements of Wiki technology. Research on Web mining, opinion mining, and sentiment analysis has also been represented at the conference. Privacy and trust are subjects very relevant to social informatics that are an active area of research. Computational social choice is reflected by papers that consider the distributive and procedural fairness of ICT applications and systems. Last but not

least, virtual teamwork is studied by several papers that attempt to recommend the best possible virtual teams or team members for a given task.

Social informatics is a maturing discipline that already has a unique set of research objectives and methods. Among these objectives, the questions posed by Tim Berners-Lee is a prominent example: can we analyze and anticipate the social properties of Web 2.0 applications before their deployment, and can we use this knowledge to improve the design of social Web applications and services? To achieve such goals, social informatics must have a deeper understanding of social goals, concepts and mechanisms. For this, social informatics must be an interdisciplinary science that draws upon the results of sociology, economics, psychology, anthropology, behavioral game theory, sociobiology and others. The SocInfo conferences are an attempt to direct research efforts toward that goal, and to enable the necessary exchange of views, knowledge and research ideas between representatives of computer and social sciences. SocInfo 2010 was an important step towards this goal.

October 2010

Adam Wierzbicki
Leonard Bolc
Marek Makowski

Organization

- Polish-Japanese Institute of Information Technology (PJIIT)
- International Institute for Applied Systems Analysis (IIASA)
- Gemius S.A. - Sponsor

Conference General Chairs

L. Bolc (Poland) - Publication Chair
M. Makowski (Austria) - Program, Co-chair
M. Makowski (Austria) - Local Chair
A. Wierzbicki (Poland) - General Chair

Conference Committee Members

K. Aberer (Switzerland)	G. Kossinets (USA)
A. Abraham (Norway)	R. Kotowski (Poland)
T. Ågotnes (Norway)	K. Lamberts (UK)
G. Barnett (USA)	J. Lang (France)
N. Bennani (France)	K. Lerman (USA)
S. Bostandjiev (USA)	M. Makowski (Austria)
U. Brandes (Germany)	D. Millard (UK)
S. Buchegger (Germany)	J. Minguillón (Spain)
C. Cornelis (Belgium)	B. Mobasher (USA)
P. Cruickshank (UK)	M. Morzy (Poland)
E. Damiani (Italy)	T. Murata (Japan)
A. Datta (Singapore)	J. O'Donovan (USA)
M. De Cock (Belgium)	W. Ogryczak (Poland)
Y.A. de Montjoye (Belgium)	A. Papaioannou (Switzerland)
N. Eagle (USA)	G. Petric (Slovenia)
D. Feng (USA)	L. Ripamonti (Italy)
F. Wai-Tat (USA)	A. Robbin (USA)
C. Goble (UK)	I. Rodriguez-Ardura (Spain)
B. Gros (Spain)	G. Roussos (England)
J. Hołyst (Poland)	S. Ruohomaa (Finland)
A. Jatowt (Japan)	J. Sabater-Mir (USA)
L. Hung Vu (Switzerland)	V. Snášel (Czech Republik)
M. Jelasity (Hungary)	D. Taraborelli (UK)
A. Jøsang (Norway)	K. Tutschku (Austria)
J. Kacprzyk (Poland)	M. Weal (UK)
P. Kazienko (Poland)	A. Wierzbicki (Poland)
G. Kossinets (USA)	W. Zhang (USA)

Reviewers

A. Carroll	Psychster LLC (USA)
W. Chen	University of Bergen (Norway)
A. Chmiel	Warsaw University of Technology (Poland)
G. Dias	University of Beria Interio (Portugal)
J. Dvorsky	VSB-Technical University Of Ostrava (Czech Republic)
T. Gjørseter	University of Bergen (Norway)
M. Heckner	Accenture Information Management Services (Germany)
Z. Horak	VSB Technical University of Ostrava (Czech Republic)
A. Hupa	Warsaw University (Poland)
J. Kessler	Indiana University (USA)
M. Kudelka	VSB Technical University of Ostrava (Czech Republic)
H. Liu	Arizona State University (USA)
R. Nielek	Polish-Japanese Institute of Information Technology (Poland)
V. Noncheva	University of Plovdiv (Bulgaria)
O. Nov	New York University (USA)
L.E. Olsen	University of Bergen (Norway)
A. Wawer	Polish Academy of Sciences (Poland)
C. Wolff	Media Computing University of Regensburg (Germany)
R. Zafarani	Arizona State University (USA)

Table of Contents

Case-Based Team Recommendation	1
<i>Yonata Andrelo Asikin, Michele Brocco, and Wolfgang Woerndl</i>	
Toward a Behavioral Approach to Privacy for Online Social Networks	19
<i>Lerone D. Banks and S. Felix Wu</i>	
A Meta Model for Team Recommendations.....	35
<i>Michele Brocco, Georg Groh, and Florian Forster</i>	
Node Degree Distribution in Affiliation Graphs for Social Network Density Modeling	51
<i>Szymon Chojnacki, Krzysztof Ciesielski, and Mieczysław Kłopotek</i>	
Achieving Optimal Privacy in Trust-Aware Social Recommender Systems	62
<i>Nima Dokoohaki, Cihan Kaleli, Huseyin Polat, and Mihhail Matskin</i>	
First-Use Analysis of Communication in a Social Network	80
<i>Satoko Itaya, Naoki Yoshinaga, Peter Davis, Rie Tanaka, Taku Konishi, Shinich Doi, and Keiji Yamada</i>	
Label-Dependent Feature Extraction in Social Networks for Node Classification	89
<i>Tomasz Kajdanowicz, Przemysław Kazienko, and Piotr Daskocz</i>	
Computing α -Efficient Cost Allocations for Unbalanced Games	103
<i>Mariusz Kaleta</i>	
Recommendation Boosted Query Propagation in the Social Network....	113
<i>Grzegorz Kukła, Przemysław Kazienko, Piotr Bródka, and Tomasz Filipowski</i>	
Social Manipulation of Online Recommender Systems	125
<i>Juan Lang, Matt Spear, and S. Felix Wu</i>	
Bicriteria Models for Fair and Efficient Resource Allocation	140
<i>Włodzimierz Ogryczak</i>	
Dynamic Context-Sensitive PageRank for Expertise Mining	160
<i>Daniel Schall and Shahram Dustdar</i>	
Trust-Based Peer Assessment for Virtual Learning Systems	176
<i>Milorad Tosic and Valentina Nejtkovic</i>	

Exponential Ranking: Taking into Account Negative Links	192
<i>Vincent A. Traag, Yurii E. Nesterov, and Paul Van Dooren</i>	
Social Email: A Framework and Application for More Socially-Aware Communications	203
<i>Thomas Tran, Jeff Rowe, and S. Felix Wu</i>	
Measuring Message Propagation and Social Influence on Twitter.com . . .	216
<i>Shaozhi Ye and S. Felix Wu</i>	
SocialWiki: Bring Order to Wiki Systems with Social Context	232
<i>Haifeng Zhao, Shaozhi Ye, Prantik Bhattacharyya, Jeff Rowe, Ken Gribble, and S. Felix Wu</i>	
Author Index	249