

PROCEEDINGS
2010 IEEE/WIC/ACM International
Conference on Web Intelligence

— WI 2010 —

31 August–3 September 2010
Toronto, Ontario, Canada

Edited by

Xiangji Jimmy Huang, Irwin King, Vijay Raghavan, and Stefan Rueger

Organization Sponsors



IEEE Computer Society



Web Intelligence Consortium (WIC)



Association for Computing
Machinery (ACM)



GenieKnows.com



Infobright

Co-Organized and in Cooperation with



Institute of Electrical and Electronics Engineers (IEEE)



York University, Toronto, Canada



Los Alamitos, California
Washington • Tokyo



Copyright © 2010 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved.

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries may photocopy beyond the limits of US copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or republication requests should be addressed to: IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 133, Piscataway, NJ 08855-1331.

The papers in this book comprise the proceedings of the meeting mentioned on the cover and title page. They reflect the authors' opinions and, in the interests of timely dissemination, are published as presented and without change. Their inclusion in this publication does not necessarily constitute endorsement by the editors, the IEEE Computer Society, or the Institute of Electrical and Electronics Engineers, Inc.

IEEE Computer Society Order Number E4191
BMS CFP10WEB-CDR
ISBN 978-0-7695-4191-4

Additional copies may be ordered from:

IEEE Computer Society
Customer Service Center
10662 Los Vaqueros Circle
P.O. Box 3014
Los Alamitos, CA 90720-1314
Tel: + 1 800 272 6657
Fax: + 1 714 821 4641
<http://computer.org/cspress>
csbooks@computer.org

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Tel: + 1 732 981 0060
Fax: + 1 732 981 9667
[http://shop.ieee.org/store/
customer-service@ieee.org](http://shop.ieee.org/store/customer-service@ieee.org)

IEEE Computer Society
Asia/Pacific Office
Watanabe Bldg., 1-4-2
Minami-Aoyama
Minato-ku, Tokyo 107-0062
JAPAN
Tel: + 81 3 3408 3118
Fax: + 81 3 3408 3553
tokyo.ofc@computer.org

Individual paper REPRINTS may be ordered at: <reprints@computer.org>

Editorial production by Randall Bilof
Cover art production by Joe Daigle/Studio Productions



IEEE Computer Society
Conference Publishing Services (CPS)
<http://www.computer.org/cps>

2010 IEEE/WIC/ACM International Conference on Web Intelligence

WI 2010

Table of Contents

Welcome Message from the WI 2010 Conference Chair and Program Chair	xiv
WI 2010 and IAT 2010 Conference Organization	xix
WI 2010 Program Committee Members	xxii
WI 2010 Non-Program Committee Reviewers	xxvi

WI 2010 and IAT 2010 Joint Invited Talks

Wikipedia and How to Use It for Semantic Document Representation	1
<i>Ian Witten</i>	
Game Theory for Security: Lessons Learned from Deployed Applications	2
<i>Milind Tambe</i>	
The Sensor Web: Unpredictable, Noisy and Loaded with Errors	3
<i>Alan Smeaton</i>	
Issues on Preference-Modelling and Personalization in Information Retrieval	4
<i>Pasi Gabriella</i>	
Why Robots Are More Than Just Agents	5
<i>Maria Gini</i>	

WI Foundations

Bees Swarm Optimization Based Approach for Web Information Retrieval	6
<i>Habiba Drias and Hadia Mosteghanemi</i>	
Approximate Representations in the Medical Domain	14
<i>Lawrence J. Mazlack</i>	

Reducing the Cold-Start Problem in Content Recommendation through Opinion Classification	204
<i>Damien Poirier, Françoise Fessant, and Isabelle Tellier</i>	
Impact of One-Timer/N-Timer Object Classification on the Performance of Web Cache Replacement Algorithms	208
<i>Saloua Messaoud Abid and Habib Youssef</i>	
A Framework for Co-classification of Articles and Users in Wikipedia	212
<i>Lei Liu and Pang-Ning Tan</i>	
Semantics and Ontology Engineering	
WEST: Weighted-Edge Based Similarity Measurement Tools for Word Semantics	216
<i>Liang Dong, Pradip K. Srimani, and James Z. Wang</i>	
Linked Open Social Signals	224
<i>Pablo N. Mendes, Alexandre Passant, Pavan Kapanipathi, and Amit P. Sheth</i>	
Chem2Bio2RDF: A Linked Open Data Portal for Systems Chemical Biology	232
<i>Bin Chen, Ying Ding, Huijun Wang, David J. Wild, Xiao Dong, Yuyin Sun, Qian Zhu, and Madhuvanathi Sankaranarayanan</i>	
Query Answering in Fuzzy Description Logics with Data Type Support	240
<i>Jingwei Cheng, Z.M. Ma, and Yu Wang</i>	
F-Logic#: Loosely Coupling F-Logic Rules and Ontologies	248
<i>Stijn Heymans, Roman Korf, Michael Erdmann, Jörg Pührer, and Thomas Eiter</i>	
Semi-automatic Acquisition of Semantic Descriptions of Processes in the Web	256
<i>Julia Hoxha and Sudhir Agarwal</i>	
Ontology-Based Specific and Exhaustive User Profiles for Constraint Information Fusion for Multi-agents	264
<i>Xiaohui Tao, Yuefeng Li, Raymond Y.K. Lau, and Shlomo Geva</i>	
Boosting Biomedical Entity Extraction by Using Syntactic Patterns for Semantic Relation Discovery	272
<i>Svitlana Volkova, Doina Caragea, William H. Hsu, John Drouhard, and Landon Fowles</i>	
Learning a Large Scale of Ontology from Japanese Wikipedia	279
<i>Susumu Tamagawa, Shinya Sakurai, Takuya Tejima, Takeshi Morita, Noriaki Izumi, and Takahira Yamaguchi</i>	
Semantic Graph Based Document-Indexing Strategy for MEDLINE	287
<i>William P. Taylor and James Z. Wang</i>	
Learning in Presence of Ontology Mapping Errors	291
<i>Neeraj Koul and Vasant Honavar</i>	
TOK: A Meta-model and Ontology for Heterogeneous Terminological, Linguistic and Ontological Knowledge Resources	297
<i>Nizar Ghoula, Gilles Falquet, and Jacques Guyot</i>	

Welcome Message from the WI 2010 Conference Chair and Program Chair

We are pleased to give you a warm welcome to the 2010 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology (WI 2010 and IAT 2010). On behalf of the WI 2010 and IAT 2010 Conference Committees, we would like to thank you for your participation and we do hope that you will enjoy the conference technical and social programs as well as our beautiful and lovely city, Toronto.

The WI 2010 and IAT 2010 conferences are sponsored and co-organized by the IEEE Computer Society Technical Committee on Intelligent Informatics (TCII), Web Intelligence Consortium, ACM SIGART, Information Retrieval and Knowledge Management Research Lab, School of Information Technology, and York University, Toronto, Canada. These conferences provide leading international collaborations for researchers and practitioners to present state-of-the-art research techniques and results. They will enable participants to cross-fertilize ideas among various domains through idea sharing and discussions on the underlying principles of various paradigms.

Web intelligence (WI) has been recognized as a valuable new direction for scientific research and development in the exploration of the fundamental roles as well as the practical impact of artificial intelligence (AI) (e.g., knowledge representation, knowledge discovery and data mining, social network intelligence) and advanced information technologies (IT) (e.g., wireless networks, ubiquitous devices, social networks, semantic Web, wisdom Web, and data/knowledge grids) on the next generation of Web-empowered products, systems, services and activities. It is one of the most the important as well as most promising IT research fields in the era of Web and agent intelligence.

The 2010 IEEE/WIC/ACM International Conference on Web Intelligence (WI 2010) was held jointly with the 2010 IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT 2010). The main topics considered at IEEE/WIC/ACM WI 2010 are as follows:

WI Foundations

- Brain Informatics for WI
- Human-Level WI
- New Cognitively Inspired Models for WI
- Granular Computing (GrC) for WI
- Autonomy-Oriented Computing (AOC) for WI
- Neuroeconomics for WI

World Wide Wisdom Web (W4)

- Meta-Knowledge Discovery and Representation
- Problem Solver Markup Language (PSML)

- Web Crawling Systems
- Search Engines and Meta-search Engines

Intelligent Human/Web Interaction

- Adaptive Web Interfaces
- Context-Aware Computing
- Learning User Profiles
- Personalized Interfaces
- Personalized Web Sites
- Remembrance Agents
- Multimedia Representation
- Visualization of Information and Knowledge
- Social and Psychological Issues

Web Support Systems

- Information Retrieval Support Systems
- Web Site Navigation Support Systems
- Recommender Support Systems
- Web-Based Decision Support Systems
- Soft Computing (including neural networks, fuzzy logic, evolutionary computation, rough sets, and granular computing) and Uncertainty Management for WI

Intelligent e-Technology

- Business Intelligence
- Intelligent Enterprise Portals
- Web-Based Direct Marketing and CRM
- Web-Based EDI
- Digital Libraries
- e-Publishing
- e-Business and e-Commerce
- e-Things and e-Activities
- e-Finance
- e-Learning
- e-Medicine and e-Health
- e-Science
- e-Government
- e-Community
- Decentralized Community Communication Techniques
- Web Security, Integrity, Privacy and Trust

WI 2010 and IAT 2010 received 505 submissions (313 papers for WI 2010 and 192 for IAT 2010) to the research and industry tracks from 46 countries and regions around the world. For WI 2010, 51 papers were accepted as regular papers and 66 papers were accepted as short

papers. For IAT 2010, 37 papers were accepted as regular papers and 41 papers were accepted as short papers. As a result, approximately 16% of the WI 2010 submissions were accepted as regular papers and 21% were accepted as short papers. For IAT 2010, around 19% of the submissions were accepted as regular papers and 21% were accepted as short papers. All submitted papers were reviewed by at least three program committee members, and any cases of conflict were further reviewed and resolved by one program vice chair and one program co-chair. There were a few borderline papers, which were re-reviewed by at least one additional program committee member and the program co-chairs.

It is impossible to organize a high-quality conference without the enormous support and expertise of many top class researchers and leaders. Our sincere thanks are due to all chairs, co-chairs, vice chairs, WIC advisory board members, WIC technical committee and WI/IAT steering committee members, program committee members, reviewers, the conference secretariat, the conference web support team, and the cyber-chair for their wonderful contributions. In particular, we would like to acknowledge the generous help received from Ning Zhong, Vivian Hu, Jessie Zhao, Jun Miao, Ellis Lau, Dawid Kasperowicz, and Heather Bai. Our special thanks go to Dr. Juzhen Dong for her continuous support.

We are grateful to the following distinguished guest speakers for the delivery of the keynote/invited addresses:

- Professor Alan Smeaton, Dublin City University, Ireland
- Professor Ian Witten, University of Waikato, New Zealand
- Professor Maria Gini, University of Minnesota, USA
- Professor Milind Tambe, University of Southern California, USA
- Professor Pasi Gabriella, Università degli Studi di Milano Bicocca, Italy

We wish to express our appreciation to the conference sponsors. We are grateful to the authors, presenters, and delegates for their contributions and participation. We wish to thank the staff at the IEEE Computer Society Press for their professional help and support in compiling the proceedings.

Xiangji Jimmy Huang
General Program Chair

Nick Cercone
Conference Chair