

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

Gerald Quirchmayr Josef Basl
Ilsun You Lida Xu Edgar Weippl (Eds.)

Multidisciplinary Research and Practice for Information Systems

IFIP WG 8.4, 8.9/TC 5
International Cross-Domain Conference and Workshop
on Availability, Reliability, and Security, CD-ARES 2012
Prague, Czech Republic, August 20-24, 2012
Proceedings

Volume Editors

Gerald Quirchmayr
University of South Australia, Adelaide, Australia
E-mail: gerald.quirchmayr@unisa.edu.au

Josef Basl
University of Economics, Prague, Czech Republic
E-mail: basljo@rek.zcu.cz

Ilsun You
Korean Bible University, Seoul, South Korea
E-mail: isyou@bible.ac.kr

Lida Xu
Old Dominion University, Norfolk, VA, USA
E-mail: lxu@odu.edu

Edgar Weippl
Vienna University of Technology and SBA Research, Austria
E-mail: edgar.weippl@tuwien.ac.at

ISSN 0302-9743
ISBN 978-3-642-32497-0
DOI 10.1007/978-3-642-32498-7
Springer Heidelberg Dordrecht London New York

e-ISSN 1611-3349
e-ISBN 978-3-642-32498-7

Library of Congress Control Number: 2012943607

CR Subject Classification (1998): H.4, K.6.5, H.3.1, H.3.3-5, E.3, K.4.4, H.2.3, H.2.8, H.5.3, D.2, J.1

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

© IFIP International Federation for Information Processing 2012
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.
The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

The Cross-Domain Conference and CD-ARES Workshop are focused on a holistic and scientific view of applications in the domain of information systems.

The idea of organizing cross-domain scientific events originated from a concept presented by the IFIP President Leon Strous at the IFIP 2010 World Computer Congress in Brisbane, which was seconded by many IFIP delegates in further discussions. Therefore, CD-ARES concentrates on the many aspects of information systems in bridging the gap between the research results in computer science and the diverse application fields.

This effort has been concentrated on the consideration of various important issues of massive information sharing and data integration that will (in our opinion) dominate scientific work and discussions in the area of information systems in the second decade of this century.

The organizers of this event who are engaged within IFIP in the area of Enterprise Information Systems (WG 8.9), Business Information Systems (WG 8.4) and Information Technology Applications (TC 5) very much welcome the typical cross-domain aspect of this event. The collocation with the SeCIHD 2012 Workshop was another possibility to discuss the most essential application factors.

The papers presented at this conference were selected after extensive reviews by the Program Committee with the essential help of associated reviewers.

We would like to thank all the PC members and the reviewers for their valuable advice, and foremost the authors for their contributions.

June 2012

Gerald Quirchmayr
Josef Basl
Ilsun You
Lida Xu
Edgar Weippl

Organization

Cross-Domain Conference and Workshop on Multidisciplinary Research and Practice for Information Systems (CD-ARES)

General Chair

Josef Basl	University of Economics, Prague, Czech Republic
Erich J. Neuhold	Vienna University of Technology, Austria (IFIP TC5 Chair)

Program Committee Chair

Gerald Quirchmayr	University of South Australia, Australia
Edgar Weippl	Vienna University of Technology, Austria (IFIP WG 8.4 Chair)

Program Committee

Amin Anjomshoaa	Vienna University of Technology, Austria
Silvia Avasilcai	Technical University “Gheorghe Asachi” of Iasi, Romania
Wichian Chutimaskul	King Mongkut University KMUTT, Thailand
Andrzej Gospodarowicz	Wroclaw University of Economics, Poland
Abdelkader Hameurlain	Paul Sabatier University Toulouse, France
Hoang Huu Hanh	Hue University, Vietnam
Ismael Khalil	Johannes Kepler University Linz, Austria
Elmar Kiesling	Software Business Austria
Josef Küng	Research Institute for Applied Knowledge Processing, Austria
Vladimir Marik	Czech University of Technology Prague, Czech Republic
Günter Müller	University of Freiburg, Germany
Nguyen Thanh Binh	International Institute for Advanced Systems Analysis, Laxenburg, Austria
Günther Pernul	University of Regensburg, Germany
Josef Schiefer	UC4 Software, Washington, USA
Stefanie Teufel	University of Fribourg, Switzerland
Janusz Wielki	University of Business, Wroclaw, Poland

VIII Organization

A Min Tjoa	Vienna University of Technology, Austria
Simon Tjoa	St. Poelten University of Applied Sciences, Austria
Lida Xu	Old Dominion University, USA
Ilsun You	Korean Bible University, Republic of Korea

Second International Workshop on Security and Cognitive Informatics for Homeland Defense (SeCIHD)

General Chair

Ilsun You	Korean Bible University, Republic of Korea
-----------	--

General Vice Chair

Hyun Sook Cho	ETRI, Republic of Korea
---------------	-------------------------

Program Co-chairs

Aniello Castiglione	University of Salerno, Italy
Kangbin Yim	Soonchunhyang University, Republic of Korea

Publicity Chair

Sang-Woong Lee	Chosun University, Republic of Korea
----------------	--------------------------------------

Program Committee

Francesca Bosco	United Nations Interregional Crime and Justice Research Institute, Italy
Pascal Bouvry	Luxembourg University, Luxembourg
Jörg Cassens	Norwegian University of Science and Technology, Norway
Antonio Colella	Italian Army, Italy
Christian Czosseck	NATO Cooperative Cyber Defense Centre of Excellence, Tallinn, Estonia
Stefania Ducci	Research Institute for European and American Studies, Greece
Joseph Fitsanakis	Security and Intelligence Studies Program, King College, USA
Alessandro Gigante	European Space Agency, ESRIN Health, Safety, and Security Officer, Italy

Tomasz Hachaj	Pedagogical University in Krakow, Poland
Leonardo Impagliazzo	Vice President, Engineering Signalling Business Unit, AnsaldoSTS, Italy
Shinsaku Kiyomoto	KDDI R&D Laboratories Inc., Japan
Fang-Yie Leu	Tunghai University, Taiwan
Masahiro Mambo	Kanazawa University, Japan
Walter Matta	Research & Development, Vitrociset, Italy
Nikos Nikolaidis	Aristotle University of Thessaloniki, Greece
Marek R. Ogiela	AGH University of Sci. and Tech., Poland
Rainer Poisel	St. Poelten University of Applied Sciences, Austria
Masakazu Soshi	Hiroshima City University, Japan
Chul Sur	Pukyong National University, Republic of Korea
Cristina Alcaraz Tello	National Institute of Standards and Technology, USA
Simon Tjoa	St. Poelten University of Applied Sciences, Austria
Mirosław Trzupek	AGH University of Science and Technology, Poland
Toshihiro Yamauchi	Okayama University, Japan

Table of Contents

Conference

Cross-Domain Applications: Aspects of Modeling and Validation

Ontology-Based Identification of Research Gaps and Immature Research Areas	1
<i>Kristian Beckers, Stefan Eicker, Stephan Faßbender, Maritta Heisel, Holger Schmidt, and Widura Schwittek</i>	

A Context-Aware Mashup Integration Guideline for Enterprise 2.0	17
<i>Gerald Bader, Amin Anjomshoaa, and A Min Tjoa</i>	

Artificial Neural Networks Approach for the Prediction of Thermal Balance of SI Engine Using Ethanol-Gasoline Blends	31
<i>Mostafa Kiani Deh Kiani, Barat Ghobadian, Fathollah Ommi, Gholamhassan Najafi, and Talal Yusaf</i>	

Validation of XML Documents with SWRL	44
<i>Jesús M. Almendros-Jiménez</i>	

A Taxonomy of Dirty Time-Oriented Data	58
<i>Theresia Gschwandtner, Johannes Gärtner, Wolfgang Aigner, and Silvia Miksch</i>	

Combining Relational and Semi-structured Databases for an Inquiry Application	73
<i>Marius Ebel and Martin Hulin</i>	

Trust, Security, Privacy and Safety

Hunting for Aardvarks: Can Software Security Be Measured?	85
<i>Martin Gilje Jaatun</i>	

A Foundation for Requirements Analysis of Privacy Preserving Software	93
<i>Kristian Beckers and Maritta Heisel</i>	

On Complexity Reduction of User Interfaces for Safety-Critical Systems	108
<i>Andreas Holzinger, Evgenia Popova, Bernhard Peischl, and Martina Ziefle</i>	

Security SLAs – An Idea Whose Time Has Come?	123
<i>Martin Gilje Jaatun, Karin Bernsmed, and Astrid Undheim</i>	
UML Representation of Extended Role-Based Access Control Model with the Use of Usage Control Concept	131
<i>Aneta Poniszewska-Maranda</i>	
A Formal Equivalence Classes Based Method for Security Policy Conformance Checking	146
<i>Eckehard Hermann, Udo Litschauer, and Jürgen Fuß</i>	
Trust as an Organismic Trait of E-Commerce Systems	161
<i>Tanja Ažderska and Borka Jerman Blažič</i>	

Mobile Applications

Making Apps Useable on Multiple Different Mobile Platforms: On Interoperability for Business Application Development on Smartphones	176
<i>Andreas Holzinger, Peter Treitler, and Wolfgang Slany</i>	
Enhancing Business APPification Using SMS Text Messages: Metrics, Strategies and Alternatives	190
<i>Mersini Paschou, Evangelos Sakkopoulos, Efrosini Sourla, and Athanasios Tsakalidis</i>	

Data Processing and Management

Near Duplicate Document Detection for Large Information Flows	203
<i>Daniele Montanari and Piera Laura Puglisi</i>	
TinyStream Sensors	218
<i>Pedro Furtado</i>	
Distributed Sampling Storage for Statistical Analysis of Massive Sensor Data	233
<i>Hiroshi Sato, Hisashi Kurasawa, Takeru Inoue, Motonori Nakamura, Hajime Matsumura, and Keiichi Koyanagi</i>	

Retrieval and Complex Query Processing

Integrating Query Context and User Context in an Information Retrieval Model Based on Expanded Language Modeling	244
<i>Rachid Aknouche, Ounas Asfari, Fadila Bentayeb, and Omar Boussaid</i>	

Indexing and Search for Fast Music Identification	259
<i>Guang-Ho Cha</i>	
Ontology-Based Retrieval of Experts – The Issue of Efficiency and Scalability within the eXtraSpec System	272
<i>Elżbieta Bukowska, Monika Kaczmarek, Piotr Stolarski, and Witold Abramowicz</i>	
OrderBased Labeling Scheme for Dynamic XML Query Processing	287
<i>Beakal Gizachew Assefa and Belgin Ergenc</i>	
A 16-Intersection Matrix for the Polygon-Polyline Topological Relation for Geographic Pictorial Query Languages	302
<i>Anna Formica, Mauro Mazzei, Elaheh Pourabbas, and Maurizio Rafanelli</i>	

E-Commerce

Usage Control in Inter-organisational Collaborative Environments – A Case Study from an Industry Perspective	317
<i>Åsmund Ahlmann Nyre and Martin Gilje Jaatun</i>	
Stock Market Multi-Agent Recommendation System Based on the Elliott Wave Principle	332
<i>Monica Tirea, Ioan Tandau, and Viorel Negru</i>	
Similarity of Transactions for Customer Segmentation	347
<i>Ke Lu and Tetsuya Furukawa</i>	
Challenges in Using Linked Data within a Social Web Recommendation Application to Semantically Annotate and Discover Venues	360
<i>Jakub Dzikowski, Monika Kaczmarek, Szymon Lazaruk, and Witold Abramowicz</i>	
Pay-As-You-Go Data Integration Using Functional Dependencies	375
<i>Naser Ayat, Hamideh Afsarmanesh, Reza Akbarinia, and Patrick Valduriez</i>	
Analyzing Recommender System’s Performance Fluctuations across Users	390
<i>Charif Haydar, Azim Roussanally, and Anne Boyer</i>	

Workshop

International Workshop on Security and Cognitive Informatics for Homeland Defense (SeCIHD)

A Secure Distributed Video Surveillance System Based on Portable Devices	403
<i>Pietro Albano, Andrea Bruno, Bruno Carpentieri, Aniello Castiglione, Arcangelo Castiglione, Francesco Palmieri, Raffaele Pizzolante, and Ilsun You</i>	
Network Profiling: Content Analysis of Users Behavior in Digital Communication Channel	416
<i>Clara Maria Colombini, Antonio Colella, Marco Mattiucci, and Aniello Castiglione</i>	
How to Forge a Digital Alibi on Mac OS X	430
<i>Aniello Castiglione, Giuseppe Cattaneo, Roberto De Prisco, Alfredo De Santis, and Kangbin Yim</i>	
Security-and-Privacy-Related Issues on IT Systems During Disasters . . .	445
<i>Shinsaku Kiyomoto, Kazuhide Fukushima, and Yutaka Miyake</i>	
Semantic Techniques of Image Retrieval – The Example of a Structural Analysis of Coronary Arteries	460
<i>Miroslaw Trzupek and Marek R. Ogiela</i>	
Evaluation of Carotid Artery Segmentation with Centerline Detection and Active Contours without Edges Algorithm	468
<i>Tomasz Hachaj and Marek R. Ogiela</i>	
Automatic Image Annotation Using Semantic Text Analysis	479
<i>Dongjin Choi and Pankoo Kim</i>	
Routing Algorithm Based on Nash Equilibrium against Malicious Attacks for DTN Congestion Control	488
<i>Chengjun Wang, Baokang Zhao, Wanrong Yu, Chunqing Wu, and Zhenghu Gong</i>	
Managing Urban Waste Collection through Timed Automata Based Fuzzy Cognitive Maps	501
<i>Giovanni Acampora, Vincenzo Loia, and Autilia Vitiello</i>	

Mobile Malware Threats and Defenses for Homeland Security	516
<i>Seung-Hyun Seo, Kangbin Yim, and Ilsun You</i>	
Facial Identity Encryption with Kinoform and Phase-Key Watermarking for Homeland Security Agencies	525
<i>Muhammad Naveed Iqbal Qureshi, Jin-Tae Kim, and Sang-Woong Lee</i>	
Detecting Unusual User Behaviour to Identify Hijacked Internet Auctions Accounts	534
<i>Marek Zachara and Dariusz Patka</i>	
A Formal Support for Collaborative Data Sharing	547
<i>Fabio Martinelli, Ilaria Matteucci, Marinella Petrocchi, and Luca Wiegand</i>	
Tool-Supported Risk Modeling and Analysis of Evolving Critical Infrastructures	562
<i>Fredrik Seehusen and Bjørnar Solhaug</i>	
A Secure Data Encryption Method by Employing a Feedback Encryption Mechanism and Three-Dimensional Operation	578
<i>Yi-Li Huang, Fang-Yie Leu, and Cheng-Ru Dai</i>	
Discussion on the Challenges and Opportunities of Cloud Forensics	593
<i>Rainer Poisel and Simon Tjoa</i>	
Towards a Logical Framework for Reasoning about Risk	609
<i>Matteo Cristani, Erisa Karafli, and Luca Viganò</i>	
A Collaborative Approach to Botnet Protection	624
<i>Matiya Stevanovic, Kasper Revsbech, Jens Myrup Pedersen, Robin Sharp, and Christian Damsgaard Jensen</i>	
Consensus Building and In-operation Assurance for Service Dependability	639
<i>Yutaka Matsuno and Shuichiro Yamamoto</i>	
Design and Analysis of a Fragile Watermarking Scheme Based on Block-Mapping	654
<i>Munkhbaatar Doyoddorj and Kyung-Hyune Rhee</i>	
Author Index	669