# Table of Contents

**Foreword** ........................................................................................................................................ iii

**Conference Organization** .............................................................................................................. iv

**Wireless Computing, Networking and Sensing**

*Dr. H. T. Kung* ................................................................................................................................... 1

**Virtual Spaces: From the Past to the Future**

*Dr. Shi-Kuo Chang* ......................................................................................................................... 2

**Software Engineering of Autonomic Grid Computing Systems and Applications**

Web Services Reliability Patterns (S)

*Ingrid Buckley, Eduardo B. Fernandez, Gustavo Rossi, S. Masoud Sadjadi* ......................... 4

Consistency in Self-Reconfiguration of Self-Healing Systems

*Micahel E. Shin, Kiran Gopala Reddy Sunanda* ........................................................................... 10

Task Decomposition for Adaptive Data Staging in Workflows for Distributed Environments (S)

*Onyeka Ezenwoye, Balaji Viswanathan, S. Masoud Sadjadi, Liana Fong, Gargi Dasgupta, Selim Kalayci* ........................................................................................................... 16

**Requirements**

Constructing FODA Feature Diagrams with a GUI-based Tool (S)

*Shin Nakajima* ............................................................................................................................. 20
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Towards a Classification of Requirements Relationships</td>
<td>Ruhaya Ab Aziz, Didar Zowghi, Tom McBride</td>
<td>26</td>
</tr>
<tr>
<td>Towards the Selection of the Most Suitable Elicitation Technique</td>
<td>Marcelo Werneck Barbosa, Glivia Angelica Rodrigues Barbosa</td>
<td>33</td>
</tr>
<tr>
<td>Through a Defined Requirements Elicitation Process (S)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Requirement Traceability Refinement Method Based on Relevance</td>
<td>Lingjun Kong, Juan Li, Yin Li, Ye Yang, Qing Wang</td>
<td>37</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applying Transformation Rules to Improve i* Models (S)</td>
<td>Marcia Lucena, Carla Silva, Emanuel Santos, Fernanda Alencar, Jaelson</td>
<td>43</td>
</tr>
<tr>
<td>Castro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nested NL Representation for OO Analysis and Design (S)</td>
<td>Magda G. Ilieva, Olga Ormandjieva</td>
<td>49</td>
</tr>
<tr>
<td>Specification of Data Requirements from Task Descriptions</td>
<td>Jose Luis de la Vara, Juan Sanchez</td>
<td>55</td>
</tr>
<tr>
<td>From Organizational Models to Software Requirements</td>
<td>Alicia Martinez, Oscar Pastor, John Mylopoulos, Hugo Estrada</td>
<td>61</td>
</tr>
<tr>
<td>Systematic Review of Requirements Reuse</td>
<td>Flavia Braga de Azambuja, Ricardo Melo Bastos, Ana Paula Terra Bacelo</td>
<td>67</td>
</tr>
<tr>
<td>Reprioritizing the Requirements in Agile Software Development:</td>
<td>Zornitza Racheva, Maya Daneva</td>
<td>73</td>
</tr>
<tr>
<td>Towards a Conceptual Model from Clients' Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Mining and Features</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Novel Hybrid Search Algorithm for Feature Selection</td>
<td>Pengpeng Lin, Huanjing Wang, Taghi M. Khoshgoftaar</td>
<td>81</td>
</tr>
<tr>
<td>Improving Text Document Clustering by Exploiting Open Web Directory</td>
<td>Gaurav Ruhela, P.Krishna Reddy</td>
<td>87</td>
</tr>
</tbody>
</table>
Automated Nursing Knowledge Management Using Indexing (S)
Shihong Huang, Sucharita Chinchanikar, Abhijit Pandya, Sam Hsu, Marilyn Parker 93

Applications

Classifying Web Robots by K-means Clustering
Derek Doran, Swapna S. Gokhale ................................................................. 97

Systematic Risk Assessment and Cost Estimation for Software Problems
Jerry Gao, Maulik Shah, Mihir Shah, Devarshi Vyas, Pushkala Pattabhiraman,
Kamini Dandapani, Emese Bari ................................................................. 103

Improving Negotiations through Fuzzy Cognitive Maps
Sergio Assis Rodrigues, Tiago Santos da Silva, Jano Moreira de Souza ............... 110

Software Engineering with Computational Intelligence and Machine Learning

Value-Based Software Quality Modeling
Naeem Seliya, Taghi M. Khoshgoftaar ....................................................... 116

Predicting Maintainability expressed as Change Impact: A Machine-learning-based
Approach
H. Lounis, M.K. Abdi, H. Sahraoui ......................................................... 122

Program File Bug Fix Effort Estimation Using Machine Learning Methods for OSS (S)
Syed Nadeem Ahsan, Javed Ferzund, Franz Wotawa ........................................ 129

Software Architecture and Evolution

An Architecture-based Evolution Management Method for Software Product Line
Xin Peng, Liwei Shen, Wenyun Zhao ....................................................... 135

Towards Design and Architectural Evaluation of Product Variants: A Case Study on an
Open Source Software System
Muhammad Irfan Ullah, Guenther Ruhe, Vahid Garousi ................................. 141
Decision Support System Environment for Software Architecture Style Selection
(DESAS v1.0) (S)
Shahrouz Moaven, Hamed Ahmadi, Jafar Habibi, Ali Kamandi ......................... 147

Towards Architecture-centric Collaborative Software Development (S)
Yanchun Sun, Hui Song, Wenpin Jiao .................................................................... 152

Agents and Multi-Agent Systems

Analysis of Agent Oriented Software Engineering Methodologies for Social Causal Models
Michele Atkinson, Sheryl Duggins ................................................................. 157

Realization of Semantic Search Using Concept Learning and Document Annotation Agents
Behrouz H. Far, Cheng Zhong, Zilan Yang, Mohsen Afsharchi ............................. 164

Agent-based Simulation Model for the Evolution Process of Open Source Software
Taemin Seo, Heesang Lee ................................................................................... 170

Towards Merging Goal Models of Networked Software
Zaiwen Feng, Keqing He, Rong Peng, Jian Wang, Yutao Ma ............................. 178

Comparison of Some Single-agent and Multi-agent Information Filtering Systems on a Benchmark Text Data Set (S)
Snehasis Mukhopadhyay, Shengquan Peng, Rajeev Raje, Mathew Palakal, Javed Mostafa ........................................................................................................ 185

Towards Adaptable BDI Agent: A Formal Aspect-oriented Modeling Approach (S)
Lily Chang, Xudong He ..................................................................................... 189

A Multi-agent Debugging Extension Architecture (S)
Ziad Al-Sharif, Clinton Jeffery ............................................................................. 194

A Recognition-primed Architecture for Human-centric Multi-agent Systems
Xiaocong Fan ..................................................................................................... 200
Using Knowledge Objects to Exchange Knowledge in a MAS Platform
Ana Paula Lemke, Marcelo Blois ................................................................. 206

JAFF: A Framework to Implement Self-adaptive Agents
Baldoine F. dos S. Neto, Andrew D. da Costa, Manoel T. de A. Netto, Viviane T. da Silva, Carlos J. P. de Lucena ................................................................. 212

An Agent-based Centralized e-Marketplace in a Virtual Environment (S)
Ingo Seidel, Markus Gartner, Josef Froschauer, Helmut Berger, Dieter Merkl .......... 218

Interoperability and Semantic Web Technologies

Semantic Service Matchmaking in the ATM Domain Considering Infrastructure Capability Constraints (S)
Thomas Moser, Richard Mordinyi, Wikan Danar Sunindyo, Stefan Biffl ................. 222

Ontology Mapping Representations: A Pragmatic Evaluation (S)
Hendrik Thomas, Declan O'Sullivan, Rob Brennan .......................................... 228

Bridging Semantic Gaps Between Stakeholders in the Production Automation Domain with Ontology Areas
Stefan Biffl, Wikan Danar Sunindyo, Thomas Moser ....................................... 233

LD2SD: Linked Data Driven Software Development
Aftab Iqbal, Oana Ureche, Michael Hausenblas, Giovanni Tummarello ................. 240

Improving Searchability of a Music Digital Library with Semantic Web Technologies Paloma de Juan, Carlos A. Iglesias ............................................................... 246

A Guideline Engine For Knowledge Management in Clinical Decision Support Systems (CDSSs)
Michele Ceccarelli, Alessandro De Stasio, Antonio Donatiello, Dante Vitale ........... 252

Ontology-based Semantic Annotations of Medical Articles (S)
Jihen Majdoubi, Mohamed Tmar, Faiez Gargouri ............................................. 258
Reverse Engineering

Automating Business Intelligence Recovery from a Web-based System
Jian Kang, Jianzhi Li, Jianchu Huang, Yingchun Tian, Hongji Yang .......................... 262

Automatic Class Matching to Compare Extracted Class Diagrams: Approach and Case Study (S)
Yan Liang, Nicholas A. Kraft, Randy K. Smith ......................................................... 268

SOA-based software engineering

Modeling and Verification of Automatic Multi-business Transactions
Min Yuan, Zhiqiu Huang, Jian Zhao, Xiang Li ......................................................... 274

An Adaptive Management Framework for Service Brokers in Service-oriented Architecture
W.T. Tsai, Tszyan Chow, Yinong Chen, Xiao Wei ...................................................... 280

Requirements Discovery Based on RGPS Using Evolutionary Algorithm (S)
Tao Peng, Bing Li, Weifeng Pan, Zaiwen Feng ......................................................... 286

Mediation Based Variability Modeling for Service Oriented Software Product Lines (S)
Mohammad Abu-Matar ................................................................................................. 291

Software Engineering Education

Pedagogy-oriented Software Modeling and Simulation of Component-based Physical Systems
Dan Tappan .................................................................................................................. 295

An Academia-Industry Collaborative Teaching and Learning Model for Software Engineering Education (S)
Huilin Ye ...................................................................................................................... 301
### Software Testing and Automation

**Data Flow Analysis and Testing for Web Service Compositions Based on WS-BPEL**  
*Chien-Hung Liu, Shu-Ling Chen* ................................................................. 306

**Knowledge-based Software Test Generation**  
*Valeh H. Nasser, Weichang Du, Dawn MacIsaac* ........................................ 312

**Some Experiments on Test Case Tracebaility (S)**  
*Macario Polo, Beatriz Perez, Pedro Reales* .................................................. 318

### Service Oriented Architecture

**Business Modeling for Service Engineering: Toward an integrated Procedure Model**  
*Gregor Scheithauer, Stefan Augustin, Guido Wirtz* ..................................... 322

**A Systematic SOA-based Architecture Process**  
*Jose Jorge Lima Dias Junior, Eduardo Santana de Almeida, Silvio Romero de Lemos Meira* .............................................................. 328

**Research and Implementation of Service-oriented Architecture Supporting Location-based Services on Sensor Networks (S)**  
*Bin-Yi Liao, Wen-Shyang Huang, Jeng-Shyang Pan, Hong-Chi Wu, Yuh-Ming Cheng, Jen-Kuin Lee, Bo-Sian Wang, E-Liang Chen, Mong-Fong Horng* ............... 334

**Service Creation and Composition for Realization On Service-oriented Architecture**  
*Chi-Lu Yang, Yeim-Kuan Chang, Chih-Ping Chu* ......................................... 338

**An Extendible Translation of BPEL to a Machine-verifiable Model**  
*John C. Sloan, Taghi M. Khoshgoftaar, Augusto Varas* .............................. 344

**Generating Test Cases of Composite Services Based on OWL-S and EH-CPN**  
*Bixin Li, Ju Cai, Dong Qiu, Shunhui Ji, Yuting Jiang* ................................. 350
User Perceived Response-time Optimization Method for Composite Web Services

Junfeng Zhao, Yasha Wang, Bing Xie ................................................................. 356

Dynamic Service Composition for Virtual UPnP Device Creation

Sheng-Tzong Cheng, Chih-Lun Chou, Jiashing Shih, Mingzoo Wu ..................... 364

Using Service-oriented Architectures for Socio-Cultural Analysis

David Garlan, Kathleen M. Carley, Bradley Schmerl, Michael Bigrigg, Orieta Celiku . 370

Languages and Program Understanding

A Conceptual Model for Comprehension of Object-oriented Interactive Systems (S)

Izuru Kume, Etsuya Shibayama ................................................................. 376

Arabic Lisp (S)

Hanan Elazhary ................................................................. 382

The Use of Reading Technique and Visualization for Program Understanding

Daniel Porto, Manoel Mendonca, Sandra Fabbri ........................................ 386

Language Support for Event-based Debugging

Ziad Al-Sharif, Clinton Jeffery ................................................................. 392

Pie Tree Visualization

Mireille Samia, Michael Leuschel ................................................................. 400

Formal Verification of Scalable NonZero Indicators

Shao Jie Zhang, Yang Liu, Jun Sun, Jin Song Dong, Wei Chen, Yanhong A. Liu ... 406

Software Quality

Detecting Defects with an Interactive Code Review Tool Based on Visualisation and Machine Learning

Stefan Axelson, Dejan Baca, Robert Feldt, Darius Sidlauskas, Denis Kacan .......... 412
Dynamic Test Profiles in Adaptive Random Testing: A Case Study (S)
Huai Liu, Fei-Ching Kuo, Tsong Yueh Chen .................................................. 418

A Novel Method of Mutation Clustering Based on Domain Analysis (S)
Changbin Ji, Zhenyu Chen, Baowen Xu, Zhihong Zhao .................................... 422

Using a Mining Frequency Patterns Model to Automate Passive Testing of Real-time Systems
Cesar Andres, Mercedes G. Merayo, Manuel Nunez ........................................ 426

DeLLIS: A Data Mining Process for Fault Localization (S)
Peggy Cellier, Mireille Ducasse, Sebastien Ferre, Olivier Ridoux ....................... 432

Extending AOP to Support Broad Runtime Monitoring Needs (S)
Amjad Nusayr, Jonathan Cook ........................................................................... 438

Clustering of Defect Reports Using Graph Partitioning Algorithms (S)
Vasile Rus, Xiaofei Nan, Sajjan Shiva, Yixin Chen .......................................... 442

Documenting Quality Attributes of Software Components (S)
Wenhui Zhu, Yanchun Sun, Gang Huang, Hong Mei ...................................... 446

Taming Inconsistency in Value-based Software Development
Du Zhang ........................................................................................................... 450

WSTester: Testing Web Service for Behavior Conformance (S)
Bixin Li, Lili Yang, Shunhui Ji, Dong Qiu, Xufang Gong ................................. 456

Robustness Verification Challenges in Automotive Telematics Software (S)
Ali Shahrokni, Robert Feldt, Fredrik Petterson, Anders Back .......................... 460

Smart Environments and Applications

A 2D-barcode Based Mobile Advertising Solution
Jerry Zeyu Gao, Hema Veeraragavathatham, Shailashree Savanur, Jinchun Xia ... 466
Long-term Prediction of Wireless Network Traffic

Zhiwei Xu, Zhou Zhou, Weibiao Wu ................................................................. 473

Software Architecture and Applications

Resource Allocation for a Modular Software System

Lance Fiondella, Swapna S. Gokhale ............................................................... 480

Enhancing Property Specification Tools With Validation Techniques

Salamah Salamah, Matthew Del Buono, Eric Baily, Sarah Printy, Derek Ferris, Laurel Christian ................................................................. 487

Software Process and Process Models

Supporting Good Decision Making at Early Stage of Software Design

Hung-Fu Chang, Stephen C-Y. Lu ................................................................. 493

A Language for Modeling Software Development Life Cycles (S)

Ernest Cachia, Mark Micallef ................................................................. 499

Weaving Process Patterns into Software Process Models (S)

Xiao-yang He, Ya-sha Wang, Jin-gang Guo, Wu Zhou, Jia-kuan Ma .............. 505

Assessing Workflow Ability of ERP and WfM Systems (S)

Lerina Aversano, Roberto Intonti, Maria Tortorella .................................. 509

Mining Objective Process Metrics from Repository Data

Michael VanHilst, Shihong Huang ................................................................. 514

Collaborative Development of System Architecture - a Tool for Coping with Inconsistency (S)

Peter Henderson, Matthew J. Henderson ................................................ 520

BITS: Issue Tracking and Project Management Tool in Healthcare Software Development (S)

Ayse Tosun, Ayse Bener, Ekrem Kocaguneli ............................................. 526
Security and Privacy

Privacy-preserving Clustering of Data Streams
*Ching-Ming Chao, Chih-Chin Shen* ................................................................. 530

FiGD: An Open Source Intellectual Property Violation Detector (S)
*Carson Brown, David Barrera, Dwight Deugo* ..................................................... 536

Integrating Privacy Requirements into Security Requirements Engineering
*Saeed Abu-Nimeh, Seiya Miyazaki, Nancy R. Mead* ........................................ 542

iPass: An Integrated Framework for Educating, Monitoring and Enforcing Password Policies for Online Services (S)
*Dhananjay Kulkarni, Diana Ciric, Fernanda Zulkarnain* ........................................ 548

Ontologies and their Applications

Improving Natural Language Specifications with Ontologies
*Sven J. Korner, Torben Brumm* ........................................................................... 552

A Knowledge-based Retrieval Model
*Fabio Silva, Rosario Girardi, Lucas Drumond* .................................................... 558

TRIple Content-based OnTology (TRICOt) for XML Dissemination (S)
*Mirella M. Moro, Deise de Brum Saccol, Renata de Matos Galante* ...................... 564

An ontology-based Approach to Portable Embedded System Development
*Feng Chen, Hong Zhou, Jianzhi Li, Ruimin Liu, Hongji Yang, Han Li, He Guo, Yuxin Wang* ................................................................. 569

An Integrated Ontology Framework for Health Information Exchange
*S. Demurjian, R. Saripalle, S. Berhe* ................................................................. 575
HCI and Smart Environments

Modeling User Interpersonal Stances in Affective Dialogues with an ECA
Nicole Novielli, Enrica Gentile ................................................................. 581

Capturing Users' Preferences and Intentions in a Semantic Search System (S)
Caio Stein D'Agostini, Renato Fileto .......................................................... 587

Toward Developing Knowledge Representation in Emergency Medical Assistance through a Ontology-based Semantic Cache Model (S)
Heloise Manica, Cristiano C. da Rocha, Jose Leomar Todesco, M. A. R. Dantas, Michael A. Bauer ................................................................. 592

Specification of a Component-based Domotic System to Support User-defined Scenarios
Fady Hamoui, Marianne Huchard, Christelle Urtado, Sylvain Vauttier ............... 597

Towards Mobility Support in Smart Environments (S)
Daniel Retkowitz, Ibrahim Armac, Manfred Nagl ....................................... 603

A Graph Transformation-based Approach to Task Allocation in Wireless Sensor Actor Networks (S)
Hossein Momeni, Vahid Rafe, Mohsen Sharifi, Adel T. Rahmani ....................... 609

Software Measurement

Another New Criterion to Improve the Interaction Diagrams Quality
Lilia Grati, Mohamed Tmar, Faiez Gargouri .............................................. 613

Software Project Effort Estimation Non Lineal Mathematical Models
Pablo R. Soria, Borja Martin, Marian Fernandez de Sevilla, Maria J. Dominguez-Alda, Miguel A. Herranz ................................................................. 619

Software Estimation: Universal Models or Multiple Models? (S)
Alain Abran, Juan Jose Cuadrado Gallego .................................................. 625
An Empirical Study of the Feedback of the In-process Measurement in a Japanese Consortium-type Software Project (S)
Yoshiki Mitani, Tomoko Matsumura, Katsuro Inoue, Mike Barker, Akito Monden, Ken-ichi Matsumoto ........................................................................................................ 631

Prest: An Intelligent Software Metrics Extraction, Analysis and Defect Prediction Tool
Ekrem Kocaguneli, Ayse Tosun, Ayse Bener, Burak Turhan, Bora Caglayan ............... 637

Accelerated Risk Management using Statistical Triggers
Rose Williams, Krishna Ratakonda ............................................................................. 643

Process Management and Outsourcing

A Layered Approach for Planning Releases under Uncertain Capacities
Jim McElroy, Guenther Ruhe ..................................................................................... 649

PP-HAS: A Task Priority Based Preemptive Human Resource Scheduling Method
Lizi Xie, Qing Wang, Junchao Xiao, Yongji Wang, Ye Yang ..................................... 655

A Real Execution of a Software Process Improvement: An Opportunity to Execute a Combination of Approaches (S)
Adriano Bessa Albuquerque, Ana Regina Rocha ..................................................... 661

Establish Decision Making Process for Selecting Outsourcing Company
Akihiro Hayshi .......................................................................................................... 666

From Strategy to Solution: A Lightweight Semi-prescriptive Approach for Software Development Lifecycle with Outsourcing Support (S)
Nelio Alves, Sergio Paim, Alexandre Cardoso, Edgard Lamounier ............................ 672

Databases and Data Modeling

A Model Driven Method for Data Warehouse
Leopoldo Zepeda, Elizabeth Cecena, Jorge Rivas, Javier Cano, Nelly Condory, Matilde Celma ........................................................................................................ 676
Analyzing the Software Development Process with SyQL and Lagrein
Mirco Bianco, Alberto Sillitti, Giancarlo Succi ...................................................... 682

Performance Analysis of a Deductive Database with a Semantic Web Reasoning Engine: ConceptBase and Racer
Simone A. Ludwig, Craig Thompson, Kristofor Amundson .............................. 688

Object Specification Language for Graph Based Conceptual level Multidimensional Data Model (S)
Anirban Sarkar, Sankhayan Choudhury, Nabendu Chaki, Swapan Bhattacharya ...... 694

A Framework for Trajectory Data Preprocessing for Data Mining (S)
Luis Otavio Alvares, Gabriel Oliveira, Carlos A. Heuser, Vania Bogorny ................. 698

Multimedia Software Engineering

A Payload Optimization Technique for Multimedia Visual Cryptographye
Moussa H. Abdallah, Rola I. Al-Khalid, Randa A. Al-Dallah .............................. 703

Knowledge Management Framework for Conference Video-recording Retrieval
Maria Sokhn, Elena Mugellini, Omar Abou Khaled .............................................. 709

Software Engineering and Aspects

Separating The Scattered Concerns: A Graph Based Model
Dipankar Majumdar, Swapan Bhattacharya ...................................................... 715

Early Analysis of Modularity in Software Product Lines
Jose M. Conejero, Juan Hernandez, Elena Jurado, Pedro J. Clemente, Roberto Rodriguez .......................................................... 721

Model-Driven Software Engineering

MD-JPA Profile: A Model Driven Language for Java Persistence
Alexandre Torres, Renata Galante, Marcelo S. Pimenta ..................................... 727