KNOWLEDGE-BASED SOFTWARE ENGINEERING
Frontiers in Artificial Intelligence and Applications

Volume 240

Published in the subseries

Knowledge-Based Intelligent Engineering Systems

Editors: L.C. Jain and R.J. Howlett

Recently published in KBIES:

Vol. 234. B. Apolloni, S. Bassis, A. Esposito and C.F. Morabito (Eds.), Neural Nets WIRN11 – Proceedings of the 21st Italian Workshop on Neural Nets
Vol. 226. B. Apolloni, S. Bassis, A. Esposito and C.F. Morabito (Eds.), Neural Nets WIRN10 – Proceedings of the 20th Italian Workshop on Neural Nets
Vol. 204. B. Apolloni, S. Bassis and C.F. Morabito (Eds.), Neural Nets WIRN09 – Proceedings of the 19th Italian Workshop on Neural Nets, Vietri sul Mare, Salerno, Italy, May 28–30 2009
Vol. 203. M. Džbor, Design Problems, Frames and Innovative Solutions
Vol. 196. F. Masulli, A. Micheli and A. Sperduti (Eds.), Computational Intelligence and Bioengineering – Essays in Memory of Antonina Starita
Vol. 193. B. Apolloni, S. Bassis and M. Marinaro (Eds.), New Directions in Neural Networks – 18th Italian Workshop on Neural Networks: WIRN 2008
Vol. 186. G. Lambert-Torres et al. (Eds.), Advances in Technological Applications of Logical and Intelligent Systems – Selected Papers from the Sixth Congress on Logic Applied to Technology
Vol. 170. J.D. Velásquez and V. Palade, Adaptive Web Sites – A Knowledge Extraction from Web Data Approach

Recently published in FAIA:

Vol. 238. A. Respício and F. Burstein (Eds.), Fusing Decision Support Systems into the Fabric of the Context

ISSN 0922-6389 (print)
ISSN 1879-8314 (online)
Knowledge-Based Software Engineering
Proceedings of the Tenth Joint Conference on Knowledge-Based Software Engineering

Edited by
Maria Virvou
University of Piraeus, Greece
and
Saeko Matsuura
Shibaura Institute of Technology, Japan

IOS Press
Amsterdam • Berlin • Tokyo • Washington, DC
Preface

This volume summarizes the works and new research results presented at the Tenth Joint Conference on Knowledge-based Software Engineering (JCKBSE 2012), which took place in August 23–26, 2012 on the island of Rodos, Greece. JCKBSE is a well established international biennial conference that focuses on the applications of Artificial Intelligence on Software Engineering. The Tenth Joint Conference on Knowledge-based Software Engineering (JCKBSE 2012) was organized by the Department of Informatics of the University of Piraeus and it was the second time that a JCKBSE took place in Greece.

This year, pretty much like every year, the majority of submissions originated from Japan, while Greece was second. The submitted papers were reviewed by at least two reviewers. Finally, 35 papers were accepted for presentation at the JCKBSE2012 and inclusion in its Proceedings. The papers accepted for presentation in JCKBSE2012 address topics such as the following:

- Architecture of knowledge-based systems, intelligent agents and softbots
- Architectures for knowledge-based shells
- Automating software design and synthesis
- Decision support methods for software engineering
- Development of multi-modal interfaces
- Development of user models
- Development processes for knowledge-based applications
- Empirical/evaluation studies for knowledge-based applications
- Intelligent user interfaces and human-machine interaction
- Internet-based interactive applications
- Knowledge acquisition
- Knowledge engineering for process management and project management
- Knowledge management for business processes, workflows and enterprise modeling
- Knowledge technologies for semantic web
- Knowledge technologies for service-oriented systems, Internet of services and Internet of things
- Knowledge technologies for web services
- Knowledge-based methods and tools for software engineering education
- Knowledge-based methods and tools for testing, verification and validation, maintenance and evolution
- Knowledge-based methods for software metrics
- Knowledge-based requirements engineering, domain analysis and modeling
- Methodology and tools for knowledge discovery and data mining
- Ontologies and patterns in UML modeling
- Ontology engineering
- Program understanding, programming knowledge, modeling programs and programmers
Software engineering methods for Intelligent Tutoring Systems
Software life cycle of intelligent interactive systems
Software tools assisting the development

In JCKBSE2012, we had Prof. Nikolaos Bourbakis as Keynote Speaker. Prof. Bourbakis (IEEE Fellow) is an OBR Distinguished Professor of IT and the Director of the Assistive Technologies Research Center (ATRC) at Wright State University, Ohio, USA. He pursues research in Applied AI, Machine Vision, Bioinformatics & Bioengineering, Assistive Technologies, Information Security, and Parallel-Distributed Processing funded by USA and European government and industry. He has published more than 330 articles in refereed International Journals, book-chapters and Conference Proceedings, and 10 books as an author, co-author or editor. He has graduated 17 Ph.Ds and 37 Master students. He is the founder and the EIC of the International Journal on AI Tools, the Editor-in-Charge of a Research Series of Books in AI (WS Publisher), the Founder and General Chair of several International IEEE Computer Society Conferences, Symposia and Workshops, an Associate Editor in several IEEE and International Journals and a Guest Editor in 18 journals special issues. His research work has been internationally recognized and has won several prestigious awards. Some of them are: IBM Author recognition Award 1991, IEEE Computer Society Outstanding Contribution Award 1992, IEEE Outstanding Paper Award ATC 1994, IEEE Computer Society Technical Research Achievement Award 1998, IEEE ICTAI 10 years Research Contribution Award 1999, IEEE Symposium on BIBE Outstanding Leadership Award 2003, ASC Award for Assistive Technology 2005, University of Patras Degree of Recognition 2007. The title of his talk was “An Intelligent Interface for Human-Machine Interaction for the Blind”.

We would like to thank the authors for choosing JCKBSE2012 as the forum for presenting the results of their research. We would also like to thank the reviewers for taking the time to review the submitted papers rigorously. For their efforts in undertaking the organization of JCKBSE2012, we would like to thank Profs. George A. Tsihrintzis and Th. Panagiotopoulos. For putting together the website of JCKBSE2012 and for managing the conference administration system, we would like to thank Mr. Ari Sako. Finally, we would like to thank the IOS Press personnel for their wonderful job in producing this Proceedings.

Maria Virvou and Saeko Matsuura
JCKBSE2012 General and Program co-Chairs
About the subseries Knowledge-Based Intelligent Engineering Systems (KBIES)

Editors: L.C. Jain and R.J. Howlett

**Aim of the Series**
The aim of the KBIES series is to report on the tremendous range of applications arising out of investigations into intelligent systems, coupled with the latest generic research that makes these applications possible. The series provides a leading resource for researchers, engineers, managers and all others concerned with this area of research, or wanting to know more about it.

**Invitation to Propose a Contribution**
Proposals are invited for text books, edited books, hand books and conference proceedings. Proposals may be sent to the series editors:

L.C. Jain  
Knowledge-Based Intelligent Engineering Systems Centre  
SCT-Building  
University of South Australia  
Adelaide  
Mawson Lakes  
SA 5095, Australia  
Lakhmi.Jain@unisa.edu.au

R.J. Howlett  
Director of Brighton KTP Centre  
Head of Intelligent Signal Processing Labs  
School of Engineering  
University of Brighton  
Brighton  
BN2 4GJ, United Kingdom  
R.J.Howlett@bton.ac.uk

For details please visit:  
www.kesinternational.org/bookseries.php  
www.iospress.com
Contents

Preface v
  
  Maria Virvou and Saeko Matsuura

A Verification Method of the Correctness of Requirements Ontology
  
  Bui Quang Huy and Atsushi Ohnishi 1

Question Answering System Using Web Relevance Score and Translation Probability
  
  Yuji Abe, Hajime Morita, Kanako Komiya and Yoshiyuki Kotani 11

Problems of a Method for Estimating SEAC and EAC by Earned Value Analysis
  
  Ryota Chiba, Kiyomi Shirakawa, Kazuki Mori and Seiichi Komiya 16

Proposal of Analysis Method Using Conceptual Data Modeling and Theory of Constraints
  
  Takamasa Sakai, Takahiro Nakagawa and Shigeo Kaneda 26

A Review Method Based on a Matrix Interpretation of GSN
  
  Shuichiro Yamamoto and Yutaka Matsuno 36

Artificial Immune System-Based Music Piece Recommendation
  
  Aristomenis S. Lampropoulos, Dionysios N. Sotiropoulos and George A. Tsihrintzis 43

A Concept-Based Image Acquisition System with User-Driven Classification
  
  D.N. Sotiropoulos, A.S. Lampropoulos and G.A. Tsihrintzis 53

Markerless Human Motion Tracking: A Survey
  
  Ioanna-Ourania Stathopoulou and George A. Tsihrintzis 61

Evaluation of an Assurance Case Development Method (d*)
  
  Takuya Saruwatari, Takashi Hoshino and Shuichiro Yamamoto 72

System Prototype Generation Tool for Requirements Review
  
  Shinobu Saito and Jun Hagiwara 81

Validating Quality Requirements Considerations in a Design Document Using Spectrum Analysis
  
  Masahiro Umemura, Haruhiko Kaita, Shinpei Ogata and Kenji Kaijiri 88

An Evaluation of a Quality Model for a High Quality Procurement Specification
  
  Hideki Nakakita, Kazuhiko Tsuda and Takako Nakatani 98

A Metamodel for Design Review Derived from Design Specification Templates
  
  Atsushi Motoyama and Takako Nakatani 108

Full-Text Retrieval System for Humanities Researches
  
  Takehiko Murakawa, Yukiharu Watagami, Keigo Utsunomiya and Masaru Nakagawa 118
A Preliminary Study on Formalization of Motivation Process in Personal Software Process Course  
Keiichi Ishibashi, Masaaki Hashimoto, Masanobu Umeda, Keiichi Katamine, Takaichi Yoshida and Yoshihiro Akiyama

Evaluation of End User Accessibility Support Using Link Content Analysis  
Hajime Iwata, Naofumi Kobayashi, Kenji Tachibana, Junko Shirogane and Yoshiaki Fukazawa

Evaluation of a Representation System of Quality Indicators  
Osamu Takaki, Noriaki Izumi, Koichiro Murata, Mitsuru Ikeda and Koiti Hasida

Toward Dynamic Assurance Cases  
Yutaka Matsuno and Shuichiro Yamamoto

An Automatic Approach for Detecting Early Indicators of Design Anti-Patterns  
Łukasz Puławski

Goal-Oriented Robustness Analysis  
Kazu Honda, Hiroyuki Nakagawa, Yasuyuki Tahara and Akihiko Ohsuga

A Review Method of Requirements Analysis Model in UML with Prototyping  
Shinpei Ogata and Saeko Matsuura

Development of Requirement Specification Editor with Semantic Information  
Kuniya Sato, Masahiro Ooba, Tomohiko Takagi, Zengo Furukawa, Seiichi Komiya and Rihito Yaegashi

Consistent GUI Arrangements by Analyzing Existing Windows  
Junko Shirogane, Seitaro Shirai, Hajime Iwata and Yoshiaki Fukazawa

Mapping Rule Between Requirements Analysis Model and Web Framework Specific Design Model  
Hirotaka Okuda, Shinpei Ogata and Saeko Matsuura

Killing Mutants Effectively – A Search Based Approach  
Mike Papadakis and Nicos Malevris

A Mutation Test Based Approach to Evaluating Test Suites for Web Applications  
Rogene Lacanienta, Shingo Takada, Haruto Tanno, Xiaojing Zhang and Takashi Hoshino

Detecting API Usage Patterns from Software Repositories Using Method Categorization  
Rizky Januar Akbar, Takayuki Omori and Katsuhisa Maruyama

Computer-Aided Diagnosis and Access on Peoples’ Health Status Using Web Technology and Mobile Devices  
Christos Lambrinidis and Efthimios Alepis

Using Fuzzy Cognitive Maps for the Domain Knowledge Representation of an Adaptive e-Learning System  
Konstantina Chrysafiadi and Maria Virvou
Error Diagnosis in Computer-Supported Collaborative Multiple Language Learning Using User Classification
  Maria Virvou, Efthymios Alepis and Christos Troussas
Motivated Agents in Virtual Worlds
  Nikos Avradinis, George Anastassakis and Themis Panayiotopoulos
Knowledge Acquisition for the Further Development of e-Government
  Stamatis Theoharis and George A. Tsihrintzis
Macro and Micro Patterns in the Software Design Activity
  Jonatan Hernandez, Hironori Washizaki and Yoshiaki Fukazawa
Finding Cross-Browser JavaScript Codes Using Sequential Pattern Mining
  Takahiro Fujitani, Takashi Kobayashi, Noritoshi Asumi and Kiyoshi Agusa
Multi-Level Human Robot Interaction by Aligning Different Ontologies
  Shotaro Kobayashi and Takahira Yamaguchi

Subject Index

Author Index