2012 IEEE 36th Annual Computer Software and Applications Conference

(COMPSAC 2012)

Izmir, Turkey
16-20 July 2012
# Table of Contents

**Message from the Standing Committee Chair** .................................................................................................................. xvi
**Message from the Program Chairs** ............................................................................................................................ xviii
**Committees** ........................................................................................................................................................................ xx
**Reviewers** ........................................................................................................................................................................... xxviii

---

## Software Life Cycle, Evolution and Maintenance I

**Effective Statistical Fault Localization Using Program Slices** ........................................................................................... 1
  *Yan Lei, Xiaoguang Mao, Ziying Dai, and Chengsong Wang*

**Recovering Traceability Links between Code and Documentation for Enterprise Project Artifacts** ................................................................. 11
  *Shouichi Nagano, Yusuke Ichikawa, and Toru Kobayashi*

**A Source Code Recommender System to Support Newcomers** ......................................................................................... 19
  *Yuri Malheiros, Alan Moraes, Cleyton Trindade, and Silvio Meira*

---

## Reliability, Metrics and Fault Tolerance I

**Workload-Aware Online Anomaly Detection in Enterprise Applications with Local Outlier Factor** ......................................................... 25
  *Tao Wang, Wenbo Zhang, Jun Wei, and Hua Zhong*

**A Metrics-Based Data Mining Approach for Software Clone Detection** ....................................................................................... 35
  *Salwa K. Abd-El-Hafiz*

**A Petri Net-Based Byzantine Fault Diagnosis Method for Service Composition** ................................................................. 42
  *Guisheng Fan, Huiquin Yu, Liqiong Chen, and Dongmei Liu*
Software Testing I
Adaptive Random Test Case Generation for Combinatorial Testing ........................................52
Rubing Huang, Xiaodong Xie, Tsong Yueh Chen, and Yansheng Lu
Capacity Evaluation of Multi-modal Network Notification Service ........................................62
J. Jenny Li, Colin L. Mallows, and Jim Landwehr
Preemptive Regression Test Scheduling Strategies: A New Testing Approach
to Thriving on the Volatile Service Environments ....................................................................72
Lijun Mei, Ke Zhai, Bo Jiang, W. K. Chan, and T. H. Tse

Panel 1: Trustworthiness of Open Source, Open Data, Open Systems and Open Standards
Trustworthiness of Open Source, Open Data, Open Systems and Open Standards ..................................................82
Ina Schieferdecker
(Open) Data Quality .......................................................................................................................83
Ina Schieferdecker
Investigating Human Factors through Amassing Large-Scale OSS Repositories ..................................................85
Minghui Zhou
Supporting Trust via Open Information Spaces .................................................................................87
Edzard Höfig

Software Life Cycle, Evolution and Maintenance II
Integrating Software Product Lines: A Study of Reuse versus Stability ........................................89
Alessandro Gurgel, Francisco Dantas, Alessandro Garcia, and Claudio Sant’Anna
Experiences of a Product Line Migration Project ........................................................................99
Detlef Streitferdt and Arfan Mansoor
Kutulu: A Domain-Specific Language for Feature-Driven Product Derivation ................................105
Orçun Dayibaş and Halit Oğuztüzün
Automatic Adaptation of Software Applications to Database Evolution
by Graph Differencing and AOP-Based Dynamic Patching .......................................................111
Yang Song, Xin Peng, Zhenchang Xing, and Wenyun Zhao
Reliability, Metrics and Fault Tolerance II

An Effective Defect Detection and Warning Prioritization Approach for Resource Leaks .......................................................... 119

Guangtai Liang, Qian Wu, Qianxiang Wang, and Hong Mei

Evaluating Reliability-Testing Usage Models .......................................................... 129

Bo Wan, Gregor v. Bochmann, and Guy-Vincent Jourdan

Towards Online Localization and Recovery for Faulty Components in Component-Based Applications .......................................................... 138

Chao You, Minghui Zhou, Hongwu Lin, Zan Xiao, and Hong Mei

Software Testing II

CATest: A Test Automation Framework for Multi-agent Systems .......................................................... 148

Shufeng Wang and Hong Zhu

Usefulness Evaluation of Simulation in Server System Testing .......................................................... 158

Jian Sun and Tomi Männistö

Towards Dynamic Random Testing for Web Services .......................................................... 164

Chang-ai Sun, Guan Wang, Kai-Yuan Cai, and Tsong Yueh Chen

How to Recommend Appropriate Developers for Bug Fixing? .......................................................... 170

Tao Zhang and Byungjeong Lee

Software Architecture and Design I

Adaptive Explanation Architecture for Maintaining Human-Computer Trust .......................................................... 176

Florian Nothdurft, Gregor Bertrand, Helmut Lang, and Wolfgang Minker

Quality-Driven Self-Adaptation: Bridging the Gap between Requirements and Runtime Architecture by Design Decision .......................................................... 185

Liwei Shen, Xin Peng, and Wenyun Zhao

A Rapid Development Framework for Multilingual Spoken Dialogue Systems .......................................................... 195

Masahiro Araki and Daisuke Takegoshi

Software Life Cycle, Evolution and Maintenance III

ALTA: Automatic Load-Time Adaptation Technique for Refactoring-Based Evolution of Software Component .......................................................... 203

Kai-Shin Lu and Carl K. Chang

An Initial Study on Refactoring Tactics .......................................................... 213

Hui Liu, Yuan Gao, and Zhendong Niu

A Framework for Examining Topical Locality in Object-Oriented Software .......................................................... 219

Nan Niu, Juha Savolainen, Tanmay Bhowmik, Anas Mahmoud, and Sandeep Reddivari
Domain Independent Event Analysis for Log Data Reduction ................................................................. 225
    Theodoros Kalamatianos, Kostas Kontogiannis, and Peter Matthews

Security
Preventing Input Validation Vulnerabilities in Web Applications
through Automated Type Analysis ........................................................................................................ 233
    Theodoor Scholte, William Robertson, Davide Balzarotti, and Engin Kirda
Real-Time Fast-Flux Identification via Localized Spatial Geolocation Detection ............................. 244
    Horng-Tzer Wang, Ching-Hao Mao, Kuo-Ping Wu, and Hahn-Ming Lee

Panel 2: Software Testing, Software Quality and Trust in Software-Based Systems
Software Testing, Software Quality and Trust in Software-Based Systems ......................................... 253
    Christof Budnik
Position Statement: Software Testing, Software Quality and Trust in Software-Based Systems ......... 254
    Rajesh Subramanyan
Position Statement: Can Testing Prove Software Has No Bug? ......................................................... 255
    Hong Zhu
Data Mining Technique Effectiveness for Improving Software Productivity and Quality .................... 256
    Toru Kobayashi

Software Architecture and Design II
An Approach for Detecting Inconsistencies between Behavioral Models of the Software Architecture and the Code ........................................................................................................ 257
    Selim Çiraci, Hasan Sözer, and Bedir Tekinerdogan
Fine-Grained Design Pattern Detection .................................................................................................. 267
    Maurice Lebon and Vassilios Tzerpos
On the Proactive Design of Product-Line Architectures with Aspects: An Exploratory Study .............. 273
Requirements Engineering
Development of Situational Requirements Engineering Processes: A Process Factory Approach .................................................................279
  Omid Jafarinezhad and Raman Ramsin

Software Product Line Engineering for Developing Self-Adaptive Systems: Towards the Domain Requirements .................................................................289
  Liwei Shen, Xin Peng, and Wenyun Zhao

Requirements Understanding: A Challenge in Global Software Development, Industrial Surveys in Kingdom of Saudi Arabia .................................................................297
  Mohammed Abdullah Alnuem, Arshad Ahmad, and Hashim Khan

Panel 3: Creative Computing: Reconciling Objective Precision with Subjective Ambiguity
Position Statement: For the Panel on Creative Computing: Reconciling Objective Precision with Subjective Ambiguity - Animated Computing Changes the Way and Style of Computer Application .................................................................307
  Ruqian Lu

Position Statement: For the Panel on Creative Computing: Reconciling Objective Precision with Subjective Ambiguity - Using the Semantic Web Technologies To Support Automatic Animation .................................................................309
  Songmao Zhang

Position Statement: Can Software Design Benefit from Creative Computing? .................................................................310
  Hong Zhu

Formal Method
XMLSnippet: A Coding Assistant for XML Configuration Snippet Recommendation .................................................................312
  Sheng Huang, Yanghua Xiao, Yiqi Lu, Wei Wang, and Yu Wang

Model-Based Static Source Code Analysis of Java Programs with Applications to Android Security .................................................................322
  Zheng Lu and Supratik Mukhopadhyay

A Change Proposal Driven Approach for Changeability Assessment Using FCA-Based Impact Analysis .................................................................328
  Xiaobing Sun, Bixin Li, and Qiandong Zhang

A Methodology for Building Effective Test Models with Function Nets .................................................................334
  Dianxiang Xu and William Chu
Fast Abstract

Paxos-Based Memory Data Replication in Stock Trading System ...............................................................340
Xiaodong Huang, Yong Zhang, Chunxiao Xing, Yinfei Huang, Jianfeng Wu, and Shuo Bai

Using Program Dynamic Analysis for Weak Algorithm Detection ..............................................................342
Zakarya A. Alzamil

Requirement Patterns for Multicore Systems ...................................................................................................344
Arfan Mansoor and Detlef Streitferdt

Performance Evaluations of Vector-Raster Satellite Image Transfers through Web Services ..........................................................346
Süleyman Eken and Ahmet Sayar

User Profiling for Policy Management in Social Communities ................................................................348
Okan Bursa, Özgü Can, and Murat Osman Ünalı

On Capturing Effects of Modifications as Data Dependencies ....................................................................350
Hasan Ural and Hüsnü Yenigün

Accelerated Deterministic Multithreading for Multichannel Video Decoder ...............................................352
Youngsam Shin, Minyoung Son, Seungwon Lee, and Shihwa Lee

Image Analysis Using Machine Learning: Anatomical Landmarks Detection in Fetal Ultrasound Images ........................................................................................................................354
Bahbibi Rahmatullah, Aris T. Papageorghiou, and J. Alison Noble

Test Case Generation by Simulating Requirements Analysis Model .................................................................356
Ryo Shikimi, Shinpei Ogata, and Saeko Matsuura

Customer Churn Prediction for Telecom Services ........................................................................................358
Utku Yabas, Hakki Candan Cankaya, and Turker Ince

A Cluster-Based Core Protection Technique for Networks-on-Chip ................................................................360
Khalid Latif, Amir-Mohammad Rahmani, Pasi Liljeberg, Hannu Tenhunen, and Tiberiu Seceleanu

HCI Knowledge in Software Engineering Practices for Designing Interactive Maintenance Assistance Systems .....................................................................................................................362
S. Benbelkacem, N. Zenati-Henda, M. Belhocine, A. Bellarbi, and M. Tadjine

An Intermediate Language for Semantic Exceptions in Context-Aware Systems .................................................364
Eun-Sun Cho and Sumi Helal

Doppel-Code: A Clone Visualization Tool for Prioritizing Global and Local Clone Impacts ..........................................................366
Christopher Forbes, Iman Keivanloo, and Juergen Rilling
Poster Session

WorldTour: Towards an Adaptive Software to Support Children with Autism in Tour Planning ................................................................. 368
Felipe Rodrigues Monteiro Sousa and Thais Helena Chaves de Castro

Implementation and Evaluation of Commodity Hardware and Software in an Open World Spoken Dialog Framework ................................................ 369
Hareendra Manuru, Rajagopal Vasudevan, Ashok Sasidharan, Thomas Lynch,
Seth Darbyshire, Satyajeet Raje, Rajiv Ramnath, and Jayashree Ramanathan

Implementing Knowledge Management Systems in Software Engineering:
Opportunities and Challenges ................................................................ 370
Mostefai Mohammed Amine and Mohamed Ahmed-Nacer

Conformance Testing of WS-BPEL Compositions under Various Load Conditions ........................................................................ 371
Afej Jmal Maâlej, Moez Krichen, and Mohamed Jmaiel

Joint COMPSAC/SAINT Panel

Plenary Panel Description: Challenges towards the Global Adoption of Cloud Computing ................................................................. 372
Vladimir Getov

Security as a Service in Smart Clouds – Opportunities and Concerns ................................................................. 373
Vladimir Getov

The Development of Cloud Computing and Its Challenges for Taiwan .................................................................................. 380
William C. Chu, Chih-Hung Chang, Chih-Wei Lu, Juei-Nan Chen,
and Feng-Jian Wang

Insider Threats to Cloud Computing: Directions for New Research Challenges ................................................................. 387
William R Claycomb and Alex Nicoll

Cloud Computing I

PaaS-Oriented Performance Modeling for Cloud Computing ................................................................. 395
Wenbo Zhang, Xiang Huang, Ningjiang Chen, Wei Wang, and Hua Zhong

Event Indexing and Searching for High Volumes of Event Streams in the Cloud ........................................................................ 405
Miao Wang, Viliam Holub, John Murphy, and Patrick O’Sullivan

Demystifying Cloud Benchmarking Paradigm - An in Depth View ................................................................. 416
Venu Vedam and Jayanti Vemulapati
**Web-Based System**

An Evaluation Model for Dependability of Internet-Scale Software on Basis of Bayesian Networks ..........................................................422

_Guannan Si, Jufeng Yang, Jing Xu, Shuo Wen, and Wei Tian_

Deriving Specifications for Composite Web Services .............................................432

_George Baryannis, Manuel Carro, and Dimitris Plexousakis_

Understanding Socio-technical Factors Influencing Testers in Software Development Organizations ..........................................................438

_Anca Deak_

**Application I**

Americans with Disabilities Act - Compliance Assessment Toolkit on Smartphone .........................................................................................442

_Mohammad Tanviruzzaman, Rizwana Rizia, Sheikh Iqbal Ahamed, and Roger Smith_

Automatic Data Clustering Analysis of Arbitrary Shape with K-Means and Enhanced Ant-Based Template Mechanism ........................................452

_Wei Zhang, Hen-I Yang, Hsin-yi Jiang, and Carl K. Chang_

Applying Knowledge Elicitation to Improve Web Effort Estimation: A Case Study .........................................................................................461

_Emilia Mendes, Manar AbuTalib, and Steve Counsell_

**Industry Track**

Architecturing Business Intelligence for SMEs ......................................................470

_Ayşe Eser Baransel and Cesur Baransel_

Agile Adoption Story from NHN ........................................................................476

_Eunha Kim and Seokmoon Ryoo_

Educational Activity Finder for Children with Pervasive Developmental Disorder through a Semantic Search System ........................................482

_Duygu Çelik, Eray Elverici, Atilla Elçi, and Necati İnan_

A Scalable Physical Memory Allocation Scheme for L4 Microkernel ..................488

_Chen Tian, Daniel Waddington, and Jilong Kuang_

Model Driven Software Development for Military Command and Control Systems .........................................................................................494

_Burak Çiftikli, Onur Özcan, and Ahmet Bora Uysal_
Panel 4: A Perspective of Software Trustworthiness Based on Finance Industry

A Perspective of Software Trustworthiness Based on Finance Industry .................................................................498

Baris Sarialioglu

Cloud Computing II

CASViD: Application Level Monitoring for SLA Violation Detection in Clouds ......................................................499

Vincent C. Emeakaroha, Tiago C. Ferreto, Marco. A. S. Netto, Ivona Brandic, and Cesar A. F. De Rose

P-Tracer: Path-Based Performance Profiling in Cloud Computing Systems ..........................................................509

Haibo Mi, Huaimin Wang, Hua Cai, Yangfan Zhou, Michael R. Lyu, and Zhenbang Chen

A Solution for Privacy Protection in MapReduce ..................................................................................................515

Quang Tran and Hiroyuki Sato

Smart and Semantic Computing

Using Semantic Web Technologies for RBAC in Project-Oriented Environments ...................................................521

Satyajeet Raje, Chowdary Davuluri, Michael Freitas, Rajiv Ramnath, and Jay Ramanathan

The RDFa Content Editor - From WYSIWYG to WYSIWYM ...........................................................................531

Ali Khalili, Sören Auer, and Daniel Hladky

Semantic Web - The Missing Link in Global Source Code Analysis? .................................................................541

Iman Keivanloo, Juergen Rilling, and Philippe Charland

Enriching the DBpedia Ontology with Shared Conceptualizations from Folksonomies .......................................551

Sana Hamdi, Alda Lopes Gancarski, Amel Bouzeghoub, and Sadok Ben Yahia

Application II

Novel Energy Saving Opportunities in Smart Grids Using a Secure Social Networking Layer ................................557

Florian Skopik and Christian Wagner

Privacy-Preserving Data Publishing for Free Text Chinese Electronic Medical Records .......................................567

Lei Chen, Ji-Jiang Yang, and Qing Wang
Disease-Disease Relationships for Rheumatic Diseases: Web-Based Biomedical Textmining an Knowledge Discovery to Assist Medical Decision Making

Andreas Holzinger, Klaus-Martin Simonic, and Pinar Yildirim

A Privacy-Preserving Cloud Computing System for Creating Participatory Noise Maps

George Drosatos, Pavlos S. Efraimidis, Ioannis N. Athanasiadis, Ellie D'Hondt, and Matthias Stevens

**HCI and Usability**

Influence of Anchor Management on Anchored Navigation in Mobile Maps

Rodrigo de A. Maués, Eduardo F. Nakamura, and Simone D. J. Barbosa

Study of Fractal Color Image Compression Using YUV Components

Eman A. Al-Hilo and Loay E. George

STREAM-ADD - Supporting the Documentation of Architectural Design Decisions in an Architecture Derivation Process

Diego Dermeval, João Pimentel, Carla Silva, Jaelson Castro, Emanuel Santos, Gabriela Guedes, Márcia Lucena, and Anthony Finkelstein

**Panel 5: Cloud Computing for Developing Countries**

Panel 5: Cloud Computing for Developing Countries Panelists

Tugkan Tuglular

**Mobile & Pervasive Computing**

Simulating Power Consumption of Location Tracking Algorithms to Improve Energy-Efficiency of Smartphones

Ulrich Bareth

KnockAround: Location Based Service via Social Knowledge

Rizwana Rizia, Mohammad Tanviruzzaman, and Sheikh Iqbal Ahamed

ConsView: Towards Application-Specific Consistent Context Views

Haibin Yang, Chang Xu, Xiaoxing Ma, Linghao Zhang, Chun Cao, and Jian Lu

**Application III**

An Agent-Based Application to Enable Deregulated Energy Markets

Nicola Capodieci, Giacomo Cabri, Giuliano Andrea Pagani, and Marco Aiello

Teaching Software Engineering in Developing Countries: A Position Paper

Rasha Osman
Leveraging 24/7 Availability and Performance for Distributed Real-Time Data Warehouses ..............................................................................................................................................654
   Ricardo Jorge Santos, Jorge Bernardino, and Marco Vieira

**Real-Time and Embedded System**

Specification Mutation Analysis for Validating Timed Testing Approaches Based on Timed Automata .................................................................................................................................................660
   M. Saeed AbouTrab, Steve Counsell, and Robert M. Hierons

Automatic RT-Java Code Generation from AADL Models for ARINC653-Based Avionics Software ..........................................................................................................................................................670
   Ying Wang, Dianfu Ma, Yongwang Zhao, Lu Zou, and Xianqi Zhao

Scheduling and Analysis of Real-Time Software Families ..............................................................................................................................................680
   Hamideh Sabouri, Mohammad Mahdi Jaghoori, Frank de Boer, and Ramtin Khosravi

**Author Index** ........................................................................................................................................................................................................690