2013 Fourth World Congress on Software Engineering

(WCSE 2013)

Hong Kong, China
3-4 December 2013
2013 Fourth World Congress on Software Engineering

WCSE 2013

Table of Contents

Preface .........................................................................................................................................................xi
Conference Committee .............................................................................................................................xiii
Additional Reviewers ................................................................................................................................xvi
Keynotes ...................................................................................................................................................xvii

Software Engineering Methodology

Software Metrics
Objective Image Quality Assessment Based on Image Complexity and Color
Similarity ...................................................................................................................................................5
Shuang Yang, Pan Gao, Fang Meng, Xiuhua Jiang, and Hao Liu

Distributed/Parallel Software Systems
Agent-Based Distributed Simulation Technology of Satellite Formation Flying ...........................................13
Chong Zhang, Yankai Wang, and Yinghong Zhao

Software Policy and Ethics
Study on Compensation for Software Infringement in Network Externality
Environments ...........................................................................................................................................19
Jianhui Zhu

Internet and Information Systems Development
Improved Text Clustering Algorithm and Application in Microblogging Public Opinion Analysis
..............................................................................................................................................................27
Yiyang Wang, Li Wang, Jing Qi, Zhong Qian, Bo Xu, Chao Lei, Yuexiang Yang, and Huali Cai
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software Requirements</strong></td>
<td>Schematizing UML Use Cases</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Sabah Al-Fedaghi and Asad Alrashed</td>
<td></td>
</tr>
<tr>
<td><strong>Software Architecture and Design</strong></td>
<td>Architecting and Constructing an SOA Bridge for an MVC Platform</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Sabelo Yalezo and Mamello Thinyane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Framework Planning of an Integrated Management Platform Applied</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Lei Ma, Qinan Jia, Jun Zhang, and Jianfeng He</td>
<td></td>
</tr>
<tr>
<td><strong>Software Testing and Analysis</strong></td>
<td>A Formal Definition of Software Testing Based on Fuzzy Measure</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Zhitao He, Chao Liu, Haihua Yan, and Huacan He</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Formal Model for Metamorphic Relation Decomposition</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Zhan-Wei Hui and Song Huang</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Method of State Abbreviation for Verification of Class Model</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Soo-Kyung Choi, Byungho Park, Robert Young Chul Kim, and Young B. Park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achievements and Challenges of Metamorphic Testing</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Zhan-Wei Hui and Song Huang</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluation of Stability and Similarity of Latent Dirichlet Allocation</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Jun Tang, Ruilong Huo, and Jiali Yao</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improvement on ABDOM-Qd and Its Application in Open-Source Community</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Software Defect Discovery Process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zhitao He, Haihua Yan, and Chao Liu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Locating Faulty Code Using Failure-Causing Input Combinations</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>Chunyan Ma, Yifei Zhang, Jie Liu, and Mengzhao</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Research on Loop Path Selection in Coverage Testing</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Qiang Wang, Jun-Fei Huang, and Yun-Zhan Gong</td>
<td></td>
</tr>
<tr>
<td><strong>Theory and Formal Methods</strong></td>
<td>Model Checking CTMDP against Temporal Specifications Characterized</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td>by Regular Expressions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jun Niu, Guosun Zeng, Jun Niu, and Weihua Zhan</td>
<td></td>
</tr>
</tbody>
</table>
Software Processes and Workflows
A Method-Based Tool Support for Rapid Software Development and Effective Process Management ................................................................. 115
   Jyhjong Lin, Chaoyu Lin, and Weipang Yang

Software Dependability, Safety, Privacy, and Reliability
Security Key Designed for LAN and Mobile Terminal .......................................................... 121
   Xiaochun Chen, Haojiong Liu, and Jinxia Dai

Other Topics in Software Engineering Methodology
Explore the Competitive Patterns of the TFT-LCD Industry - The Comparison among Japan, Taiwan, and South Korea .................................................. 127
   Wen-Pin Tien
Neural Network Ensemble Based on K-Means Clustering Individual Selection and Application for Software Reliability Prediction ........................................... 131
   Kewen Li, Kang Zhao, and Wenying Liu
Using Artificial Neural Network (ANN) to Explore the Influences of Number of Inventors, Average Age of Patents, and Age of Patenting Activities on Patent Performance and Corporate Performance .................................................. 136
   Yu-Shan Chen, Wen-Pin Tien, Yi-Wen Chen, Chien-Chiang Lin, and Yu-I Lee

Software Engineering Applications
Embedded and Real-Time Software
Design and Implementation on Sorting and Tracking Processor for Radar Signal Based on DSP ................................................................. 145
   Jiang Yan, Haiqing Jiang, and Zhenxing Lu

Software Engineering for Mobile, Ubiquitous, and Pervasive Systems
A Theoretical Study of the Influence of Gas Pump Thermocouple Hot Cover Structure on Temperature Measurement .................................................. 153
   Zhengang Zhang, Qing Feng, and Lang Wang

Software Applications
EJDB - Embedded JSON Database Engine ........................................................................... 161
   Anton Adamanskiy and Andrey Denisov
Java Source Code Static Check Eclipse Plug-In Based on Common Design Pattern ................................................................. 165

Haotian Zhang and Shu Liu


Xiaoyi Chen and Dianping Ouyang

Soft General Rough Formal Context .......................................................... 176

Li Fu

Computer Applications

Data Engineering
A Flexible Transfer Function Model for the Volume Rendering of Finite Element Data ........................................................................................................................... 185

Yi Tang, Zhong Ning Guo, and Zhi Gang Huang

Individual Emotion Classification between Happiness and Sadness by Analyzing Photoplethysmography and Skin Temperature ................................................................................. 190

Min Woo Park, Chi Jung Kim, Mincheol Hwang, and Eui Chul Lee

Signal Processing and Multimedia
A Method of Suppressing Coherent Interference Based on Improved Nulling Technology ................................................................................................................................. 197

Jianhong Xiang and Chunlei Dong

Computing the Sparse Solution to Fourier Extension of Nonperiodic Function ............................................................... 202

Guojun Jiang, Yawen Luo, Kun Zhang, and Chuanlin Zhang

Concept of a Speech Assistant System ................................................................. 207

Lászlő Czap, Attila Károly Varga, and Béla Illés

Design and Implementation of a Real-Time Video Stream Analysis System Based on FFMPEG ........................................................................................................... 212

Xiaohua Lei, Xiuhua Jiang, and Caihong Wang

Iterative MUSIC for Highly Correlated MEG Source Localization: A Simulation Study ......................................................................................................................... 217

Zhongping Tao and Junpeng Zhang

Large Image Fast Compositing Based on Uniform Sample ......................................................................................... 221

Jian Wu, Tianxiu Yu, and Lei Zhao

Re-configurable DSP Processor - A New Computing Platform for Software Radio Applications ........................................................................................................ 225

Amrita Saha and Amitabha Sinha
Communications and Networking

Blog Recommender Based on Hypergraph Modeling Clustering Algorithm ..................................................231
Yongen Luo, Jicheng Hu, and Xiaofeng Wei

DPRP: Distributed Parallelled Rule Pre-matchings for NIDS: A Possible Way to Deploy Middlebox in Future Internet ...........................................................................................................236
Yi Zhang and Zhigang Sun

FSArch: Enables FPGA-Based Platforms to Provide Network Services .............................................................241
Jianbiao Mao, Qingjie Xu, Zhigang Sun, and Xicheng Lu

Improvement of High-Availability Seamless Redundancy (HSR) Unicast Traffic Performance Using Port Locking ..........................................................................................................................246
Ibraheem Raed Abdulsalam and Jong Myung Rhee

Migrating OpenDPI to Multi-core Platforms for Performance Enhancement ..........................................................251
Ying Le and Leijun Huang

Research on the Next-Generation Green Data Center Technology ........................................................................257
Hanmin Ye and Zihang Song

RNP: A Remote-Desktop Based NetMagic Remote Debugging Platform .....................................................................261
Tao Zhao, Jianbiao Mao, and Jinfeng Huang

Sensitivity Analysis of the Transient Response of Nonuniform Coupled Transmission Lines in Frequency Domain ......................................................................................................................266
Jianhua Yin, Xingxin Guo, Wenwen Cao, Cheng Gao, and Jinquan Zhao

System Level Delay Modeling for Network-on-Chip ..................................................................................................271
Fang Zhou and Ning Wu

Traffic-Reduction for High-Availability Seamless Redundancy (HSR) Protocol Using Dual Virtual Paths Algorithm ..........................................................................................................................276
Saad Allawi Nsaif and Jong Myung Rhee

Automation and Control

Design of Nonlinear Aero Controller and Simulation for Quadrotor Unmanned Aerial Vehicles ..................................................283
Ming Yao and Yunqing Xu

Optimal Actuator and Sensor Locations for Active Vibration Control: Using Improved Particle Swarm Algorithm ..........................................................................................................................288
Tian-xiong Wang, Yu-ming Bo, Xiang-ming Wang, and Gao-peng Zhao

The State-Space Model Identification-Based Adaptive Collaborative Multi-satellite Simulation System ..................................................................................................................293
Yinghong Zhao, Yankai Wang, and Chong Zhang
Other Topics in Computer Applications

A Three Dimensional Imaging-Based Framework for Planning Maxillomandibular Advancement Surgery for the Treatment of Obstructive Sleep Apnoea

Syed M.S. Islam, Anthony D. Lucey, Julien Cisonni, Mithran S. Goonewardene, M. Bennamoun, Mauro Farella, and Jaafar Abduo

Collaboration and Research Information System Used for Sustainable Long-Term Research

Petr Vcelak, Michal Kratochvil, and Jana Kleckova

Detection of Moving Target Using Improved Optical Flow Method

Mai Liu and Nan Liang

Development of Large Scale Integrated Measurement Database Middleware on 400km/h Speed

Ok-Yul Yang and Kyung-Hun Hwang

Improved Harris Corner Detection for Chinese Characters

Na Yao, Tiecheng Bai, Xia Jiang, and Haifang Lv

Research on Subjective Assessment Method of Ultra High Definition Video Quality

Jiangbo Xu and Xiuhua Jiang

Semantic Analysis and Implicit Target Extraction of Comments from E-Commerce Websites

Hui Song, Jianfeng Chu, Yun Hu, and Xiaoqiang Liu

Sparse Representation for 3D Face Recognition

Zhe Guo and Yang-yu Fan

The Image Retrieval Based on Scale and Rotation-Invariant Texture Features of Gabor Wavelet Transform

Gang Chen, Ning Chen, and Xia Lin

Author Index