2014 IEEE 38th Annual Computer Software and Applications Conference

(COMPSAC 2014)

Vasteras, Sweden
21 – 25 July 2014

IEEE

IEEE Catalog Number: CFP14061-POD
ISBN: 978-1-4799-3576-5

2014 IEEE 38th Annual International Computers, Software and Applications Conference

COMPSAC 2014

Table of Contents

Message from the Standing Committee Chair....xiv
Message from the Program Co-Chairs....xvi
Message from the General Chairs....xvii
Message from the Steering Committee Chair....xix
Conference Organizers....xxi
Program Committee....xxiii
Reviewers....xxviii

Software Engineering I

The Issues of Solving Staffing and Scheduling Problems in Software Development Projects....1
Daniela C.C. Peixoto, Geraldo R. Mateus, and Rodolfo F. Resende

Randomized Model Generation for Performance Testing of Model Transformations....11
He Xiao, Zhang Tian, Ma Zhiyi, and Shao Weizhong

Optimizing Non-orthogonal Space Distance Using PSO in Software Cost Estimation....21
Qin Liu, Xiaoyuan Chu, Jiakai Xiao, and Hongming Zhu

A Mutual Information-Based Hybrid Feature Selection Method for Software Cost Estimation Using Feature Clustering....27
Qin Liu, Shihai Shi, Hongming Zhu, and Jiakai Xiao

Automated Analysis in Software Engineering

PF-Miner: A New Paired Functions Mining Method for Android Kernel in Error Paths 33
Huqiu Liu, Yuping Wang, Lingbo Jiang, and Shimin Hu

A Feature-Driven Crossover Operator for Product Line Architecture Design Optimization 43
Thelma Elita Colanzi and Silvia Regina Vergilio

Build Predictor: More Accurate Missed Dependency Prediction in Build Configuration Files 53
Bo Zhou, Xin Xia, David Lo, and Xinyu Wang

A Pattern Based Approach for Automatic Business Process Specialization 59
Abderrahmane Leshob, Hafedh Mili, and Anis Boubaker

Validation & Verification

GUIDiVa: Automated Discovery and Validation of State-Based GUI Invariants 65
Ali Darvish and Carl K. Chang

A Runtime Verification Framework for Control System Simulation 75
Selim Ciraci, Jason C. Fuller, Jeff Daily, Atefe Makhmalbaf, and David Callahan

Towards Model-and-Code Consistency Checking 85
Markus Riedl-Ehrenleitner, Andreas Demuth, and Alexander Egyed

Tackling Incomplete System Specifications Using Natural Deduction in the Paracomplete Setting 91
Alexander Bolotov and Vasilyi Shangin

Bug Reports

Towards Semi-automatic Bug Triage and Severity Prediction Based on Topic Model and Multi-feature of Bug Reports 97
Geunseok Yang, Tao Zhang, and Byungjeong Lee

Automated Configuration Bug Report Prediction Using Text Mining 107
Xin Xia, David Lo, Weiwei Qiu, Xingen Wang, and Bo Zhou

An Improved Discriminative Model for Duplication Detection on Bug Reports with Cluster Weighting 117
Meng-Jie Lin and Cheng-Zen Yang

Faceted Bug Report Search with Topic Model 123
Kaiping Liu and Hee Beng Kuan Tan

Service & Application

Towards Uniform Management of Cloud Services by Applying Model-Driven Development 129
Toni Mastelić, Ivona Brandić, and Andrés García García

An SLA-Driven Cache Optimization Approach for Multi-tenant Application on PaaS 139
Huihong He, Zhiyi Ma, Hongjie Chen, Dan Wu, Huanhuan Liu, and Weizhong Shao

FSaaS: File System as a Service 149
Dapeng Dong and John Herbert

Modelling Variability in Activity Diagrams for Mobile Business Applications 155
Viktor Kolokolov, Stefan T. Ruehl, Paul Baumann, Shaozhen Zhang, and Stephan A.W. Verclas

Quality Assurance and Assessment I

Extending the Theoretical Fault Localization Effectiveness Hierarchy with Empirical Results at Different Code Abstraction Levels 161
Chung Man Tang, W.K. Chan, and Y.T. Yu

Adoption of Free Libre Open Source Software (FLOSS): A Risk Management Perspective 171
Ron S. Kenett, Xavier Franch, Angelo Susi, and Nikolas Galanis

Quantifying the Characteristics of Java Programs That May Influence Symbolic Execution from a Test Data Generation Perspective 181
Marcelo M. Eler, Andre T. Endo, and Vinicius H.S. Durelli

Spec & Requirements

Eliciting Relations from Natural Language Requirements Documents Based on Linguistic and Statistical Analysis 191
Lin Liu, Tianying Li, and Xiaoxi Kou

Counterexample-Guided Abstraction Refinement for Component-Based Systems 201
Lianyi Zhang, Qingdi Meng, and Quiming Luo

A Formal Representation of Platform Feature-to-Requirement Traceability for Software Product Line Development 211
Sungwon Kang, Jingyu Kim, Sungju Kang, and Seokhwan Eom

Software Engineering II

Dynamic Slicing of Python Programs 219
Zhifei Chen, Lin Chen, Yuming Zhou, Zhaogui Xu, William C. Chu, and Baowen Xu

Efficient Caching and Incrementalization of Object Queries on Collections in Programming Codes 229
Venkata Krishna Suhas Nerella, Sanjay Madria, and Thomas Weigert

Trimming Test Suites with Coincidentally Correct Test Cases for Enhancing Fault Localizations 239
Xiaozhen Xue, Yulei Pang, and Akbar Siami Namin

Motivating by Examples: An Empirical Study of Teaching an Introductory Software Engineering Course in Brazil 245
Rasha Osman and Arilo C. Dias-Neto

Quality Assurance and Assessment II

VertexRank: Importance Rank for Software Network Vertices 251
Huan Luo, Yuan Dong, Yiying Ng, and Shengyuan Wang

Design and Safety Analysis for System Architecture: A Breeze/ADL-Based Approach 261
Luxi Chen, Linpeng Huang, Chen Li, Linzhu Wu, and Weichao Luo

Transformation from Activity Diagrams with Time Properties to Timed Coloured Petri Nets 267
Xuling Chang, Linpeng Huang, Jianpeng Hu, Chen Li, and Bei Cao

Understanding and Measuring Nesting 273
Hend Alrasheed and Austin Melton

Network Traffic

Optimizing the Power Consumption of Mobile Networks Based on Traffic Prediction 279
Safaa Dawoud, Abdulbaki Uzun, Sebastian Göndör, and Axel Küpper

Power-Saving Mechanism for IEEE 802.11 Clients in a Multicast Multimedia Streaming Network 289
Yuta Morisawa, Yoshihiro Kawahara, and Tohru Asami

How to Generate Realistic Network Traffic? 299
Antoine Varet and Nicolas Larrieu

Development of a Secure Traffic Analysis System to Trace Malicious Activities on Internal Networks 305
Soshi Hirono, Yukiko Yamaguchi, Hajime Shimada, and Hiroki Takakura

Embedded Systems

A Distributed Topic-Based Pub/Sub Method for Exhaust Data Streams towards Scalable Event-Driven Systems 311
Ryohei Banno, Susumu Takeuchi, Michiharu Takemoto, Tetsuo Kawano, Takashi Kambayashi, and Masato Matsuo

Integrated Modular Avionics (IMA) Partition Scheduling with Conflict-Free I/O for Multicore Avionics Systems 321
Jung-Eun Kim, Man-Ki Yoon, Richard Bradford, and Lui Sha

Time-Sensitive Adaptation in CPS through Run-Time Configuration Generation and Verification 332
Marisol García-Valls, Diego Perez-Palacin, and Raffaela Mirandola

Liquid Software Manifesto: The Era of Multiple Device Ownership and Its Implications for Software Architecture 338
Antero Taivalsaari, Tommi Mikkonen, and Kari Systä

Empirical Study

Exploring Blueprints on the Prioritization of Architecturally Relevant Code Anomalies—A Controlled Experiment 344
Everton Guimaraes, Alessandro Garcia, and Yuanfang Cai

Empirically Based Evolution of a Variability Management Approach at UML Class Level 354
Anderson Marcolino, Edson Oliveira Jr., Itana Gimenes, and Ellen F. Barbosa

Instability and Abstractness Metrics Based on Responsibility 364
Saleh Almugrin, Waleed Albattah, Omar Alaql, Musaad Alzahrani, and Austin Melton

Security

Your Phone Knows You: Almost Transparent Authentication for Smartphones 374
Mohammad Tanviruzzaman and Sheikh Iqbal Ahamed

A Forensic Analysis of Android Malware—How is Malware Written and How it Could Be Detected? 384
Kevin Allix, Quentin Jerome, Tegawendé F. Bissyandé, Jacques Klein, Radu State, and Yves Le Traon

Auditing Buffer Overflow Vulnerabilities Using Hybrid Static-Dynamic Analysis 394
Bindu Madhavi Padmanabhuni and Hee Beng Kuan Tan

A Countermeasure Recommendation System against Targeted Attacks with Preserving Continuity of Internal Networks 400
Hirokazu Hasegawa, Yukiko Yamaguchi, Hajime Shimada, and Hiroki Takakura

Defect Prediction

A Scenario-Based Approach to Predicting Software Defects Using Compressed C4.5 Model 406
Biwen Li, Beijun Shen, Jun Wang, Yuting Chen, Tao Zhang, and Jinshuang Wang

A Semi-supervised Approach to Software Defect Prediction 416
Huihua Lu, Bojan Cukic, and Mark Culp

FECAR: A Feature Selection Framework for Software Defect Prediction 426
Shulong Liu, Xiang Chen, Wangshu Liu, Jiaqiang Chen, Qing Gu, and Daoxu Chen

Plenary Panel

Security with Privacy—Opportunities and Challenges: Panel Position Paper 436
Elisa Bertino

Network Application and Configuration

A Low Cost Hierarchy-Awareness Extension of Skip Graph for World-Wide Range Retrievals 438
Xun Shao, Masahiro Jibiki, Yuuichi Teranishi, and Nozomu Nishinaga

SIROM3—A Scalable Intelligent Roaming Multi-modal Multi-sensor Framework 446
Jiaxing Zhang, Hanjiao Qiu, Salar Shahini Shamsabadi, Ralf Birken, and Gunar Schirner

Web Technology

An Online Education Approach Using Web Operation Record and Replay Techniques 456
Yanchun Sun, Dejian Chen, Wenpin Jiao, and Gang Huang

JavaScript: The Used Parts 466
Sharath Gude, Munawar Hafiz, and Allen Wirfs-Brock

Towards an Open Architecture Model for Web and Mobile Software: Characteristics and Validity Properties 476
Bahtijar Vogel, Arianit Kurti, Tommi Mikkonen, and Marcelo Milrad

Virtual Machine

Transpacific Live Migration with Wide Area Distributed Storage 486
Ikuo Nakagawa, Kohei Ichikawa, Tohru Kondo, Yoshiaki Kitaguchi, Hiroki Kashiwazaki, and Shinji Shimojo

CrowdAdaptor: A Crowd Sourcing Approach toward Adaptive Energy-Efficient Configurations of Virtual Machines Hosting Mobile Applications 493
Edward Y.Y. Kan, W.K. Chan, and T.H. Tse

A Lightweight Virtual Machine Image Deduplication Backup Approach in Cloud Environment 503
Jiwei Xu, Wenbo Zhang, Shiyang Ye, Jun Wei, and Tao Huang

Emergent Topics

Which Android App Store Can Be Trusted in China? 509
Yi Ying Ng, Hucheng Zhou, Zhiyuan Ji, Huan Luo, and Yuan Dong

Specific Touch Gesture on Mobile Devices to Find Attractive Phrases in News Browsing 519
Shohe Ito, Takuya Yoshida, Fumiko Harada, and Hiromitsu Shimakawa

Analysis of Reliability and Resilience for Smart Grids 529
Murtadha N. Albasrawi, Nathan Jarus, Kamlesh A. Joshi, and Sahra Sedigh Sarvestani

Generating Accessible Multimodal User Interfaces Using MDA-Based Adaptation Approach 535
Lamia Zouhaier, Yousra Bendaly Hlaoui, and Leila Jemni Ben Ayed

Network Performance

Performance Evaluation of Reconfigurable TCP Communication on Wi-Fi Network Using GE Channel Model 541
Naoki Oguchi and Shunji Abe

Performance Improvement of SCTP Communication Using Selective Bicasting on Lossy Multihoming Environment 551
Koki Okamoto, Nariyoshi Yamai, Kiyohiko Okayama, Keita Kawano, Motonori Nakamura, and Tokumi Yokohira

Adaptive Online Feedback Controlled Message Compression 558
Marcus Jägemar, Sigrid Eldh, Andreas Ermedahl, and Björn Lisper

Social Networks

Emergence of Fractals in Social Networks: Analysis of Community Structure and Interaction Locality 568
Sho Tsugawa and Hiroyuki Ohsaki

Homesick Lévy Walk: A Mobility Model Having Ichi-Go Ichi-e and Scale-Free Properties of Human Encounters 576
Akihiro Fujihara and Hiroyoshi Miwa

Preserving Location-Related Privacy Collaboratively in Geo-social Networks 584
Lin Zhang, Mingxuan Yuan, Yao Guo, Xiangqun Chen, and Lei Chen

SPTP: A Trust Management Protocol for Online and Ubiquitous Systems 590
Ivor D. Addo, Ji-Jiang Yang, and Sheikh I. Ahamed

Fast Abstract

Towards Test Architecture Based Software Product Line Testing 596
Jihyun Lee and Sungwon Kang

Comparing Control Flow Graphs of Binary Programs through Match Propagation 598
Hyun-Il Lim

Behavioral Anomaly Detection System on Network Application Traffic from Many Sensors 600
Akira Nagata, Kohei Kotera, Katsuichi Nakamura, and Yoshiaki Hori

Improve User's Security Literacy by Experiencing Behavior of Pseudo Android Malware 602
Makoto Kato and Saeko Matsuura

Predicting Release Time Based on Generalized Software Reliability Model (GSRM) 604
Kiyoshi Honda, Hironori Washizaki, and Yoshiaki Fukazawa

Industry Papers

Experiences Integrating Heterogeneous Government Open Data Sources to Deliver Services and Promote Transparency in Brazil 606
Kellyton dos Santos Brito, Marcos Antônio Silva Costa, Vinicius Cardoso Garcia, and Silvio Romero de Lemos Meira

Operation Support System Based on Augmented Reality Technology 608
Tatsuya Osawa, Jun Shimamura, and Yukinobu Taniguchi

On Architecture for QoS-Aware Packet Aggregation 610
Tomoaki Umeki and Yoshinori Kitatsuji

Software-as-a-Service Solution Implementation—Data Migration Perspective 612
Luba Shabnam, Farzana Haque, Moshiur Bhuiyan, and Aneesh Krishna

Doctoral Symposium and Posters

Performance Preservation Using Servers for Predictable Execution and Integration 614
Rafia Inam

Exploratory Performance Analysis of Microbot Swarm in Three-Dimensional Field 618
Shota Agemura and Hiroyuki Ohsaki

A Distributed Flow Control with Backward Propagation: Algorithm and Preliminary Performance Evaluation 622
Kohei Tsutsumi, Hiroyuki Ohsaki, and Hideaki Suzuki

A Model for Distributed Agile Release Planning: Doctoral Symposium Paper 626
Ingo Richter, Robert Lindermeier, and Michael Weber

Media Supported Workspaces in Agile Software Development: Doctoral Symposium Paper 630
Florian Raith and Robert Lindermeier

SMoCoR: A Smart Mobile Contact Recommender Based on Smart Phone Data 634
Xiwei Zhuang, Yanchun Sun, and Kui Wei

Thermodynamics-Based Entropy Adjustment for Robust Self-Organized Network Controls 636
Takuya Iwai, Daichi Kominami, Masayuki Murata, and Tetsuya Yomo

Expiration Timer Control Method for QoS-Aware Packet Chunking 638
Hiroki Yanaga, Daiki Nobayashi, and Takeshi Ikenaga

A Taxonomy for SLA-Based Monitoring of Cloud Security 640
Dana Petcu

A QoS-Oriented Inter-cloud Federation Framework 642
Maria Salama and Ahmed Shawish

Information Orchestration System for Closing the Information Retrieval Capability Gap 644
Toru Kobayashi

Cider: An Event-Driven Continuous Integration Server 646
Ondřej Kupka and Filip Zavoral

Author Index 648