

# **27th International Conference on Computers and Their Applications 2012**

**(CATA-2012)**

**Las Vegas, Nevada, USA  
12 – 14 March 2012**

**Editor:**

**Sahra Sedigh**

**ISBN: 978-1-61839-747-8**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2012) by the International Society for Computers and Their Applications  
All rights reserved. Reproduction in any form without the written consent of ISCA is prohibited.

Original ISBN: 978-1-880843-84 (Out of Print)  
Reprint ISBN: 978-1-61839-747-8

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the International Society for Computers and Their Applications  
at the address below.

International Society for Computers and Their Applications  
975 Walnut Street, Suite 132  
Cary, NC 27511-4216

Phone: (919) 467-5559  
Fax: (919) 467-3430

[isca@ipass.net](mailto:isca@ipass.net)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# INTERNATIONAL SOCIETY FOR COMPUTERS AND THEIR APPLICATIONS

## 27<sup>th</sup> International Conference on Computers and Their Applications

March 12-14, 2012  
Imperial Palace Hotel  
Las Vegas, Nevada, USA

## TECHNICAL PAPER INDEX

### INTELLIGENT SYSTEMS AND KNOWLEDGE DISCOVERY

<b>An Affordable Housing Energy Management System Based upon ANFIS Prediction</b> <i>Jennifer Sindelir and Gordon K. Lee (San Diego State University, USA)</i>	1
<b>Relational Association Rule Mining in Market Basket using the Rolodex Model with P-Tree</b> <i>Arijit Chatterjee, Mohammad Hossain, Arjun G. Roy, and William Perrizo (North Dakota State University, USA)</i>	7
<b>Retrieving Information by Clustering Related Events using Vector Space</b> <i>Kanwalinderjit K. Gagneja and Kendall E. Nygard (North Dakota State University, USA)</i>	13
<b>NeuroCog: An Adaptive Topological Map Learning and Reactive System for Maze Navigation</b> <i>Luciene de O. Marin, Melisa F. Fagundes, Edson R. De Pieri, Mauro Roisenberg and Patricia D. M. Plentz (Federal University of Santa Catarina, Brazil)</i>	19
<b>Developing a Simulation Platform for Intelligent Transportation Systems Applications Based on Connected Vehicles</b> <i>Muhammad Arafat (University of Detroit Mercy, USA and TELECOM Bretagne, France), Utayba Mohammad, Nizar Al-Holou, Malok Alamir Tamer, and Mohamad Abdul-Hak (University of Detroit Mercy, USA)</i>	25
<b>Mining Twitter Streams for Evaluating Event Relatedness Using a Density Based Clustering Approach</b> <i>Chung-Hong Lee, Wei-Shiang Wen (National Kaohsiung University of Applied Sciences, Taiwan), and Hsin-Chang Yang (National University of Kaohsiung, Taiwan)</i>	34
<b>On Improving Keyword Conversion Rates in Organic &amp; Sponsored Search</b> <i>Pierre M. Fiorini (CF Search Marketing, USA)</i>	40
<b>A Developmental Theory to Resolve the Self's Halting Problem</b> <i>S. Jeffrey Besser (Naval Postgraduate School, USA)</i>	46

### SOFTWARE ENGINEERING AND TESTING

<b>A Software Tool that Extracts Syntax-based Software Metrics based on the Z Formalization</b> <i>Raouf Alomainy and Wei Li (University of Alabama in Huntsville, USA)</i>	52
<b>Towards Tool-Driven Penetration Testing for Form-Based Authentication</b> <i>Rebecca A. Woelfel and Joshua J. Pauli (Dakota State University, USA)</i>	58

<b>Algorithms to Calculate the Manhattan (L1) Distance for Vertical Data Represented in pTrees</b>	65
<i>Mohammad K. Hossain, Arjun G. Roy, Arijit Chatterjee, and William Perrizo (North Dakota State University, USA)</i>	
<b>Measuring the Overhead of Intel C++ CnC over TBB for Gauss-Jordan Elimination</b>	71
<i>Peiyi Tang (University of Arkansas at Little Rock, USA)</i>	

## APPLICATIONS AND SERVICES

<b>TOZE: A GUI Editor and Type Checker for Object-Z</b>	77
<i>Tim Parker, Kasi Periyasamy and Kenny Hunt (University of Wisconsin-La Crosse, USA)</i>	
<b>UV6: an OS Kernel as an Application Program without Virtualization</b>	83
<i>Shuichi Oikawa (University of Tsukuba, Japan)</i>	
<b>Using a Screen Real Estate Index to Support Adaptive User Interfaces</b>	89
<i>Alfred Taylor, Sr., Karthik Ramalingam, and Les Miller (Iowa State University, USA)</i>	
<b>Web-based Translation Support System for Group Reading</b>	95
<i>Katsuhiro Hozoji and Susumu Matsumae (Saga University, Japan)</i>	
<b>Simplifying Neurorobotic Development with NCSTools</b>	101
<i>Corey M. Thibeault, Joshua M. Hegie, Laurence Jayet Bray and Frederick C. Harris, Jr. (University of Nevada, Reno, USA)</i>	
<b>A Soft Real-Time, Parallel GUI Service in Tessellation Many-Core OS</b>	108
<i>Albert Kim, Juan A. Colmenares, Hilfi Alkaff and John Kubiatowicz (University of California Berkeley, USA)</i>	
<b>An Approach of Service Selection and Design with Sensitivity Analysis</b>	116
<i>Xiaobo Yuan and Mohit Sud (University of Windsor, Canada)</i>	
<b>A Low Occupancy Study of Artificial Neural Networks on GPUs</b>	122
<i>Thomas Donaldson and Yoginder Dandass (Mississippi State University, USA)</i>	

## COMPUTER NETWORKS AND SECURITY

<b>An Integrated Approach to Network Vulnerability Scanning for Security Engineers</b>	128
<i>Devon J. Greene and Patrick Engebretson (Dakota State University, USA)</i>	
<b>An Introductory Look at Vulnerability Hunting</b>	134
<i>Adam Klindworth and Joshua Pauli (Dakota State University, USA)</i>	
<b>Characterization of a Campus Internet Workload</b>	140
<i>Adam H. Villa and Elizabeth Varki (University of New Hampshire, USA)</i>	
<b>Applying Open Resilient Cluster Management (ORCM) To A Multi-Chassis Core Router</b>	148
<i>Douglas Comer and Salman Javed (Purdue University, USA)</i>	
<b>A Filter-based Approach for SQL Injection Attack Detection</b>	156
<i>Ying Jin, Xiaoying Shen, and Chunhui Song (California State University, USA)</i>	
<b>Keeping the Bad Eyes Out: Database Security for Forensics Data</b>	160
<i>Kinyetta Jeter, Luay A. Wahsheh, Aftab Ahmad, Jonathan M. Graham, Cheryl V. Hinds, Aurelia T. Williams, and Sandra J. DeLoatch (Norfolk State University, USA)</i>	
<b>A Vulnerability Evaluation Method for Power Analysis Attacks against Cryptography Circuits</b>	167
<i>Masaya Yoshikawa and Toshiya Asai (Meijo University, Japan)</i>	

## EDUCATIONAL SYSTEMS

<b>A Professional Development Program Using Graphing Handhelds/Mini-Computers and Its Attitudinal Effect on Teachers of Mathematics - A Two Year Study</b>	173
<i>Gail M. Gallitano (West Chester University, USA)</i>	
<b>A Curriculum Model for Industrial Control Systems Cyber-Security with Sample Modules</b>	179
<i>J. Chris Foreman, James H. Graham, Jeffrey L. Hieb, and Rammohan K. Ragade (University of Louisville, USA)</i>	
<b>E-Learning Ecosystem based on Multi-Agent Systems</b>	184
<i>Randa Aljebly, Salah Hammami, and Hassan Mathkour (King Saud University, Saudi Arabia)</i>	
<b>Losing the Lake: Development and Deployment of an Educational Game</b>	190
<i>Joseph M. Vesco, Katie Gilgen, Anne Paine (University of Nevada, Reno, USA), Marissa Owens, E. Michael Nussbaum, Gale M. Sinatra, Sajjad Ahmad, Kent J. Crippen (University of Nevada, Las Vegas, USA), Sergiu M. Dascalu and Frederick C. Harris, Jr. (University of Nevada, Reno, USA)</i>	

## COMPUTER ARCHITECTURES

<b>An Interactive Redesign Approach for Trading Test Time, Area, and Fault Coverage in Testable Synthesis</b>	196
<i>Soha Baz and Haidar Harmanani (Lebanese American University, Lebanon)</i>	
<b>Partition Models for a Shared Dynamically Reconfigurable Fabric</b>	202
<i>Mua'ad Abu-Faraj and Ian R. Greenshields (University of Connecticut, USA)</i>	
<b>Parallel Implementation of Non-Slicing Floorplan with MPI and OpenMP</b>	208
<i>Oluwaseun Owojaiye and Nagi Mekhield (Ryerson University, Canada)</i>	
<b>PCI Probe: A Tool for Testing PCIe Peripheral Devices in 64-bit Windows 7</b>	216
<i>Cody Tankersley, Yoginder S. Dandass, and Thomas H. Morris (Mississippi State University, USA)</i>	

## SPECIAL SESSION ON SOFTWARE AND INFORMATION SYSTEM

<b>Reassuring Electronic Commerce Mechanism Design in User Evaluation System</b>	222
<i>Satoshi Takahashi (University of Tsukuba, Japan), Koki Murakata and Tokuro Matsuo (Yamagata University, Japan)</i>	
<b>A System Approach to Software Measurement</b>	230
<i>Mark Burgin (UCLA, USA) and Narayan C. Debnath (Winona State University, USA)</i>	
<b>An Online Mechanism for a Sporting Event</b>	234
<i>Sajal Mukhopadhyay, Debidas Ghosh (NIT Durgapur, India), and Narayan C. Debnath (Winona State University, USA)</i>	

## INFORMATION SYSTEMS AND DATABASES

<b>A Decision-Support System for Higher Education, the Saudi Ministry Case Study</b>	240
<i>Abdulkader A. Alfantookh, Hussam M. Ramadan, Alaa Eldin M. Hafez, Mourad A. Ykhlef, Ahmad J. AlShibli, and Mourad A. Benchikh (King Saud University, Saudi Arabia)</i>	
<b>Using MS WORD as an Improvised Tool for Digital Humanities Data Preparation</b>	246
<i>Katia P. Mayfield, Emanuel S. Grant, and Crystal Alberts (University of North Dakota, USA)</i>	
<b>A Study on Applicability of Hierarchical Task Network Planner in Smart City Scenario: A Smart City Tour and Travel Planning Use Case</b>	252
<i>Plaban K. Bhowmick, Debnath Mukherjee, and Prateep Misra (Tata Consultancy Services, India), and Arunasish Sen (Institute of Engineering and Management, India)</i>	

<b>Experiments on Synopsis-based TV Program Recommendation</b>	
<i>Snehasis Banerjee, Plaban K. Bhowmick, Debnath Mukerjee, and Prateep Misra (Tata Consultancy Services, India)</i>	258
<b>Column-oriented Database Systems: A Comparison Study</b>	
<i>Arjun G. Roy, Mohammad K. Hossain, Arijit Chatterjee, and William Perrizo (North Dakota State University, USA)</i>	264
<b>LexSpec: Toward a New Model of Digital Publication</b>	
<i>Kendra Douglas and Joshua Stein (Western Washington University, USA)</i>	270
<b>Autonomic Database Management: State of the Art and Future Trends</b>	
<i>Katarina Grolinger and Miriam A. M. Capretz (The University of Western Ontario, Canada)</i>	276
<b>Sufficient Statistics for Re-optimizing Repetitive Queries</b>	
<i>Feng Yu, Wen-Chi Hou, and Michael Wainer (Southern Illinois University, USA), Cheng Luo (Coppin State University, USA), and Dunren Che (Southern Illinois University, USA)</i>	282
<b>SIGNAL PROCESSING</b>	
<b>An NMF based Approach for Addressing DNA Microarray Sub-grid Images</b>	
<i>Mohammed M. Elhenawy and Yue Wang (Virginia Tech, USA)</i>	288
<b>Mammograms Segmentation Using Log-Normal Distribution</b>	
<i>Yasser Reyad, Ali El-Zaart, and Alaaeldin M. Hafez (King Saud University, Saudi Arabia)</i>	294
<b>3D Scans of As-built Historical Street Scenes in Tamsui</b>	
<i>Naai-Jung Shih, Chia-Yu Lee, Yu-Hwa Yang, Tzu-Ying Chan, and Shih-Cheng Tzeng Tseng (National Taiwan University of Science and Technology, Taiwan)</i>	299