20th International Conference on Computers and Their Applications 2005

New Orleans, Louisiana, USA
16-18 March 2005

Editors:

G. Hu

ISBN: 978-1-61839-552-8

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© (2005) 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: 1-880843-54-4 (Out of Print)
Reprint ISBN: 978-1-61839-552-8

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

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
Web: www.proceedings.com

INTERNATIONAL SOCIETY FOR COMPUTERS AND THEIR APPLICATIONS

20th International Conference on Computers and Their Applications

March 16-18, 2005
Holiday Inn Downtown-Superdome Hotel, New Orleans, Louisiana USA

TECHNICAL PAPER INDEX

ALGORITHM

Routing Design and Performance Evaluation of X-ARC on the Semi-Cactus Workflow
Shin-Jer Yang (Soochow University, Taiwan), W. Chung-Kung Yen (Shih Hsin University, Taiwan) and Ting-Yuan Yang (Soochow University, Taiwan) 1

Finding Median Set of Tree Structures in Synchronous Distributed Systems
Jonathan W. Berry (Sandia National Labs, USA), Daniel Hrozencik (Chicago State University, USA), Shrisha Rao (Mount Mercy College, USA) and Zhizhang Shen (Plymouth State University, USA) 7

Using Linear Congruential Generators for Cryptographic Purposes
Chung-Chih Li and Bo Sun (Lamar University, USA) 13

Waveform Analysis for High-Quality Loop-Based Audio Distribution
Stuart Cunningham (University of Wales, UK) 19

A New Non-Blocking Synchronous Checkpointing Scheme for Distributed Systems
B. Gupta, S. Rahimi, and P. Naskar (Southern Illinois University, USA) 26

A New Cellular Automata Approach to Prediction Coding
Dianxun Shuai and Xiang Feng (East China University of Science and Technology, China) 32

Efficient Identification of Finite Mixture Models
Wenbin Luo (St. Mary's University, USA) 38

Minimizing the Effect of Processing Power Fragmentation while Scheduling Real-time Task-graphs on a Cluster of Computers
Alaa Amin, Reda Ammar and Swapna Gokhale (University of Connecticut, USA) 44

Integer Programming Methods for Several Optimization Problems in Graph Theory
Jamiru Luttamaguzi (Elizabeth City State University, USA), Michael Pelsmajer (Illinios Institute of Technology, USA), Zhizhang Shen (Plymouth State University, USA) and Boting Yang (University of Regina, Canada) 50

A New Sufficient Condition for the Existence of Hamiltonian Paths
M. Sohel Rahman, M. Kaykobad and Mohammad Saifur Rahman (Bangladesh University of Engineering and Technology, Bangladesh) 56

Vertical Set Square Distance: A Fast and Scalable Technique to Compute Total Variation in Large Datasets
Taufik Abidin, Amal Perera, Masum Serazi, William Perrizo (North Dakota State University, USA) 60

High-Level Design of a Pull Protocol
Walter Dosch (University of Lübeck, Germany) and Merik Meriste (University of Tartu, Estonia) 66

DATA MINING AND SEARCH ENGINE

The Design of an Interactive Approach to Statistical Data Mining
Jhewei Jiang, Yanliang Gu, Wen-Chi Hou, Chih-Fang Wang (Southern Illinois University, USA) 74

MetaFinder: A Meta-Search Engine with an Open Architecture
Chunxia Zhang, Shiyong Lu (Wayne State University, USA) and Lily Rui Liang (University of the District of Columbia, USA) 80

Association Rules Mining Algorithm
Rekha Bhowmik (Winona State University, USA) 86

Clustering Using Self Organized Map on Rmesh
John Jenq (Montclair State University, USA) 91

NETWORKS

Energy Reducing Broadcasting Algorithms in Ad Hoc Networks
Xiao Chen and Jian Shen (Texas State University, USA) 97

Level-Based Equalization of Cumulative Participation of Sensors for Load-Balanced Routing in Wireless Networked Sensors
N. Shah and I. Zeid (Northeastern University, USA) 103

An Introduction to Intrusion Detection in the Wireless Environment
Aldridge Drane Wilder III and Vijaykumar Shanmugasundaram (Concordia College, USA) 109

Effect of Fragmentation in WLAN Systems with Interference Problems
Shakil Akhtar (United Arab Emirates University, UAE) 115

Integrating Active Agent Technology with Network Management
Jiang Guo, Yuehong Liao, Behzad Parviz, Renée Hawk (California State University Los Angeles, USA) ... 121

Simulation and Analysis of Traffic Engineering Capabilities of MPLS Networks Using Linux Test-Bed
Mansoor Alam, Praveen Bethoju (University of Toledo, USA), Min Song (Old Dominion University, USA) .. 127

Shortest Path Problem with Multiple Constraints
B. Tai-Chang Chen (Shih Hsin University, Taiwan) 133

A Note on Hierarchical Distance Vector Routing -- Free from the Count-to-Infinity Problem
V. Doraiswamy, R. Jandhyala, and B. Gupta (Southern Illinois University, USA) 139

ARTIFICIAL INTELLIGENCE VISUALIZATION, MULTIMEDIA

Maintaining a Database for Events Mentioned in the Arabic Newspaper Text
Saleem Abuleil (Chicago State University, USA) 145

A Visualization Tool for Displaying Hand Gestures
Beifang Yi, Frederick C. Harris, Jr., Sergiu M. Dascalu (University of Nevada, Reno, USA) 150

Communication Pattern Extraction: Visualizing Causal Relationships in Complex Systems
P. Pietikäinen, J. Röning (University of Oulu, Finland) 156

Improved Learning Algorithm Performance Using Linear Kernel Transformation
Morshed U. Chowdhury (Deakin University, Australia) 164

ARCHITECTURE AND SECURITY

Exploiting Trivial Computation in Dependable Processors
Toshinori Sato (Kyushu Institute of Technology, Japan) 168

Techniques for Improving Branch Prediction Accuracy in YAGS Predictor
Ekkasit Tiamkaew and Angkul Kongmunvattana (University of Nevada, Reno, USA) 174

Efficient Prefix Computation Based on Mesh with 2-spacing Segmented Buses
Yipeng Liu, Dunren Che, Na Ren (Southern Illinois University, USA) 178

Anomaly-Based Intrusion Monitoring Using a Dynamic Honeypot
Jeffery Hieb and James H. Graham (University of Louisville, USA) 184

BIOINFORMATICS AND ENGINEERING, NEURAL NETWORKS

Neurosurgical Simulation System with Smooth Tactile Sensation
Mayumi Shimizu and Yasuaki Nakamura (Hiroshima City University, Japan) 190

Predicting Yeast Gene Function Based on Hidden Markov Models
Xutao Deng, Huimin Geng, Hesham Ali (University of Nebraska at Omaha, USA) 196

Advances In Human Target Detection Using Opaque Material Penetrating Radar Data
Anthony J. Gervasi, John M. Weiss, Bernt Askildsen, Scott Thompson, (South Dakota School of Mines and Technology, USA) 202

Classification of Types of Dementia Using a Neural Network Model
D. L. Hudson, M. E. Cohen (University of California, San Francisco, USA), M. Kramer, A. Szeri (University of California, Berkeley, USA), and F. L. Chang (University of California, San Francisco and Fort Wayne Neurological Clinic, USA) 208

PRACTICE AND APPLICATIONS

The Development of Rating Methods for Preference Ranking of Water Level Prediction Models
Carl Steidley, Alexey L. Sadovski, Kelly Torres Knott, Rafic Bachnak (Texas A&M University Corpus Christi, USA) 214

Route Recommendations: Navigation Assistance in Complex Virtual Environments
Pedram Sadeghian, Mehmed Kantardzic, Oleksandr Lozitskiy (University of Louisville, USA) and Walaa Sheta (Mubarak City for Scientific Research, Egypt) 220

An Approach to Protection Using a Non-Persistent Client-Side Page Proxy
B. D. Gaston, K. M. George, N. Park (Oklahoma State University, USA) 226

A Secured Web Browser for E-Commerce Transactions
Brian Dellisanti, Larry A. Dunning, Sub Ramakrishnan (Bowling Green State University, USA) 232

INFORMATION SYSTEMS

Bilingual Hypermedia Teaching Materials for Introductory Java
Maxim Konovalov and Kirk Scott (University of Alaska Anchorage, USA) 236

ACAD: A Domain-specified Web Search Engine
Dehu Qi, Ravi Pulletikurty, and Puneet Deepak (Lamar University, USA) 241

Using Web Mining to Sample the Contents of an Information Ecosystem to Locate and Retrieve Web Pages
R. L. Walker (Tapicu, Inc., USA) 247

Using GPS-Enabled Cell Phones for Traffic-Flow Data Collection
Bruce Beyeler and David C. Pheanis (Arizona State University, USA) 253

Optimal Server Selection for Content Routing
Md. Mostofa Akbar (Bangladesh University of Engineering and Technology, Bangladesh and University of Victoria, Canada), E. G. Manning, G. C. Shoja (University of Victoria, Canada), M. Sohel Rahman and M. Kaykobad (Bangladesh University of Engineering and Technology, Bangladesh) 259

A Flexible and Intrusion Tolerant Voting Mechanism
Shivakant Mishra (University of Colorado, USA) 265

A Practical Experience on Web Applications" Developing Environments
Syed M. Rahman, Akram Salah, Paul Juell (North Dakota State University, USA) 271

A Geographical Information System (GIS) Real-Time Web Portal for Monitoring of Marsh Habitats
Carl Steidley, Ravinder Rawat, Ray Bachnak, Gary Jeffress, Alexey Sadovski (Texas A&M University Corpus Christi, USA) 277

SPECIAL SESSION: EMBEDDED SYSTEMS

ARS VEHO: Augmented Reality System for VEHicle Operation
Marcel Levy, Sergiu Dascalu, Frederick C. Harris, Jr. (University of Nevada, Reno, USA) 282

Optimizing Resource Utilization in System-on-a-Programmable-Chip with Location-Aware Genetic
Sin Ming Loo (Boise State University, USA) 290

A Real Time Linux System for Flight Testing Aircraft
Charles E. Hall, Jr. (North Carolina State University, USA) 296

Implementation of an Embedded Systems Curriculum
William Stapleton, Kenneth Ricks, David Jeff Jackson (The University of Alabama, USA) 302

On-Chip BIST-Based Diagnosis of Embedded Programmable Logic Cores in System-on-Chip Devices
Charles Stroud, Srinivas Garimella, and John Sunwoo (Auburn University, USA) 308

Prototyping an Embedded Bus-Based Parallel System
Chung-Seok (Andy) Seo, Abhijit Chatterjee and Timothy J. Drabik (Georgia Inst. of Technology, USA), Behnam S. Arad and Reena Patel (California State University Sacramento, USA) 314

A 32-bit Residue Arithmetic Unit for High Performance Embedded Systems
Behnam S. Arad and Sachin Rudrapatna (California State University, Sacramento, USA) 320

Network Calculus for Real Time Analysis of Embedded Systems with Cyclic Task Dependencies
Henrik Schioler, Jan Jessen, Jens Dalsgaard, Kim G. Larsen (Aalborg University, Denmark) 326

IMAGE PROCESSING

Distance Measures in RGB and HSV Color Spaces
Desari Haritha, C. Bhagvati (University of Hyderabad, India) and R. K. Jain (GEQD, India) 333

Computer-Based, Real-Time, Ultrasonic Railroad Track Flaw Inspection
Howard Sholl, Reda Ammar, Ian Greenshields (University of Connecticut, USA) 339

An FPGA Implementation for Watershed-Based Image Segmentation
David Jeff Jackson and Yu-Ling Ko (The University of Alabama, USA) 344

Implementation of Image Processing Algorithms for Region Identification on an FPGA
David Jeff Jackson and Ching-Kuang Wang (The University of Alabama, USA) 349

SOFTWARE ENGINEERING

Relationship Between Code Metrics and Change History
James Fawcett, Murat Gungor, Arun Iyer, Kanat Bolazar (Syracuse University, USA) 354

Adopting Test-Driven Development in Web Applications' Developments
Syed M. Rahman and Akram Salah (North Dakota State University, USA)..... 361

Science of Design: Building Blocks and Current State of Instruction
Thomas Philip and Edward B. Allen (Mississippi State University, USA) 367

FoCuS: A Dynamic Regression Suite Generation Platform for Processor Functional Verification
Amir Hekmatpour, James Coulter and Azadeh Salehi (IBM Microelectronics, USA) 373

SOFTWARE ENGINEERING, PATTERN RECOGNITION

Breaking the Constraints to a High Performance Metacomputing System: A System Approach
Lily D. LI, Wei Li, Russel Stonier (Central Queensland University, Australia) and Xinghuo Yu (RMIT University, Australia) 379

Automatic Lyrics Alignment on Popular Music
Chi Hang Wong, Kin Hong Wong, Wai Man Szeto (The Chinese University of Hong Kong, Hong Kong) ... 385

CGI Program Generation and Session-Based Authentication
B. D. Gaston, Ralph Grayson and K. M. George (Oklahoma State University, USA) 391

Hybrid Learning Rules for Identifying Spacecraft System
Tharwat E. Alhanafy, H. Tantawi, M. Refai (Al-Azhar University, Egypt), Tarek S. Sobh (Egyptian Armed Forces, Egypt), and Awad H. Khalil (The American University in Cairo, Egypt) 397

DATABASE

An Empirical Study of Qualities of Association Rules from a Statistical View Point
Maryann Dorn, Zhewei Jiang, Wen-Chi Hou, Chih-Fang Wang (Southern Illinois University, USA) 404

Processing Multiple Relations in the Knowledge Discovery Process
M. Mehdi Owrang O (American University, USA), L. L. Miller and Li Fang (Iowa State University, USA) 410

Empirical Study of the GBC Approach for Mapping XML Data to Relations
Dunren Che, Wen-Chi Hou, Michael Wainer, Ping Han (Southern Illinois University, USA) 417

An Architectural Model for Low Overhead Spatial Data Authentication and Distribution in a Peer To Peer Based Spatial Database Model
Gregory Vert, Rawan Alkhaldi, Sara Nasser (University of Nevada, Reno, USA) 423

SPECIAL SESSION: SOFTWARE ALGORITHMS, MEASURE AND TOOLS

Algorithm for Reducing the Complexity of Switching Time in Real-Time Multitask Environments
Haesun Lee, Ilhyun Lee (University of Texas of the Permian Basin, USA) and Haklin Kimm (East Stroudsburg University of Pennsylvania, USA) 429

UML Profiles for Design Patterns
Ana Garis, Daniel Riesco, German Montejano (Universidad Nacional de San Luis, Argentina) and Narayan Debnath (Winona State University, USA) 435

Quality of Software That Does Not Exist
M. Burgin (University of California Los Angeles, USA) and N Debnath (Winona State University, USA) 441

Properties Needed in Distribution Media to Counter Software Piracy
M. R. Warsi (Aligarh Muslim University, India) and N. Debnath (Winona State University, USA) 447

PARALLEL AND DISTRIBUTED COMPUTING, SIMULATION

A Parallel Algorithm for Matrix Multiplication of Compressed Z Order Data Structures
Kirk Scott (University of Alaska Anchorage, USA) 453

A Fast and Efficient Recovery Scheme for Distributed Programs
B. Gupta, A. Thakre, and D. Chhillar (Southern Illinois University, USA) 459

Internet-based Simulation and Optimization of Milling Process
L. H. Dong and C. H. Fan (Shanghai Maritime University, China) 465

Fast Online Predicate Detection Using Symbolic Model Checking
Chunbo Chu and Monica Brockmeyer (Wayne State University, US) 470

ROBOTICS AND CONTROL SYSTEMS

A Modified Evolutionary Algorithm Using a Heuristic Evaluation Function with Mutation Rate and Crossover Rate Tuning
Ping Tang (Guangdong University of Technology, China), Supriya Bhat, Jay Kothari and Gordon K. Lee (San Diego State University, USA) 478

Agent-Based Architecture for Intelligent Semi-Autonomous Robots
James H. Graham, Eric Kuhl and Jonathan Nida (University of Louisville, USA) 484

Path Prediction for Moving Object using Enforced Fuzzy Clustering
Deok Hee Nam (Wilberforce University, USA), Harpreet Singh (Wayne State University, USA) and Grant Gerhart (Tank Automotive Command and Armaments Command, USA) 488

Design of the Embedded System and Data Communication for an Agricultural Autonomous Vehicle
Jens Dalsgaard Nielsen, Kirsten Mølgaard Nielsen and Jan D. Bendtzen (Aalbord University, Denmark) .. 494