

32nd International Conference on Computers and Their Applications (CATA 2017)

Honolulu, Hawaii, USA
20 – 22 March 2017

Editors:

**Antoine Bossard
Gordon Lee
Les Miller**

ISBN: 978-1-5108-3666-2

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© (2017) 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: 978-1-943436-06-4 (Out of Print)
Reprint ISBN: 978-1-5108-3666-2

Printed by Curran Associates, Inc. (2017)

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

International Society for Computers and Their Applications
64 White Oak Court
Winona, MN 55987
USA

Phone: (507) 458-4517

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: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Keynote	1
The Power of Computing in Astrophysics <i>Günther Hasinger</i>	1
Data and Knowledge Management Applications	3
Using Gamification to Encourage Continuing Computer Science and Information Technology Education in South African Corporate IT Departments <i>Laurie Butgereit</i>	3
Using POMDP in Building an Adaptive Intelligent Tutoring System <i>Fangju Wang</i>	9
Data Deduplication for Audio Data Files <i>Mohamad Zaini Nurshafiqah, Hikari Yoshii, Fumiya Enomoto, Itaru Koike, Toshiyuki Kinoshita</i>	17
Access Log Analysis for Increasing the Number of Applicants Using LCS at Recruitment Site <i>Yutaro Kanno, Katsutoshi Kanamori, Hiroyuki Nishiyama</i>	23
Optimization Methods	27
A Permutation-Based Algorithm for Computing Covers from Matchings <i>Ariel Fernandez, Ryszard Janicki, Michael Soltys</i>	27
Forecast Based on Historical Data for RTSJ Event Handlers <i>Rogério Bodemuller, Matheus B. Leite, Patricia D. M. Plentz</i>	33
Optimal Placement of Relay Stations in a Wireless Sensor Network <i>Kiran Kumar Vallabh, Vinay Gonela, Damian Lampl, Kendall E. Nygard</i>	39
Optimizing Local Least Squares Regression for Short Term Wind Prediction <i>Erin S. Keith, Richard Kelley, Anna Panorska, Frederick C Harris Jr.</i>	47
Networks	55
Crawling the .jp TLD for Chinese Character Frequency Analysis as of 2016 <i>Antoine Bossard</i>	55
Measuring Cloud Service Reliability by Weighted Defects Over the Number of Clients as a Proxy for Usage <i>Abdullah Bokhary, Jeff Tian</i>	63
Application Migration for Cloud-Hosted Websites <i>Wei Hao, Andy Greely, Zhonghang Xia</i>	71
Hardware and Parallel Processing	77
A Solution to Slitherlink Puzzles Using FPGA <i>Tetsuo Miyauchi, Kiyofumi Tanaka</i>	77
On the Performance of Parallel Back-propagation Neural Network Implementations Using CUDA <i>Ganeshamoorthy Kandasamy, Nagulan Ratnarajah</i>	85
Approximate Performance Evaluation Technique for Computer Systems with Memory Resource Shared by Multiple Job Types <i>Hikari Yoshii, Mohamad Zaini Nurshafiqah, Takayuki Amemiya, Itaru Koike, Toshiyuki Kinoshita</i>	93
NAMACHA: A Software Development Environment for a Multi-Chip Convolutional Network Accelerator <i>Tetsui Ohkubo, Ryo Takata, Ryuichi Sakamoto, Masaaki Kondo, Hideharu Amano</i>	101

Intelligent Systems	107
Fast Online Listwise Learning to Rank for Collaborative Filtering <i>Eduardo Bürgel, Jerusa Marchi, Eduardo J. Spinosa</i>	107
Sequencing Learning Objects with Temporal Logic Plans <i>Darlan Anschau, Jerusa Marchi, Elder Rizzon Santos</i>	113
Using Machine Learning Techniques to Track Individuals & Their Fitness Activities <i>Thomas Reichherzer, Mikayla Timm, Nathan Earley, Nathaniel Reyes, Vimal Kumar</i>	119
An Evaluation of Machine Learning Algorithms for Prediction of Shelter Animal Outcomes <i>Mikayla Timm, Eman M. El-Sheikh</i>	125
Special Session: Software and Applications I	131
Discovering Community Structure Using Network Sampling <i>Samuel Chen, Joyati Debnath, Raluca Gera, Brian Greunke, Nicolas Sharpe, Scott Warnke</i>	131
A Novel Three Phase Symmetric Cipher Technique <i>Praveen Kumar, Bidyut Gupta, Koushik Sinha</i>	137
Spanning Tree Entropy of Mosaic Network <i>Raihana Mokhlissi, Dounia Lotfi, Joyati Debnath, Mohamed El Marraki</i>	143
An Efficient Algorithm for Load Partitioning in Multicore Shared-tree Multicast <i>Koushik Sinha, Bidyut Gupta, Ansuman Bhattacharya</i>	149
Special Session: Purposeful Systems	155
Purposeful Systems – Truly Integrating Systems of Humans and Machines <i>Maximilian Etschmaier, Gordon Lee</i>	155
Trust and Purpose in Computing <i>Kendall E. Nygard, Md. Minhaz Chowdhury, Pratap Kotala</i>	161
On the Verge of a New Relationship Between Man and Artificial Learning Machines? <i>Eugénio Oliveira</i>	167
Algorithms	173
Author Disambiguation with Restricted Longest Common Subsequence Algorithm <i>Srikanth R. Kambam, Cihan Varol</i>	173
RHO-AFFINE-ORB: An Improved ORB Algorithm for Fully Affine Invariant Matching <i>André Brasil Wyzykowski, Jerusa Marchi, Paulo Manoel Mafra</i>	179
Execution Right Delegation: Beyond the Rate Monotonic <i>Takaharu Suzuki, Kiyofumi Tanaka</i>	185
Identifying Workflow Differences Based on Spatial Visualization <i>Georgi Batinov, Kofi Whitney, Les Miller</i>	191
Image Analysis and Visualization	199
Development of a Recording Application Working on the Web for the Physical Condition Evaluation System Using the Lip Movement <i>Yuko Hoshino, Miyuki Suganuma, Mitsuho Yamada</i>	199
Dimensionality of Features for Micro-Expression Recognition <i>Valerie Simonis, Jacob Furst</i>	205
Pipeline for Reconstruction and Visualization of Underwater Marine Archaeology Sites using Photogrammetry <i>Sebastian M. T. Seibert von Fock, Sara Bilich, Katie Davis, Vaibhav K. Viswanathan, Zayra Lobo, Jessica Lupanow, Christopher Clark, Timmy Gambin, Zoë Wood</i>	211

Programming and Security	217
A Survey of Static Type Checkers of JavaScript Programs <i>Astrid Younang, Lunjin Lu, Nabil Almashfi</i>	217
Portfolio Investment Based on Gene Expression Programming <i>Chan-Yi Chou, Chang-Biau Yang, Hung-Hsin Chen</i>	225
Decontamination of an Arbitrary Network from Multiple Black Viruses <i>Jie Cai, Paola Flocchini, Nicola Santoro</i>	231
An Active Rule-Based System for XACML 3.0 <i>Minolini Nithyanandam, Ying Jin</i>	239
Panel I: Impact of Social Networking on Society	245
The Impact of Social Networking on Society <i>Gordon Lee, Laurie Butgereit, Gongzhu Hu, Thomas Reichherzer, Frederick C Harris Jr.</i>	245
Special Session: Software and Applications II	247
Experience on Augmented Reality Application at UTPB: Design and Implementation <i>Quan Yuan, Jacob Jordon, Ashley Arellano, Haesun Lee, Ilhyun Lee</i>	247
Social Life Amidst the Internet of Things: Using P2P and Social Connectivity <i>Henry Hexmoor, Bidyut Gupta</i>	253
Exploring Abstract Data Type Development Using Manipulatives and Gamification <i>Nicole Anderson</i>	259
Generation of Annotation for Diagrams Based on Attribute Evaluation <i>Takaaki Goto, Takeo Yaku, Kensei Tsuchida</i>	265
Panel II: Purposeful Systems	273
Prospects of the Future: Can Humans Stay in Control of Systems that Truly Integrate Humans and Machines? <i>Maximilian Etschmaier, Eugénio Oliveira, Kendall E. Nygard, Maurice E. Cohen, Donna Hudson, Bryan Knowles</i> ..	273
Special Session: Software and Applications III	275
Mobile Robots Navigation with Temporal Constraints Using Behavior Trees and Recovery Actions <i>Henrique F. Raia, Rafael R. R. de Souza, Patricia D. M. Plentz</i>	275
A Conceptual Model to Implement Smart Bus System Using Internet of Things (IoT) <i>Giridhar Maji, Sharmistha Mandal, Soumya Sen, Narayan C. Debnath</i>	281
A Fuzzy Logic based Method to Evaluate the Quality of Business Process Models <i>Narayan C. Debnath, Carlos Humberto Salgado, Mario Gabriel Peralta, Daniel Riesco, Lorena Baigorria, German Montejano</i>	287
Healthcare Applications	293
Healthcare Design Patterns – An Internet of Things Approach <i>Kasi Periyasamy, Kaiyu Wan, Vangalur Alagar</i>	293
Combining Artificial Intelligence and Biomedical Engineering to Enhance Methods for Disease Diagnosis and Prognosis <i>Donna Hudson, Maurice E. Cohen, Samuel E. Hudson</i>	301
Study of Fatigue and Evaluation of Physical Condition by Paralanguage Recognition and Gazing Point Analysis <i>Miyuki Suganuma, Saya Urakabe, Ryota Kuramochi, Shinya Mochiduki, Yuko Hoshino, Mitsuho Yamada</i>	307
A Coherent Healthcare System with RDBMS, NoSQL and GIS Databases <i>Huanmei Wu, Ashishi Ambavane, Sunanda Mukherjee, Songan Mao</i>	313
Software Engineering	319

Requirements Development Process of CMMI-DEV for Evolutionary Maintenance Projects: A Case Study of Implementation <i>Aline F. dos A. Lima, Thiago Syllas, Sandro R. B. Oliveira, Pamella B. Melo, Juan P. P. Rodrigues</i>	319
CERTICS - A Harmonization with CMMI-DEV Practices for Implementation of Continuous Improvement Competence Area <i>Fabrício W. da S. Garcia, Sandro R. B. Oliveira, Clênio F. Salviano</i>	327
Toward Automating the Specification of Geometric Tolerances for Design for Fit Applications in Machine Design <i>Faryar Etesami</i>	333
Analysis of User Experience and Performance at Initial Exposure to Novel Keyboard Input Methods <i>Connor F. Scully-Allison, Hirav Parekh, Frederick C Harris Jr., Sergiu M. Dascalu</i>	339

Author Index