

# **2015 Asia-Pacific Conference on Computer Aided System Engineering (APCASE 2015)**

**Quito, Ecuador  
14-16 July 2015**



**IEEE Catalog Number: CFP1531X-POD  
ISBN: 978-1-4799-7589-1**

# **2015 Asia-Pacific Conference on Computer Aided System Engineering**

## **APCASE 2015**

### **Table of Contents**

<b>Message from the Chairs.....</b>	xii
<b>Organizing Committee.....</b>	xiv
<b>Reviewers .....</b>	xv

---

## **Full Papers**

### **Autonomous and Autonomic Systems**

Basic Features of a Reflective Middleware for Intelligent Learning Environment in the Cloud (IECL) .....	1
<i>Manuel Sánchez, Jose Aguilar, Jorge Cordero, and Prisila Valdiviezo</i>	
An Optimal Control Approach for a Fault Tolerant Control Applied to an AUV for Inspection of Dams .....	7
<i>Eduardo Attuy Carvalho and Carlos Henrique Farias Dos Santos</i>	
Intelligent Well Systems .....	13
<i>Edgar Camargo, Egner Aceros, and Jose Aguilar</i>	

### **Biomedical and Health Systems**

Application Middleware for Management of Medical Applications Based on HL7 Standards .....	19
<i>Omar Hernando Moreno Torres and Javier Antonio Ballesteros Ricaurte</i>	
Automatic Segmentation and Analysis of Thermograms Using Texture Descriptors for Breast Cancer Detection .....	24
<i>Tatiana M. Mejía, María G. Pérez, Víctor H. Andaluz, and Aura Conci</i>	
Cost-Sensitive Learning for Imbalanced Bad Debt Datasets in Healthcare Industry .....	30
<i>Donghui Shi, Jian Guan, and Jozef Zurada</i>	

Development of a Prototype Arduino-Mobile in Area of Telemedicine for Remote Monitoring Diabetic People (MAY 2015) .....	36
<i>Yair Enrique Rivera Julio</i>	
Electroencephalographic Signals Acquisition for the Movement of a Wheelchair Prototype in a BCI System .....	41
<i>Pinos Eduardo, Guevara Daniel, and Fátima López</i>	
Proposal for a Specialist System for Dental Implant Based on Images .....	46
<i>Cesar Luiz Rizzatti Junior, Marcelo Rudek, Anderson Luis Szejka, and Osiris Canciglieri Junior</i>	

## **Communications and Networks**

Design and Implementation of a Non-ionizing Radiation Measuring System Evaluated with an Unmanned Aerial Vehicle .....	52
<i>Giancarlo Villena Prado and Manuel A. Yarleque Medina</i>	
Development of Radial Waveguide Dividers with Large Number of Ports .....	58
<i>Raúl V. Haro-Báez, José L. Masa-Campos, Jorge A. Ruiz Cruz, P. Sánchez Olivares, and Enrique V. Carrera</i>	
Space-Time Code Selection Using Channel Prediction .....	63
<i>T. Dimas Mavarez, Reinaldo Velásquez, Keila Candotti, and Monica Huerta</i>	
WDM-PON Design Model Based on the Minimum Spanning Tree Search over Delaunay Triangulations .....	68
<i>Germán V. Arévalo, Roberto C. Hincapié, and Javier E. Sierra</i>	

## **Computer-Based Tools and Techniques In Power Systems Operation**

Future Grid Business Model Innovation: Distributed Energy Resources Services Platform for Renewable Energy Integration .....	72
<i>Marcelo Sandoval and Santiago Grijalva</i>	
Improving the Computer Aided Power System Operation in Ecuador: Enhancements to SCADA/EMS .....	78
<i>Jaime C. Cepeda, Gabriel Rivera, and Lourdes Farinango</i>	
Parametric Identification to an Electronic Ballast System - Hid-Mh Lamp Based in Subspaces Methods .....	84
<i>Jaime Paúl Ayala Taco, Irvin Alberto Cedeño García, and Edison Ramiro Nieto Ríos</i>	
Reducing the Fuel Consumption of Hybrid Fuel Cell/Photovoltaic Power Systems Using PBIL-Based Reconfiguration .....	90
<i>C.A. Ramos-Paja, F. Bolaños, D. Gonzalez, F. Ramirez, and J.R. Camarillo</i>	

## **Data Mining & Computer-Aided System Optimization & Design**

Benchmark Tests on Improved Merge for Big Data Processing .....	96
<i>Zbigniew Marszalek, Marcin Wozniak, Grzegorz Borowik, Raniyah Wazirali,     Christian Napoli, Giuseppe Pappalardo, and Emiliano Tramontana</i>	
Decision Table Decomposition for Further Rule Induction .....	102
<i>Grzegorz Borowik, Tadeusz Luba, Cezary Jankowski, and Michał Mankowski</i>	
HyMuDS: A Hybrid Multimodal Data Acquisition System .....	107
<i>Anup Kale, Zenon Chaczko, and Shaher Slehat</i>	
Review of Big Data Storage Based on DNA Computing .....	113
<i>Hanadi Ahmed Hakami, Zenon Chaczko, and Anup Kale</i>	

## **Engineering Smart Systems**

A Comparative Study of the Wavenet PID Controllers for Applications in Non-linear Systems .....	118
<i>M.A. Saldaña O., A. García-Barrientos, L.E. Ramos V., Jean-Francois Balmat,     and Frédéric Lafont</i>	
Location, Sizing, and Operation Scheme of Power Storage in Distribution Systems .....	124
<i>L.F. Grisales, A. Grajales, O.D. Montoya, R.A. Hincapie, and M. Granada</i>	
Time and Frequency Feature Selection for Seismic Events from Cotopaxi Volcano .....	129
<i>Román Lara-Cueva, Paúl Bernal, María Gabriela Saltos, Diego S. Benítez,     and José Luis Rojo-Álvarez</i>	

## **Heuristic Computation Models and Systems**

Adaptive Beamforming for Moving Targets Using Genetic Algorithms .....	135
<i>Diego Burgos, Jonas Kunzler, Rodrigo Lemos, and Hugo Silva</i>	
An Approach for Multiple Combination of Ontologies Based on the Ants Colony Optimization Algorithm .....	140
<i>Maribel Mendonça, Niriaska Perozo, and José Aguilar</i>	
Computational Intelligence Application in Modeling Seismic Record and Soil Test Data at a Specified Area .....	146
<i>Tienfuan Kerh, Yu-Hsiang Su, and Ayman Mosallam</i>	
Building Blocks Identification Based on Subtree Sample Counts for Genetic Programming .....	152
<i>Bogdan Burlacu, Michael Kommenda, and Michael Affenzeller</i>	

Identity Recognition Using an Artificial Intelligence Based on Artificial Immune System .....	158
---	-----

*Jadiel Caparrós Da Silva, Fernando Parra Dos Anjos Lima,  
 Anna Diva Plasencia Lotufo,  
 and Jorge Manuel Moreira De Campos Pereira Batista*

Learning Bayesian Network by a Mesh of Points .....	163
---	-----

*Byron Oviedo, Luis Moreira, Amilkar Puris, and Serafín Moral*

## **Machine Vision and Image Processing**

Hyperspectral Analysis Based Anthocyanin Index (ARI2) during Cocoa Bean Fermentation Process .....	169
--	-----

*Jessica Ruiz Reyes, Juan Soto Bohórquez, and William Ipanaque Alama*

Optical Flow as a Tool for Cardiac Motion Estimation .....	173
--	-----

*Emiro Ibarra, Rubén Medina, Villie Morocho, and Pablo Vanegas*

Real-Time Face Detection and Tracking Utilising OpenMP and ROS .....	179
--	-----

*Eduardo Tusa, Arash Akbarinia, Raquel Gil Rodriguez, and Corina Barbalata*

Toward 2D Image Classifier Based on Firefly Algorithm with Simplified Sobel Filter .....	185
--	-----

*Christian Napoli, Giuseppe Pappalardo, Emiliano Tramontana,*

*Grzegorz Borowik, Dawid Polap, and Marcin Wozniak*

## **Mechatronic, Sensory, and Robotic Systems**

A System for 2D Imaging of Magnetic Field Based on Solid-State Magneto-Inductive Sensors .....	190
--	-----

*D.S. Benitez, S. Quek, and P. Gaydecki*

Analysis, Design, and Implementation of an Autopilot for Unmanned Aircraft - UAV's Based on Fuzzy Logic .....	196
---	-----

*Valencia-Redrovan David, Guijarro-Rubio Octavio, Basantes-Montero David, and Enríquez-Champutiz Victor*

Design and Implementation of a Temperature Predictive Controller for a Dryer Plant of Cocoa Beans .....	202
---	-----

*P. Parra Rosero, W. Ipanaque Alama, and J. Manrique Silpu*

Development of a New Type of Lightweight Power Assist Suit for Transfer Work .....	208
--	-----

*Chiharu Ishii, Hiroki Yamamoto, and Daichi Takigawa*

Evaluation of Algorithms for Linear and Nonlinear PID Control for Twin Rotor MIMO System .....	214
--	-----

*Ricardo Cajo and Wilton Agila*

Sliding Mode Control: Implementation Like PID for Trajectory-Tracking for Mobile Robots .....	220
<i>Pablo Proaño, Linda Capito, Andrés Rosales, and Oscar Camacho</i>	

## **Security and Safety Systems**

A First Attempt to Cloud-Based User Verification in Distributed System .....	226
<i>Marcin Wozniak, Dawid Polap, Grzegorz Borowik, and Christian Napoli</i>	
Authorship Semantical Identification Using Holomorphic Chebyshev Projectors .....	232
<i>Christian Napoli, Emiliano Tramontana, Grazia Lo Sciuto, Marcin Wozniak, Robertas Damaševicius, and Grzegorz Borowik</i>	
Objective Quality Metrics in Correlation with Subjective Quality Metrics for Steganography .....	238
<i>Raniyah Wazirali, Shaher Slehat, Zenon Chaczko, Grzegorz Borowik, and Lucía Carrión</i>	
Toward Dynamic Signal Coding for Safe Communication Technology .....	246
<i>Fryderyk Koziol, Grzegorz Borowik, Marcin Wozniak, and Zenon Chaczko</i>	

## **Smart Laboratory and Education Systems**

Application of Collimated Projection Systems for the Purpose of Driving Simulators .....	252
<i>Grzegorz Gudzbeler, Mariusz Dabrowski, and Grzegorz Borowik</i>	
Haptic Middleware Based Software Architecture for Smart Learning .....	257
<i>Zenon Chaczko, Cheuk Yan Chan, Lucia Carrion, and Wael Mohammad G. Alenazy</i>	
Mirroring Teachers' Assessment of Novice Students' Presentations through an Intelligent Tutor System .....	264
<i>Vanessa Echeverría, Bruno Guamán, and Katherine Chiluiza</i>	
Supporting the Assessment of Collaborative Design Activities in Multi-tabletop Classrooms .....	270
<i>Roger X. Granda, Vanessa Echeverría, Katherine Chiluiza, and Marisol Wong-Villacrés</i>	

## **Software Intensive Systems**

Automatic Parallelization of GPU Applications Using OpenCL .....	276
<i>Lizandro D. Solano-Quinde, Brett M. Bode, and Arun K. Soman</i>	
GPU Acceleration of the Horizontal Diffusion Method in the Weather Research and Forecasting (WRF) Model .....	284
<i>Ronald M. Gualán Saavedra, Lizandro D. Solano Quinde, and Brett M. Bode</i>	

Reconfiguration of Photovoltaic Arrays Based on a GPU-Accelerated Exhaustive Search Algorithm .....	290
<i>Juan Ramón Camarillo-Peñaanda, Daniel González Montoya, and Carlos Andrés Ramos-Paja</i>	

## **System Theory and Applications**

Application of Control Theory Markov Systems to Minimize the Number of Transmissions in a Multi-hop Network .....	296
<i>Jonathan M. Palma O., Leonardo D.P. Carvalho, Alim P.C. Gonçalves, Christian E. Galarza, and André M. De Oliveira</i>	
Fault Diagnosis for Controlled Continuous Systems from a Hybrid Approach: A Case Study .....	302
<i>Mariela Cerrada, Joffre Ortiz, and René Vinicio Sánchez</i>	
Relations between Different Constructions of Bent Functions and Their Enumerations .....	308
<i>Chunhui Wu and Bernd Steinbach</i>	
Sliding Mode Control: An Approach to Control a Quadrotor .....	314
<i>Marco Herrera, William Chamorro, Alejandro P. Gómez, and Oscar Camacho</i>	

## **Wireless Network Systems & Apps**

Hybrid Monitoring Proposal for Wireless Sensor Network .....	320
<i>Marlon Navia, Alberto Bonastre, and José C. Campelo</i>	
NLOS Mitigation Based on TOA for Mobile Subscriber Positioning Systems by Weighting Measures and Geometrical Restrictions .....	325
<i>E. René Játiva, David Sánchez, and Josep Vidal</i>	
Pseudo Random Network Coding in Infrastructure to Vehicle Environment for Data Download .....	331
<i>Darwin Astudillo, Emmanuel Chaput, and Andre-Luc Beylot</i>	
Redfang: A High-Level Bluetooth Library for Building Distributed Android Applications .....	337
<i>Diego Ordóñez Camacho</i>	

## **Posters**

3D Visualization of Heterogeneous User Interactions in a Social Network .....	342
<i>Wanjun Pei, Benjamin Guthier, and Abdulmotaleb El Saddik</i>	

NeoPlag: An Ecosystem to Support the Development and Evaluation of New Algorithms to Detect Plagiarism .....	348
<i>Diego Quisi-Peralta, Cristian Timbi-Sisalima, Vladimir Robles-Bykbaev, Paola Ingavélez-Guerra, Bertha Tacuri-Capelo, Hernán Fajardo-Heras, and Manuel Barrera-Maura</i>	
Mechatronic Hand Prosthesis for Child .....	354
<i>B. Gámez, M. Cabrera, L. Serpa, and J. Cabrera</i>	
Acquisition and Conditioning of Electromyographic Signals for Prosthetic Legs .....	360
<i>F. Cadena, J. Sanipatin, G. Verdezoto, H. Cervantes, D. Ortiz, and D. Ojeda</i>	
Securing Teredo Client from Nat Holes Vulnerability .....	366
<i>Shaher Suleman Slehat, Zenon Chaczko, and Anup Kale</i>	
Performance Analysis of Wireless Network Modes in Conformance with IEEE 802.11b and WDS .....	370
<i>Román Lara-Cueva, Diego Benítez, Claudia Fernández, and Carlos Morales</i>	
Analysis of the Security IPv6 and Comparative Study between Two Routing Protocols Oriented to IPv6 .....	374
<i>José Roberto Patiño Sánchez</i>	
Technologies' Application, Rules, and Challenges of Information Security on Information and Communication Technologies .....	380
<i>Cumbal Renato and Narváez María</i>	
Design of a Supervisory Control System for a Clinker Kiln Operation .....	387
<i>Eliezer Colina, Mara Falconí, Villie Morocho, José Medina, and Alfredo Mora</i>	
Semantic Recommender Systems for Digital TV: From Demographic Stereotyping to Personalized Recommendations .....	392
<i>J. Ávila, X. Riofrío, K. Palacio-Baus, M. Espinoza-Mejía, and V. Saquicela</i>	
Planning a Wireless Mesh Network Which Takes Advantage of the Urban Geography of the City .....	397
<i>Maria Elena Villapol, David Perez Abreu, and Carlos Cordero</i>	
Optimal Location and Sizing of DGs and Determining of a Protection Scheme to Improve Reliability Indices .....	403
<i>L.F. Grisales, A. Grajales, O.D. Montoya, R.A. Hincapie, and M. Granada</i>	
Fuzzy Inference System Applied to Mechanical Design of Bone Tissue Engineering Scaffolds .....	409
<i>Hernán Lara, Ciro Rodríguez, and Christian Mendoza-Buenrostro</i>	
Architecture of a Systemic Protection System for the Interconnected National System of Ecuador .....	414
<i>M.V. Flores, D.E. Echeverría, R.P. Barba, and G. Argüello</i>	
<b>Author Index .....</b>	<b>420</b>