

2011 IEEE Electronics, Robotics and Automotive Mechanics Conference

(CERMA 2011)

**Cuernavaca, Morelos, Mexico
15-18 November 2011**



IEEE Catalog Number: CFP1146A-PRT
ISBN: 978-1-4577-1879-3

2011 Electronics, Robotics and Automotive Mechanics Conference

CERMA 2011

Table of Contents

| | |
|---------------------------------|------|
| Message from General Chair..... | xii |
| Organizing Committee..... | xiii |
| Reviewers..... | xv |

Semiconductors and Circuit Design

| | |
|--|----|
| Computing Resonance Frequency Curves in Parametrically Switched RLC Circuit with Application to Analog Filtering | 3 |
| <i>Luis Moreno-Ahedo</i> | |
| Sine Wave Oscillator Using a Mathematical Function | 8 |
| <i>Pedro Ochoa M., María de Lourdez Díaz D., Lucía Juárez Q., and Sergio I. Hernández R.</i> | |
| Modeling of a CMOS Active Pixel Image Sensor: Towards Sensor Integration with Microfluidic Devices | 14 |
| <i>Matías Vázquez-Piñón, José Gómez-Quiñones, Sergio Camacho-León, Graciano Dieck-Assad, and Sergio O. Martínez-Chapa</i> | |
| A Multi-channel Sinusoidal Generator for Electrokinetic Stimulation of Microfluidic Platforms | 20 |
| <i>Jose Gomez-Quiñones, Victor H. Perez-Gonzalez, Hector Moncada-Hernandez, Olivier Rossetto, Graciano Dieck-Assad, and Sergio O. Martinez-Chapa</i> | |

Artificial Intelligence and Neural Networks

| | |
|--|----|
| Artificial Organic Networks | 29 |
| <i>Hiram Ponce and Pedro Ponce</i> | |
| Genetically Enhanced Intelligent Speed Control for Induction Machines Using Direct Torque Control | 35 |
| <i>Fernando David Ramirez Figueroa and Alfredo Victor Mantilla Caeiros</i> | |

| | |
|---|----|
| Outlier Detection Applying an Innovative User Transaction Modeling with Automatic Explanation | 41 |
| <i>Deisy Galeana Pérez and Manuel Mejía Lavalle</i> | |
| On-Line Production Cost Optimization in High Performance Machining Operations through AI Techniques | 47 |
| <i>Jorge A. Silva, Héctor R. Siller, G. Kitazawa, and José V. Abellán-Nebot</i> | |
| Input-Output Stability for Differential Neural Networks | 53 |
| <i>Emmanuel García Morán and Daishi Alfredo Murano Labastida</i> | |
| Experimental Fatigue Crack Propagation Simulation by ANN of a Newly Developed Controlled Rolled Microalloyed Steel Plate | 59 |
| <i>Jan Mayén, Sergio Serna, Bernardo Campillo, Marco Antonio Cruz Chávez, Arturo Molina, and Osvaldo Flores</i> | |
| FPGA Based LIRA Neural Classifier | 65 |
| <i>Alejandro Vega, Tatiana Baidyk, Ernst Kussul, and José Luis Pérez Silva</i> | |
| Chaotic Time Series Prediction with Feature Selection Evolution | 71 |
| <i>V. Landassuri-Moreno, J. Raymundo Marcial-Romero, A. Montes-Venegas, and Marco A. Ramos</i> | |
| Continuous-Time Neural Identification for a 2 DOF Vertical Robot Manipulator | 77 |
| <i>Francisco Jurado, María A. Flores, V. Santibañez, M.A. Llama, and Carlos E. Castañeda</i> | |
| Separation and Identification of Environmental Noise Signals Using Independent Component Analysis and Data Mining Techniques | 83 |
| <i>Ma. Guadalupe López P., Luis P. Sánchez F., Herón Molina Lozano, and L. Noé Oliva Moreno</i> | |
| Computer Tool for Analyzing Gases in Power Transformers | 89 |
| <i>Francisco Arias, Santiago Álvarez, Juan Palacio, German Zapata, Helman Suárez, and José Velasquez</i> | |

Computer Vision and Robotics

| | |
|---|-----|
| Detection of the Tiredness Level of Drivers Using Machine Vision Techniques | 97 |
| <i>Robinson Jiménez, Flavio Prieto, and Victor H. Grisales</i> | |
| Optimizing Feature Selection Techniques for Sentiment Classification | 103 |
| <i>Diego Uribe</i> | |
| Semi-automatic Recognition of Human Activities under Variable Lighting | 108 |
| <i>Jaime R. Ruiz, Leopoldo Altamirano, Eduardo F. Morales, Adrián León, and J.A. González</i> | |
| Visual Lip Segmentation in Patients with Cleft Lip and/or Cleft Palate | 114 |
| <i>Andrés Leonardo Jutinico and Flavio Prieto</i> | |

| | |
|--|-----|
| Bio-inspired Event Based Motion Detection for Traffic Safety in a Close-Real Automotive Environment | 120 |
| <i>Cristina Conde, Eduardo Orbe, Isaac Martín de Diego, and Enrique Cabello</i> | |
| Improvement of a Video Smoke Detection Based on Accumulative Motion Orientation Model | 126 |
| <i>Ochoa-Brito Alejandro, Millan-Garcia Leonardo, Sanchez-Perez Gabriel, Toscano-Medina Karina, and Nakano-Miyatake Mariko</i> | |
| Analysis of AVI Files for Mice Behavior Experiments in the Morris Water Maze | 131 |
| <i>Gerardo Miramontes-de León, Arturo Moreno-Báez, Claudia Sifuentes-Gallardo, Ernesto García-Domínguez, and Marisol Galván Valencia</i> | |
| Interest Points Image Detectors: Performance Evaluation | 137 |
| <i>Perez Daniel Karina Ruby, Escamilla Hernandez Enrique, Nakano Miyatake Mariko, Perez Meana Hector Manuel, and Gabriel Sanchez Perez</i> | |
| Implementation and Test of Appearance-Based Vision Algorithms Using High-Level Synthesis in FPGA | 143 |
| <i>Emmanuel Ortiz-López, Mario-Alberto Ibarra-Manzano, José-Amparo Andrade-Lucio, and Oscar-Gerardo Ibarra-Manzano</i> | |
| Point-Triplet Descriptors for 3D Facial Landmark Localisation | 149 |
| <i>Marcelo Romero, Nick Pears, Adriana Vilchis, Juan C. Ávila, and Otniel Portillo</i> | |
| A New Tool for Merging the Information Based on Clustering Methods | 155 |
| <i>José Miguel Torres Garfias, Jesús Linares Flores, Antonio Orantes Molina, and M.C. Jorge L. Barahona Avalos</i> | |
| Generalization of the Interception of Multiple Moving Objects | 161 |
| <i>Juan Alejandro Flores Campos, José Alfredo Rosas Flores, and Cándido Palacios Montufar</i> | |
| Design and Optimization of Real-Time Boosting for Image Interpretation Based on FPGA Architecture | 167 |
| <i>Mario-Alberto Ibarra-Manzano and Dora-Luz Almanza-Ojeda</i> | |
| Improvement of Radon-Based Image Hashing Using Image Normalization | 173 |
| <i>Kelsey Ramirez, Mariko Nakano, and Hector Perez</i> | |
| Soccer Ball Speed Estimation Using Optical Flow for Humanoid Soccer Player | 178 |
| <i>Eric Hernández Castillo, Ziziliz Zamudio Beltrán, and Juan Manuel Ibarra Zannatha</i> | |
| Vortex Swarm Path Planning Algorithm | 184 |
| <i>C. Helbert Eduardo Espitia, E. Jorge Iván Sofrony, and P. César Leonardo González</i> | |
| Design and Dynamic Modeling of Humanoid Biped Robot e-Robot | 191 |
| <i>C. Hernández-Santos, R. Soto, and E. Rodríguez</i> | |

| | |
|--|-----|
| Water-Displacement-Based Sun-Tracking System to Control the Orientation of a Cylinder Parabolic Solar Concentrator | 197 |
| <i>J.A. Flores Campos, J.A. Rosas Flores, and C. Palacios Montúfar</i> | |
| Innovative Design and Modeling of a Micromixer: Navier-Stokes and Convection-Diffusion Equations | 203 |
| <i>C.F. Flores-Rivera and G. Pérez-Lechuga</i> | |

Power Electronics and Control Systems

| | |
|---|-----|
| The Novel Method for Estimating VRLA Battery State of Charge | 211 |
| <i>Stanislav Tairov and Luiz Carlos Stevanatto</i> | |
| A Fuzzy PI Controller Application in Boost Converter | 216 |
| <i>Evandro Gomes, Ginalber Serra, and Jose Gomes</i> | |
| Modeling and Control of a Wind Turbine Synchronous Generator | 222 |
| <i>Rubi Garcia Hernandez and Raul Garduno Ramirez</i> | |
| Fuzzy Logic Control for a Two Tanks Hydraulic System Model | 228 |
| <i>Juan Anzurez, Luis Alberto Torres, and Isidro Ignacio Lazaro</i> | |
| A New Hybrid Control for STATCOM | 234 |
| <i>Saúl Calderón Fernández, Máximo Hernández Ángeles, Leonardo Guardado Zavala, and Enrique Melgoza Vázquez</i> | |
| Practical Considerations on Output Feedback Linear Programming Predictive Control | 240 |
| <i>Luis Amezcuita-Brooks, Diana Hernandez, and Francisco Gonzalez-Sanchez</i> | |
| Fault Detection for a Bus Suspension Model Using an Utkin Observer | 246 |
| <i>Hazael Ballesteros Moncada and Juan Anzurez Marin</i> | |
| Fault Diagnosis in Linear Multivariable Systems: An Inversion Approach | 252 |
| <i>Rogelio Martínez-Hernández and José Juan Rincón-Pasaye</i> | |
| Discrete-Time Modeling and Control of PMSM | 258 |
| <i>Antonio Navarrete, Jorge Rivera, Juan J. Raygoza, and Susana Ortega</i> | |
| Feedback Electronic Power Drive for a Brushless AC Servomotor | 264 |
| <i>Javier Ollervides, Ivan Gonzalez, Victor Santibañez, and Alejandro Dzul</i> | |
| Sensorless Control of Induction Motors with Core Loss | 270 |
| <i>Marco Meza, Jorge Rivera, Juan J. Raygoza, and Susana Ortega</i> | |
| Using a Realization Technique for System Reconfigurability Evaluation: Simulation Application on a DC Motor | 277 |
| <i>Brian M. González Contreras, N. Delgadillo Checa, M.A. Carrasco Aguilar, B. Cante Michcol, and F.E. Morales López</i> | |
| Fuzzy C-Means Clustering Technique Applied for Modeling Parameters of an Intelligent Greenhouse Open Control System | 283 |
| <i>Paul Cepeda, Pedro Ponce, David Romero, and Arturo Molina</i> | |

| | |
|---|-----|
| THD in Cascade Multilevel Inverter Symmetric and Asymmetric | 289 |
| <i>Olga Lidia Jimenez, Rodolfo Amalio Vargas, Jesus Aguayo, Jaime Eugenio Arau, Gerardo Vela, and Abraham Claudio</i> | |
| AC-DC Power-Factor-Corrected Switching Converter Based on Air-Gap Transformer and Pulse Position Modulator for Lighting Applications | 296 |
| <i>Roberto Baca, Gabriel Romero Paredes, and Ramón Peña</i> | |
| Implementation of Different Wavelets in an Auto-Tuning Wavenet PID Controller and Its Application to a DC Motor | 301 |
| <i>Oscar Islas-Gómez, Luis Enrique Ramos-Velasco, and Jair García-Lamont</i> | |
| A PIC Microcontroller Embedded System for Medical Rehabilitation Using Ultrasonic Stimulation through Controlling Planar X-Y Scanning Trajectories | 307 |
| <i>P. N. Rivera-Arzola, J. C. Ramos-Fernández, J. M. Ortega Franco, M. Villanueva-Ibáñez, and M. A. Flores-González</i> | |
| Analog Actuator for Multimodal Environmental Corrosion Measurements | 311 |
| <i>Jose Antonio Gutierrez Gnechi, Marisol Larios Lopez, Jose Luis Ramirez Reyes, Adriana Tellez Anguiano, and Juan Carlos Gonzalez Hernandez</i> | |
| Analysis of Quasi-square Waveform to Eliminate Acoustic Resonances in Lamps of High Intensity Discharge (HID) | 315 |
| <i>Juan Aquí, Mario Ponce, and Julio Cortés</i> | |
| Automated Wetting Front Detector | 320 |
| <i>Jose Antonio Gutierrez Gnechi, Philippe Lobit, Fernando Landeros Paramo, Adriana Tellez Anguiano, and Arturo Mendez Patiño</i> | |
| High Impedance Fault Detection Using Discrete Wavelet Transform | 325 |
| <i>Vicente Torres G. and Hector F. Ruiz P.</i> | |

Communciations and Computer Networks

| | |
|--|-----|
| Gain Equalization for Erbium-Doped Fiber Amplifiers by the Synthesis of a Long-Period Fiber Grating | 333 |
| <i>Ignacio Flores-Llamas, Fatima Moumtadi, and Julio Carlos Delgado-Hernández</i> | |
| Considerations on Interference for Hybrid Mode Digital Radio Broadcast Standards over AM Frequencies | 338 |
| <i>Fatima Moumtadi, Julio Carlos Delgado-Hernández, Ignacio Flores-Llamas, and Roberto Tovar-Medina</i> | |
| Survey on Compensation for Analog Front End Imperfections by Means of Adaptive Digital Front End for On-Chip OFDM Wireless Transmitters | 343 |
| <i>Martin Garcia-Hernandez, Alfonso Prieto-Guerrero, and Gerardo A. Laguna-Sanchez</i> | |

| | |
|--|-----|
| Low Complexity Turbo Code Specification for Power-Line Communication (PLC) | 349 |
| <i>Alfonso Martínez Cruz, Ricardo Barrón Fernández, José Luis Oropeza Rodríguez, and Gerardo A. Laguna Sánchez</i> | |
| Performance Evaluation of Medium Access Control Protocol for Wireless Networks | 355 |
| <i>Aldo Mendez-Perez, Marco Panduro-Mendoza, Raul Aquino-Santos, and Manuel Munguía-Macario</i> | |
| Dual Patch Antenna Array for the Openly TV Frequency Ranges in Mexico | 360 |
| <i>Margarita Tecpoyotl-Torres, Jorge Alberto Damián-Morales, and José Gerardo Vera-Dimas</i> | |
| Design and Development of a BlueBee Gateway for Bluetooth and ZigBee Wireless Protocols | 366 |
| <i>E. Cano and I. Garcia</i> | |
| Exploring a Framework for the Application of the Next Generation Networks (NGN) in the Mexican Rural Context | 371 |
| <i>Alberto Colin, Arturo Serrano, and Eduardo Alvarez-Guzmán</i> | |
| Development of Heterogeneous Node Network Using Microcontroller with Protocols CAN and Zigbee | 377 |
| <i>Marcos Antonio Estremote and Nobuo Oki</i> | |
| GNSS Receiver Based on a SDR Architecture Using FPGA Devices | 383 |
| <i>Miguel Sánchez Meraz, Juan Manuel Castro Arvizu, and Amadeo José Argüelles Cruz</i> | |

Computer Science and Education

| | |
|--|-----|
| CUDA-enabled Particle-Based 3D Fluid Haptic Simulation | 391 |
| <i>Justino Mejorada Pier, Ivan Figueroa, and Joel Huegel</i> | |
| Advantages of Using a Multi-model Environment in Software Process Improvement | 397 |
| <i>Muñoz Mirna, Mejía Jezreel, Alor Giner, Calvo-Manzano Jose A., and San Feliu Tomás</i> | |
| Similarity Study: A Case Study on Software Outsourcing Based on CMMI-ACQ | 403 |
| <i>Gloria Piedad Gasca Hurtado, Bell Manrique, and Guillermo Gonzalez-Calderon</i> | |
| Integration of Usability Into the Development of Mobile Computing Environments Applied to Contextual Location Based Services (LBS) | 409 |
| <i>Nazir O. Molina Coronel, Javier Ortiz Hernández, Socorro Sáenz Sánchez, and Juan G. González Serna</i> | |
| An Evolutionary Hybrid Strategy for Solving the Rural Postman Problem | 415 |
| <i>J. Raymundo Marcial-Romero, Héctor A. Montes-Venegas, and Jorge H. Zuñiga</i> | |

| | |
|---|------------|
| Definition of a Hybrid Measurement Process for the Models ISO/IEC 15504-ISO/IEC 12207:2008 and CMMI Dev 1.3 in SMEs | 421 |
| <i>Julio Cesar Ruiz, Zurisadai Benjamín Osorio, Jezreel Mejia, Mirna Muñoz, Ana María Chávez, and Beatriz Alejandra Olivares</i> | |
| Designing an XML-based Representation for CaesarJ Source Code | 427 |
| <i>Alberto Salinas-Mendoza, Ulises Juárez-Martínez, Giner Alor-Hernández, and Beatriz A. Olivares-Zepahua</i> | |
| Development of Report Management Software for the Analysis of Student Performance in an Educational Game | 433 |
| <i>Luis Huerta, Antonio Leon, Lucina Torres, Venustiano Soancatl, Inti Reyes, Nubia Cabrera, and Andrea Herrera</i> | |
| Visual Learning Environments for Computer Programming | 439 |
| <i>Sergio Sandoval-Reyes, Pedro Galicia-Galicia, and Ivan Gutierrez-Sanchez</i> | |
| Emerging Technologies for Electric Power Generation Personnel Training | 445 |
| <i>Guillermo Rodríguez, Yasmín Hernández, and Israel Paredes-Rivera</i> | |
| A New Approach for Measuring the Distribution of Graphite Nodules Based on Singular Value Decomposition | 450 |
| <i>Ana Herrera-Navarro, Hugo Jimenez-Hernandez, Hayde Peregrina-Barreto, Luis Morales-Hernández, Federico Manriquez-Guerrero, and Iván Terol Villalobos</i> | |
| Design and Implementation of an Electronic Voting System for Choosing the Position of Advisor Student in a University | 455 |
| <i>Gina Gallegos-García, Verónica K. Ruiz Venegas, Adriana Molina Silva, and Eleazar Aguirre Anaya</i> | |
| Linear Responsibility Chart for PSP | 461 |
| <i>Alejandro Fuentes-Penna, Jorge A. Ruiz-Vanoye, Sebastian Pathiyamathon-Joseph, and Miguel A. Fernández-Medina</i> | |
| Benchmark of Annotation of Geolocation between Google and Yahoo | 467 |
| <i>Jesús Ricardo Guzmán Jiménez and Liliana Ibeth Barbosa Santillán</i> | |
| Author Index | 472 |