

2012 IEEE Ninth Electronics, Robotics and Automotive Mechanics Conference

(CERMA 2012)

**Cuernavaca, Mexico
19 – 23 November 2012**



**IEEE Catalog Number: CFP1246A-PRT
ISBN: 978-1-4673-5096-9**

2012 Ninth Electronics, Robotics and Automotive Mechanics Conference

CERMA 2012

Table of Contents

Message from the General Chair.....	xii
Organizing Committee.....	xiii
Reviewers.....	xv

Computer Vision and Robotics

Algorithm for Detection of Single Isolated Human Insulin Crystals for In-Situ Microscopy	3
<i>Geovanni Martinez, Patrick Lindner, Arne Bluma, and Thomas Scheper</i>	
Hypoechoic Nodules Detection and Classification in TRUS Prostate Images Using Active Contours and Parabolic Zone Division	9
<i>Yohans Alejandro Carmona Montana, Osslan Osiris Vergara Villegas, Humberto de Jesús Ochoa Domínguez, and Vianey Guadalupe Cruz Sánchez</i>	
Rough Set Theory-Based Image Segmentation: A Comparison of Approaches in Two Color Spaces	15
<i>Alberto J. Patlan-Rosales and Raul E. Sanchez-Yanez</i>	
DFT-Based Watermarking Method for Medical Images.....	21
<i>Manuel Cedillo-Hernandez, Francisco J. Garcia-Ugalde, Mariko Nakano-Miyatake, and Hector M. Perez-Meana</i>	
Combining Color Constancy and Gamma Correction for Image Enhancement	25
<i>Jonathan Cepeda-Negrete and Raul E. Sanchez-Yanez</i>	
Vision-Based Trajectory Tracking on the 3D Virtual Space for a Quadrotor	31
<i>Francisco Jurado, Guillermo Palacios, and Francisco Flores</i>	
Intelligent Algorithm for Parallel Self-Parking Assist of a Mobile Robot	37
<i>M.-A. Ibarra-Manzano, J.-H. De-Anda-Cuéllar, C.-A. Pérez-Ramírez, Ó.-I. Vera-Almanza, F.-J. Mendoza-Galindo, M.-A. Carbajal-Guillén, and D.-L. Almanza-Ojeda</i>	

Distance Perception in Mobile Robots as an Emergent Consequence of Visuo-Motor Cycles Using Forward Models	42
<i>Wilmer Gaona, Jorge Hermsillo, and Bruno Lara</i>	
GPS Precision Time Stamping for the HDL-64E Lidar Sensor and Data Fusion	48
<i>Angel-Iván García-Moreno and José-Joel Gonzalez-Barbosa</i>	
Background Subtraction Model Based on Adaptable MOG	54
<i>David Vega-Hernández, Ana M. Herrera-Navarro, and Hugo Jiménez-Hernández</i>	
Navigation Control System of Walking Hexapod Robot	60
<i>Javier Ollervides, Jorge Orrante-Sakanassi, Víctor Santibáñez, and Alejandro Dzul</i>	
Application of Self-Organizing Techniques for the Distribution of Heterogeneous Multi-Tasks in Multi-Robot Systems	66
<i>Yadira Quiñonez, Darío Maravall, and Javier de Lope</i>	
Self Body Mapping in Mobile Robots Using Vision and Forward Models	72
<i>Esaú Escobar, Jorge Hermsillo, and Bruno Lara</i>	
An Electrical Stimulation System for Research and Testing	78
<i>Martha Salomé López de la Fuente and José Antonio Benavides Gómez</i>	
Haptic Guidance Using Primitives for the Execution of Virtual Robotic Tasks	83
<i>Carlos Vázquez and Jan Rosell</i>	
Real Time Stereo Vision with a Modified Census Transform in FPGA	89
<i>Juan Manuel Xicoténcatl-Pérez, Arturo Lezama-León, José Miguel Liceaga-Ortiz-De-La-Peña, and Rubén O. Hernández-Terrazas</i>	
Supervision and Command Architecture for Automation and Robotics Platform	95
<i>Ricardo A. Castillo E. and João Mauricio Rosário</i>	

Computer Science and Education

Personal Mobile Health Systems for Supporting Patients with Chronic Diseases	105
<i>J. A. Garibaldi-Beltrán and M. Vazquez-Briseno</i>	
Software Process Architecture: Roadmap	111
<i>Mery Pesantes, Cuauhtémoc Lemus, Hugo A. Mitre, and Jezreel Mejía</i>	
Semi Fragile Watermarking System in Temporal Domain for PCM Audio Signals	117
<i>Mario Gonzalez-Lee, Luis J. Morales-Mendoza, Rene F. Vazquez-Bautista, and Efren Morales-Mendoza</i>	
A User-Based Testing Procedure for a Telemanipulation System	123
<i>Marcelo Romero, Rigoberto Martínez, Otniel Portillo, Adriana Vilchis, and Juan C. Ávila</i>	

Simulated Annealing Algorithm for 2D Image Compression	129
<i>Pedro Moreno-Bernal, Marco Antonio Cruz-Chávez, Abelardo Rodríguez-León, Otoniel López, Manuel P. Malumbres, Martín G. Martínez-Rangel, Alina Martínez-Oropeza, Beatriz Martínez-Bahena, and Jazmín Yanel Juárez-Chávez</i>	
Expected Requirements in Support Tools for Software Process Improvement in SMEs	135
<i>Muñoz Mirna, Mejía Jezreel, Calvo-Manzano Jose A., Cuevas Gonzalo, San Feliu Tomás, and De Amescua Antonio</i>	
Identifying Findings for Software Process Improvement in SMEs: An Experience	141
<i>Mejía Jezreel, Muñoz Mirna, Navarro Pablo, Ortega Edgar, García Alejandro, and Monreal Sandra</i>	
Neighborhood Hybrid Structure for the Optimization of Mechanical Properties of a Microalloyed Steel Based on Its Chemical Composition	147
<i>Jazmín Yanel Juárez-Chávez, Marco Antonio Cruz-Chávez, Sergio Alonso Serna Barquera, Bernardo Campillo Illanes, Jesús Del Carmen Peralta-Abarca, Beatriz Martínez-Bahena, and Pedro Moreno-Bernal</i>	
Subsystem of Data Acquisition Using the ModBus Protocol in Real Time of the Digital Electro-Hydraulic Control and Its Integration with the Integral System of Process Information of Laguna Verde Nuclear Power Plant	153
<i>Efren Ruben Coronel Flores and Carlos Chairez Campos</i>	
 Artificial Intelligence and Neural Networks	
Feature Distributions in Domain Adaptation	159
<i>Diego Uribe and Enrique Cuan</i>	
Applying Adapted PSO Approach to Minimize Costs in the Beer Distribution Game Using Three Dynamic Demand Patterns	165
<i>M. Gutiérrez Contreras, L.E. Mancilla Espinoza, M.R. Baltazar Flores, and M.A. Sotelo-Figueroa</i>	
Feedback Scheme Based on Fuzzy Control for Shear Force Control	171
<i>Diego V. Escamilla, Héctor R. Siller, Federico Guedea, Rodolfo Cortés, and Víctor Coello-Cárdenas</i>	
Support Vector Machines Applied to a Combustion Process	176
<i>Claudia I. Torres, Fernando Hernández, Antonio Trejo, and Guillermo Ronquillo</i>	
Analysis and Review of the Contribution of Neural Networks to Saving Electricity in Residential Lighting by a Design in MATLAB	182
<i>Diego Armando Giral, Ricardo Romero Romero, and Cesar Hernández</i>	

Neighborhood Hybrid Structure for Minimum Spanning Tree Problem	191
<i>Beatriz Martínez Bahena, Marco Antonio Cruz-Chávez, Ocotlán Díaz-Parra, Martín Gerardo Martínez Rangel, Martín H. Cruz Rosales, Jesús Del Carmen Peralta Abarca, and Jazmín Yanel Juárez Chávez</i>	
Speaker identification using Neural Networks on an FPGA	197
<i>Felipe Trujillo-Romero and S. O. Caballero-Morales</i>	
Graphical Representation and Exploratory Visualization for Decision Trees in the KDD Process	203
<i>Wilson Andrés Castillo Rojas and Claudio Meneses Villegas</i>	
Unsupervised Clustering Method for the Capacited Vehicle Routing Problem	211
<i>Alina Martínez-Oropeza, Marco Antonio Cruz-Chávez, Martín H. Cruz-Rosales, Pedro Moreno Bernal, and Jesús Del Carmen Peralta-Abarca</i>	
 Power Electronics and Control Systems	
Dynamic Model of a Mobile Robot with Two Active Wheels and the Desing an Optimal Control for Stabilization	219
<i>M.C. Gregoria Corona Morales, Vladimir V. Alexandrov, and José Eligio Moisés Gutiérrez Arias</i>	
Robust Fractional Digital Control of a First Order Plus Integrator Process	225
<i>Laboret Sergio, Rodriguez Rivero Cristian, Pucheta Julián, and Sauchelli Victor</i>	
Control of Bifurcations Using Discontinuous Control	231
<i>Patricia L. A. Rosas M., David I. Rosas A., and Joaquin Álvarez</i>	
An Identification Technique for Linear Systems: Application on a Hydraulic Testbed	237
<i>Brian M. González Contreras, L. Flores Pulido, M.A. Mora Lumbreras, I. Hilario Contreras, and M.A. Carrasco Aguilar</i>	
Nonlinear Controllers Applied to Fixed-Wing UAV	243
<i>Tadeo Espinoza, Alejandro Dzul, Luis García, and Ricardo Parada</i>	
Cartesian Control Application in Haptic Interfaces for Motor Rehabilitation Purposes	249
<i>González-Rojas Luis A. , Jarillo-Silva Alejandro, Cruz-Tolentino José A., Gómez Victor, García-Antonio Mario, and Domínguez-Ramírez Omar A.</i>	
Stability of Oscillatory Processes in the Wheel's Angular Velocity during ABS Operation	255
<i>Iván Vázquez Álvarez, Pavel Anatolevich Kruchinin, Andrés Ferreyra Ramírez, and Juan Jesús Ocampo Hidalgo</i>	
DSP-Based Space Vector Modulation for a VSI-Fed Permanent Magnet Drive	261
<i>Roberto Morales-Caporal, Omar Sandre-Hernández, Edmundo Bonilla-Huerta, J. Crispín Hernández-Hernández, and J. Juan Hernández-Mora</i>	

Model and Observer-Based Controller Design for a Quanser Helicopter with Two DOF	267
<i>Edilberto Carlos Vivas González, Diego Mauricio Rivera, and Edwar Jacinto Gómez</i>	
Fuzzy Control Type II in DC-DC Converters	272
<i>Marco Antonio Márquez Vera, Filiberto Muñoz Palacios, and José Manuel Farfán García</i>	
Stochastic Control of a Quadrotor	277
<i>Francisco Jurado, Leonardo E. Herrera, and Carlos E. Castañeda</i>	
Analysis and Design of a DC-DC Resonant Converter with a Class D Inverter and LCC Resonant Tank	282
<i>Mario Ponce-Silva, Juan C. Martínez, Javier Loranca, and Enedino Martínez</i>	
DC Motor Speed Control via a DC to DC Buck Power Converter	288
<i>J. M. Alba-Martínez, R. Silva-Ortigoza, H. Taud, J. Alvarez-Cedillo, I. Rivera-Zárate, and R. Bautista-Quintero</i>	
Flatness Based Control of a Buck-Converter/DC-Motor Combination	294
<i>R. Silva-Ortigoza, J. M. Alba-Martínez, M. Marciano-Melchor, V. M. Hernández-Guzmán, and M. Marcelino-Aranda</i>	
Self-Oscillating DC-DC Resonant Converter	300
<i>Julio-Alfredo Cortés-Rodríguez and Mario Ponce-Silva</i>	
Analysis of Quadratic Step-Down DC-DC Converters Based on Noncascading Structures	305
<i>Rodrigo Loera-Palomo and Jorge Alberto Morales-Saldaña</i>	
Experimental Platform of a Physical Model for a Quadrotor Helicopter	311
<i>Raúl M. Vázquez, Marcelo Romero, Otniel Portillo, Juan C. Ávila, and Adriana H. Vilchis</i>	
A Neutron Spectra Unfolding Code, Based on Iterative Procedures, Designed under LabVIEW Environment	315
<i>Ortiz-Rodríguez J.M. and Vega-Carrillo H.R.</i>	
Multi-tank Fuzzy Level Controller System Using Kinect	320
<i>Robinson Jiménez M. Camilo Caceres, Oscar Avilés, and Camilo Grodillo</i>	

Semiconductors and Circuit Design

Computational Tool to Support Design of DAC Converter Model AD7528 with the Object Code in XML	327
<i>Tiago da Silva Almeida, Alexandre César R. da Silva, and Daniel J. B. S. Sampaio</i>	
A Successive Approximation A/D Converter Using a PWM Modulator DAC	333
<i>Gustavo Della Colletta, Luis H. C. Ferreira, Tales C. Pimenta, and Paulo C. Crepaldi</i>	

Advances in the Construction of ECG Wearable Sensor Technology: The ECG-ITM-05 eHealth Data Acquisition System	338
<i>José Antonio Gutiérrez Gnechchi, Antonio de Jesús Valencia Herrejón, Adriana del Carmen Téllez Anguiano, Arturo Méndez Patiño, and Daniel Lorias Espinoza</i>	
A Technique for Adapting a Quasi-Digital Photodetector to a Frequency-to-Digital Converter	343
<i>Raymundo Barrales-Guadarrama, Antonio Mocholí-Salcedo, Ernesto Rodrigo Vázquez-Cerón, Melitón Ezequiel Rodríguez-Rodríguez, and Víctor Rogelio Barrales-Guadarrama</i>	
Amplification of 4-, 8-, 16-, 32- and 64-QAM through the Memory Polynomial-Model as Special Case of the Volterra Series Implemented in a RF Satellite Link	349
<i>J. R. Cárdenas-Valdez, J. A. Galaviz-Aguilar, J. C. Núñez-Pérez, and C. Gontrand</i>	
Improvement and Evaluation of the MS2SV for Mixed Systems Design Described in Abstraction High Level	353
<i>Tiago da Silva Almeida, Alexandre César R. da Silva, and Daniel J. B. S. Sampaio</i>	
Evaluation of Analog vs. ASIC Input/Filter Stage for Multimodal Biopotential Wearable Sensor Data Acquisition	359
<i>José Antonio Gutiérrez Gnechchi, Antonio de Jesús Valencia Herrejón, Adriana del Carmen Téllez Anguiano, David Infante Sanchez, and Daniel Lorias Espinoza</i>	
Innovative Design and Modeling of a Micropump: A Microfluidics Application	365
<i>Ciro-Filemón Flores-Rivera, G. Pérez-Lechuga, and J. P. Nuño-de-la-Parra</i>	
Low Power Low Noise Neural Amplifier with Adjustable Gain	371
<i>Odilon de Oliveira Dutra and Tales C. Pimenta</i>	
Presence of Internal Field Emission Currents in GaAs Diodes	377
<i>Víctor Rogelio Barrales-Guadarrama, Melitón Ezequiel Rodríguez-Rodríguez, Raymundo Barrales-Guadarrama, and Ernesto Rodrigo Vázquez-Cerón</i>	
Simulation Model to Solve the Forward Problem in Acoustic Reflectometry	384
<i>Ernesto R. Vázquez Cerón, Joseph H. Pierluissi, Oscar Alvarado Nava, Víctor R. Barrales Guadarrama, Ezequiel Rodríguez Rodríguez, and Raymundo Barrales Guadarrama</i>	
Fast Recovery Power Epitaxial Diode	389
<i>A.G. Rojas-Hernández, A. Vera-Marquina, and A. Garcia-Juárez</i>	

Communications and Computer Networks

Patch Antenna Array with Reduced Sizes for Reception of Openly Mexican Television	397
<i>M. Tecpoyotl-Torres, C. A. Castillo-Milián, J. A. Damián-Morales, and J. G. Vera-Dimas</i>	
MAC Protocol with Dynamic Rate Based on Spread Spectrum for Ad-Hoc Networks	403
<i>Aldo Mendez-Perez, Omar Elizarraras-Ferral, Marco Panduro-Mendoza, and Manuel Munguia-Macario</i>	
Performance Analysis for LTE Transmission Using Channel Estimators	407
<i>J. H. Pech-Carmona, J. L. Cuevas-Ruíz, and A. Aragón-Zavala</i>	
Three Basic Geometries of Rings Containing Microstrip Antennas	413
<i>M. Tecpoyotl-Torres, J. G. Vera-Dimas, J. Escobedo-Alatorre, R. Cabello-Ruíz, and R. Vargas-Bernal</i>	
Design and Implementation of an Embedded Wireless System to Monitor a Hall-Effect Gas Sensor at a Household	418
<i>Eduardo Rodriguez, Marco A. Aceves-Fernandez, Juan M. Ramos-Arreguín, Saúl Tovar-Arriaga, J. Carlos Pedraza-Ortega, and J. Emilio Vargas-Soto</i>	
Ka-Band Channel Model. Statistical Validation	425
<i>D.A. Sánchez Salas and J.L. Cuevas Ruíz</i>	
Author Index	431