

# **2015 International Conference on Mechatronics, Electronics and Automotive Engineering (ICMEAE 2015)**

**Cuernavaca, Morelos, Mexico  
24 – 27 November 2015**



IEEE Catalog Number: CFP1590W-POD  
ISBN: 978-1-4673-8330-1

**Copyright © 2015 by the Institute of Electrical and Electronic Engineers, Inc  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\*This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1590W-POD
ISBN (Print-On-Demand):	978-1-4673-8330-1
ISBN (Online):	978-1-4673-8329-5

**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  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# **2015 International Conference on Mechatronics, Electronics and Automotive Engineering**

## **ICMEAE 2015**

### **Table of Contents**

<b>Message from the General Chair.....</b>	x
<b>Organizing Committee.....</b>	xi
<b>Reviewers.....</b>	xiii

---

#### **Computer Vision, Computational Intelligence and Human-Computer Interaction**

Customer Authentication of Digital Imaging Using Hybrid Watermarking .....	3
<i>Manuel Cedillo-Hernández, Antonio Cedillo-Hernández, Carlos Aldair Roman-Balbuena, Francisco García-Ugalde, Mariko Nakano-Miyatake, and Hector Manuel Pérez-Meana</i>	
A Block-Wise Deformation-Based Approach for Facial Expression Recognition .....	9
<i>Fabiola M. Villalobos-Castaldi, Nicolás C. Kemper, Esther Rojas-Krugger, and Laura G. Ramírez-Sánchez</i>	
An Efficient Content-Based Video Retrieval for Large Databases .....	15
<i>Antonio Cedillo-Hernández, Manuel Cedillo-Hernández, Francisco García-Ugalde, Mariko Nakano-Miyatake, and Héctor Pérez-Meana</i>	
Comparative Analysis of Phase Unwrapping in PSP Using Depth Images .....	20
<i>Rodrigo Escobar Díaz Guerrero, Juan Carlos Moya Morales, Juan Manuel Ramos Arreguín, José Emilio Vargas Soto, and Jesús Carlos Pedraza Ortega</i>	
Four Level Haar Transform Architecture for Feature Extraction .....	25
<i>Roy Flores-Flores, J. Luis Tecpanecatl-Xihuitl, Ruth M. Aguilar-Ponce, and César Torres-Huitzil</i>	
Architecture for Real-Time Color Detection on Video Based on the Choquet Fuzzy Integral .....	30
<i>Rosario Ramirez-Lugo, Omar G. Valenzuela-López, J. Luis Tecpanecatl-Xihuitl, and Ruth M. Aguilar-Ponce</i>	

An Approach to Improve Mouth-State Detection to Support the ICAO Biometric Standard for Face Image Validation .....	35
<i>Salvador Coronel Castellanos, Ismael Solis Moreno, Jose A. Cantoral Ceballos,     Rogelio Alvarez Vargas, and Pedro L. Martinez Quintal</i>	
Image De-Noising Algorithm Based on Intersection Cortical Model and Median Filter .....	41
<i>Estela Ortiz, Manuel Mejia-Lavalle, Dante Mújica, and Gerardo Reyes</i>	
Dimensional Analysis of Geometric Figures through Computer Vision .....	45
<i>Márcio José da Silva</i>	
Hybrid Object Detection Vision-Based Applied on Mobile Robot Navigation .....	51
<i>J. G. Velásquez-Aguilar, M. Granados-Contreras, A. Ramírez-Agundis,     and F. Aquino-Roblero</i>	
Vortex Particle Swarm Optimization in 2D Cases .....	57
<i>Helbert Eduardo Espitia and Jorge Iván Sofrony</i>	
Modified Neural Net for the Boolean Satisfiability Problem .....	64
<i>Manuel Mejía-Lavalle, José Ruiz A., Joaquín Pérez O., and Marilu Cervantes S</i>	
Error Coded Affine Projection Like Algorithm .....	70
<i>Alejandro Rodriguez, Juan C. Sanchez, and Juan G. Avalos</i>	
Proposal of a Computer Vision System to Detect and Track Vehicles in Real Time Using an Embedded Platform Enabled with a Graphical Processing Unit .....	76
<i>Andrés Felipe Hurtado, Jairo Alejandro Gómez, Víctor Manuel Peñeyory,     Iván Mauricio Cabezas, and Felipe Elvira García</i>	
Modeling Student Engagement by Means of Nonverbal Behavior and Decision Trees .....	81
<i>C. A. Vázquez Rodríguez, M. Mejía Lavalle, and R. Pinto Elías</i>	
Characterization of QRS Complex in ECG Signals Applying Wavelet Transform .....	86
<i>Márcio José da Silva</i>	

## **Control Systems, Instrumentation and Industrial Applications**

PVTOL Control: A Backstepping Approach .....	93
<i>Carlos Aguilar-Ibanez, Humberto Sossa-Azuela, and Miguel S. Suarez-Castanon</i>	
Design and Measurement of the Standards of a Miniaturized sEMG Acquisition System with Dry Electrodes Integrated .....	99
<i>A. Ruvalcaba, A. Altamirano, C. Toledo, R. Muñoz, A. Vera, and L. Leija</i>	
Kinematics Modeling and Experimental Validation of a CyberForce Haptic Device Based on Passive Control System .....	105
<i>Juan Daniel Ramírez-Zamora, Gerardo Martínez-Terán,     Omar Arturo Domínguez-Ramírez, Luis Enrique Ramos-Velasco, Vicente Parra Vega,     and Ismaylia Saucedo-Ugalde</i>	

Control Based on Differential Flatness for a DC/DC Boost Converter via a Sigma–Delta-Modulator .....	111
<i>J. A. Rodríguez-Meza, R. Silva-Ortigoza, J. Sandoval-Gutiérrez, M. Antonio-Cruz, H. Taud, J. N. Alba-Juárez, C. Y. Sosa-Cervantes, and R. Macías-Igari</i>	
Sit-to-Stand Simulation for Torque Estimation on Lower Limb Joints .....	116
<i>C. M. Lara-Barrios, A. Blanco-Ortega, A. Abúndez-Pliego, and J. Colín-Ocampo</i>	
CyberForce Haptic Device: Kinematics and Manipulability .....	122
<i>Gerardo Martínez-Terán, Omar Arturo Domínguez-Ramírez, Juan Daniel Ramírez-Zamora, Luis Enrique Ramos-Velasco, Ismaylia Saucedo-Ugalde, and Alejandro Lugo-Villeda</i>	
Experimental Characterization of a Magnetorheological Damper by a Polynomial Model .....	128
<i>M. Arias-Montiel, K. H. Floreán-Aquino, E. Francisco-Agustín, D. M. Piñón-López, R. J. Santos-Ortiz, and B. A. Santiago-Marcial</i>	
Optimization of Linear and Fuzzy Controllers for Cylindrical Tank .....	134
<i>Helbert Eduardo Espitia and Guzmán Díaz González</i>	
Modeling and Simulation for a DC/DC Buck Power Electronic Converter–DC Motor System .....	139
<i>J. N. Alba-Juárez, R. Silva-Ortigoza, H. Taud, J. A. Rodríguez-Meza, and V. M. Hernández-Guzmán</i>	
A Review of Embedded Systems Used in WMR for the Trajectory Tracking Task .....	145
<i>C. Márquez-Sánchez, R. Silva-Ortigoza, M. Antonio-Cruz, C. Y. Sosa-Cervantes, and V. M. Hernández-Guzmán</i>	
Modeling, Simulation and Control of Functional Electrical Stimulation Cycle Ergometer System .....	151
<i>Kevin Vázquez, Karla Cordova, and Ana Isabel González</i>	
Time-Frequency Analysis of a Pulsed Excitation and Its Application in Randles Model .....	157
<i>Gerardo Miramontes-de-León, Claudia Sifuentes-Gallardo, Arturo Moreno-Báez, Ernesto García-Domínguez, and Rafael Magallanes-Quintanar</i>	
Design of a Graphical User Interface to Control a Lifting Mechanism .....	162
<i>Cuauhtémoc Morales-Cruz, Eduardo Vazquez-Santacruz, and Mariano Gamboa-Zuñiga</i>	
 <b>Mechatronics, Robotics, and Biomedical Systems</b>	
Test of a Robust ZMP Based Pattern Generator with a 12-Internal-DoF Biped Robot Model .....	169
<i>Edmundo Rocha-Cozatl, Ulises Jimenez-Rioja, and Fernanda Merino-Morales</i>	
Mobile Robot for Gamma Radiation Detection with Long Range Remote Control .....	175
<i>Raúl M. Vázquez and Efrén Gutiérrez</i>	

IMU-Based Trajectory Generation and Modelling of 6-DOF Robot Manipulators .....	181
<i>Manuel Ortiz-Salazar, Angel Rodríguez-Liñán, Luis M. Torres-Treviño,     and I. López-Juárez</i>	
Variable Control Gains for P-D Controller for Robot Manipulators .....	187
<i>Oscar Ramos Arroyo, Fernando Reyes Cortés, María Aurora Diozcora Vargas Treviño,     and Sergio Vergara Limón</i>	
Optimal Control Effect into Innate Immune System .....	193
<i>Ma. Aracelia Alcorta García, Yosefat Nava Aleman, Nora Elizondo Villarreal,     Sonia Gpe. Anguiano Rostro, Facundo Cortes Martínez, and Ernesto Torres López</i>	
Comparative Study of a PID and PD Control Bounded by Hyperbolic Tangent Function in Robot 3 DOF .....	199
<i>Á Jimenez-Uribe, L. F. Serna-Hernández, J. M. Hernández-Paredes, and B. Muñoz-Barrón</i>	
Global Dynamics of the Angiogenesis in a Tumor-Immune System Model .....	205
<i>Luis A. Cantera and Konstantin E. Starkov</i>	
Global Dynamics of one Chronic Lymphocytic Leukemia Model .....	211
<i>Antonio Villegas and Konstantin E. Starkov</i>	
A Set of Strategies Used in Cochlear Implants Implemented in a DSP .....	217
<i>José Luis Oropeza Rodríguez and Cristóbal Ramírez Lazo</i>	
Navegation Control of a Mobile Robot .....	223
<i>Amparo Dora Palomino Merino, María Aurora Diozcora Vargas Treviño,     and Sergio Vergara Limón</i>	

## **Communications, Computer Networks, and Mobile Applications**

Visible Light Communication Applied on Vehicle-to-Vehicle Networks .....	231
<i>Pedro Augusto Pinho Ferraz and Irlon Silva Santos</i>	
Reconstruction Error Estimation of Gaussian Markov Processes with Jitter .....	236
<i>José Rodrigo Espinoza-Bautista, Daniel Rodríguez-Saldaña, and Vladimir Kazakov</i>	
Maximum Error Estimation of Gaussian Processes in the Sampling-Reconstruction Procedure .....	241
<i>Gabriela Morales-Arenas, Daniel Rodríguez-Saldaña, and Vladimir Kazakov</i>	
Identification, Location, and Reception of Low Earth Orbit Satellites (LEO) Signals .....	246
<i>José Eduardo Oros, Javier Trejo, and Ante Salcedo</i>	
Recent Progress in the Implementation of AMI Projects: Standards and Communications Technologies .....	251
<i>Joaquin Garcia-Hernandez</i>	
Stress Analysis on the Folded Beams of a MEM Accelerometer .....	257
<i>Margarita Tecpoyotl-Torres, Ramon Cabello-Ruiz, J. Gerardo Vera-Dimas,     Israel Garcia-Salmoran, Alfonso Torres-Jácome, and Rafael Vargas-Bernal</i>	

Structural Optimization of an Electrothermal Chevron V-Shape Microactuator Device .....	262
<i>Pedro Vargas-Chable, Margarita Tecpoyotl-Torres, Said Robles-Casolco,     and Ramon Cabello-Ruiz</i>	
Fading Mitigation Technique Based on Semiblind Channel Estimation and Adaptive Transmission Rate .....	268
<i>J. H. Pech-Carmona and K. Vázquez Ascenció</i> n	
<b>Author Index</b> .....	275