

2018 IEEE 38th Central America and Panama Convention (CONCAPAN XXXVIII)

**San Salvador, El Salvador
7-9 November 2018**



**IEEE Catalog Number: CFP18COU-POD
ISBN: 978-1-5386-6123-9**

**Copyright © 2018 by the Institute of Electrical and Electronics 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18COU-POD
ISBN (Print-On-Demand):	978-1-5386-6123-9
ISBN (Online):	978-1-5386-6122-2

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

A Game Theoretic Model of Indian Electricity Market.....	1
<i>Jainil Vachhani and Jay Joshi</i>	
Estimación en línea de modos interárea utilizando la Transformada Wavelet Discreta y el Análisis Prony.....	6
<i>Carlos Juárez and Delia Graciela Colomé</i>	
Shared Fields Shading: Solar Power Plants and Crops.....	14
<i>Isaac Rojas</i>	
Computational Algorithm for the Analysis of Loadability in Distribution Systems.	20
<i>Fernando Toledo Toledo and Miguel Ángel León Vázquez</i>	
A simple temperature and irradiance-dependent expression for the efficiency of photovoltaic cells and modules	26
<i>Luis Murillo-Soto and Carlos Meza Benavides</i>	
Computational Project for the Selection of Personal Protective Equipment	32
<i>Fernando Toledo Toledo and Josue Crespo Gonzalez</i>	
Electronic prototype of control and monitoring of environmental parameters implementing IoT.....	38
<i>Manuel De Jesús Gámez López</i>	
Application for digital signature and generation of certificates using the Bouncy Castle API considering digital signature law in El Salvador	44
<i>Álvaro Zavala</i>	
Analysis of the Wake Effect in the Distribution of Wind Turbines	50
<i>Wilder Durante Gómez, Fredy López, Gerardo Vidal Pavón, Reynaldo Iracheta Cortez, Sulio Zaragoza Antonio and Eduardo Torres Moreno</i>	
Extended vectorial model ACP of latent semantic indexation in the natural language processing for the search and retrieval of information in electronic documents.....	57
<i>Daro Cristian Arias Jaco</i>	
Evaluation of the nonlinear Schrödinger equation for radio over fiber systems.....	62
<i>Cristian Calderón, Narly Basto, Karla Puerto and Dinael Guevara</i>	
Conductores eléctricos, principios metalúrgicos y sus aplicaciones	68
<i>Mauricio Corredera, Jennifer Rodríguez, Noé Arita and Tanya Bogantes</i>	
Towards the definition of a guide to publish open government data	72
<i>Margarita Ramos-Lopera, Ricardo Ledezma-Henry, Kendall Cabrera-Ramírez, Katherine Bermúdez-Mora and Antonio González-Torres</i>	
Determination of the level of ripeness and freshness of fruits by electronic sensors.....	78
<i>Omar Otoniel Flores Cortez, Veronica Idalia Rosa and Jose Oswaldo Barrera Montes</i>	
Control of the Angular Position of a Rotary Torsion Plant Using a 2DOF FO PID Controller.....	82
<i>Arturo Rojas-Moreno, Oscar Salazar-Aquino and Jose Pampamallco-Jara</i>	

Evaluación de la seguridad de suministro de energía eléctrica en Nicaragua 2016 - 2030 ...	87
<i>Napoleon Blanco and Julio Canales</i>	
Una comparación de rendimiento entre MongoDB, ArangoDB y CouchBase para la operación lectura sobre bases de datos geográficas	92
<i>Marlen Treviño Villalobos, Leonardo Viquez Acuña, Rocío Quirós Oviedo and Gaudy Esquivel Vega</i>	
Using parallel computing for seismo-volcanic event location based on seismic amplitudes ..	98
<i>Guillermo Cornejo-Suárez, Leonardo Van der Laat, Esteban Meneses Rojas, Javier Pacheco and Mauricio Mora</i>	
On observability and controllability for a bioethanol dynamical model obtained from cocoa industrial waste	104
<i>Pablo A. López Pérez, Teresa Romero Cortes, Omar Santos, Dulce Jazmín Hernández Melchor, Vicente Peña Caballero and Francisco Martínez Farías</i>	
ORTE Exoskeleton: Kinematic Analysis and Dynamic Modeling	110
<i>Marie Andre Destarac Eguizabal, Jorge García Montaña, Manuel Cardona, Ricardo Espinoza Gómez, Lisandro Puglisi and Cecilia E. Garcia Cena</i>	
Anemia during pregnancy in Peru in 2017: A geographic information system study	116
<i>Carlos Sotomayor-Beltran, Guillermo Wenceslao Zarate Segura and David Tarazona</i>	
Path planning on static environments based on exploration with a swarm robotics and RRG algorithms	121
<i>Cindy Calderón-Arce, Rebeca Solís-Ortega and Timothy Bustillos-Lewis</i>	
Designing a Transversal Flux PMSG with Analytical Methods for Applications in Wind Turbines	127
<i>Miguel Ángel Hernandez Rodríguez, Reynaldo Iracheta Cortez, Norberto Flores Guzman, Emmanuel Hernández Mayoral, Wilder Durante Gómez and Rolando Gómez Gómez Torres</i>	
Development of a Mobile Application for Orientation of Visitors of ITCA-FEPADE through mapping, 3D rendering and Global Positioning	136
<i>Elvis Moisés Martínez Pérez</i>	
Distribution Network Element Model Parameters: Creation of Database	142
<i>Andrés Arguello, Gustavo Valverde, Jairo Quirós and Gustavo Gómez</i>	
Diseño del Sistema Eléctrico para Alimentar Auxiliares de la Caldera de un Ingenio Azucarero en México	148
<i>Raul Fiscal Escalante and Domingo Adán Sámano</i>	
A Distributed Test-Cases Dependencies Framework - Application to the SIP protocol	156
<i>Alberto Marroquín, Vencent Martínez, José Solares and Stephane Maag</i>	
New Proposal of Electric Rates in Costa Rica	162
<i>Gustavo Gómez</i>	
Robust coordination of overcurrent and undervoltage protection devices for microgrids	166
<i>Oscar Núñez-Mata, Rodrigo Palma-Behnke and Patricio Mendoza-Araya</i>	

Energy Storages as Synthetic Inertia Source in Power Systems.....	172
<i>Pawel Sowa, Mateusz Szablicki, Piotr Rzepka and Adrian Halinka</i>	
An Approach to Management Assessment for GEANT Backbone Using GNS3 for SNMPv3.....	178
<i>Jose-Ignacio Castillo-Velazquez, Fernando Delacruz-Alejandre and Monica Huerta</i>	
Gas turbine for Micro-CHP system and heat recovery with a conventional steam boiler: Thermodynamic analysis.....	184
<i>Adriana Santamaria Padilla and Hernando Romero Paredes Rubio</i>	
Energy Simulation of Proposed Net Zero Energy Laboratory Building in Central America	191
<i>Luis Aarón Martínez Figueroa, Carlos M. Romero, Franklin A. Castellanos, Mario W. Chávez, Carlos M. Flores, Lizeth Rodríguez, Carlos A. Cisneros and René I. Ariza</i>	
Design and construction of a low-cost cabin prototype with controlled environments for wood finishes.....	197
<i>Gilberto Carrillo and Mauricio Gómez</i>	
Web Service for Monitoring Electricity Billing at a University Campus	203
<i>Carlos Eugenio Martínez-Cruz and Teddy Miguel Calderón-López</i>	
UTILCON version beta: A Free Trainer for Conference Mangement Systems in Spanish ..	209
<i>Jose-Ignacio Castillo-Velazquez and Manuel Israel Trigueros Galicia</i>	
Aplicación de un Éster Natural Base Soya en Transformadores	215
<i>Josué Rodríguez, José Contreras and Jesús Avila</i>	
A finite element implementation for the three variable Biot model and an introduction to its application to sugar cane milling processes.....	221
<i>Enmanuel Amaya, Mauricio Pohl, Riccardo Rossi and Antonia Laresse</i>	
Two degrees of freedom controller design of a grid-side converter for injecting wind energy into the grid.....	231
<i>Daniel Memije, Oscar Carranza Castillo, Jaime Rodriguez-Rivas and Rubén Ortega</i>	
Parallelization of a Magnetohydrodynamics Model for Plasma Simulation.....	237
<i>Daniel Alvarado, Alvaro de La Ossa, Francisco Frutos-Alfaro and Esteban Meneses Rojas</i>	
Hardening applied over a WLAN SOHO Environment for mitigation of vulnerabilities	243
<i>Magnolia Alcalá-García, Daniel-Javier Serrano-Martinez and Jose-Ignacio Castillo-Velazquez</i>	
About TCR and Arc Furnace for Flicker Reduction	249
<i>Mauro Loggini, Adda Ureña, Mauricio Quiñonez and José Ramos</i>	
Design of a Vehicle Driver Drowsiness Detection System through Image Processing using Matlab.....	254
<i>Melissa Rosemery Yauri Machaca, Brian Andreé Meneses Claudio, Natalia Indira Vargas Cuentas and Avid Roman-Gonzalez</i>	
Design of a Radio Frequency Detection System for Mobile Phones.....	260
<i>Brian Andreé Meneses-Claudio, Witman Joel Alvarado-Díaz and Avid Roman-Gonzalez</i>	

Análisis predictivo de motores por medio de vibraciones	265
<i>David Torres</i>	
A 3D Approach for the Visualization and Edition of Hierarchies: The Case of Biological Taxonomies	272
<i>Lilliana Sancho-Chavarría and Erick Mata-Montero</i>	
Preliminary Design of a Low-cost water level monitoring system for bridges	278
<i>Michael Chaves, Aníbal Ruiz, Cesar Garita and Giannina Ortiz</i>	
Simulation of the ion current in computational environment using PIC method	284
<i>Guillermo Wenceslao Zarate Segura</i>	
On developing a Flexible Methodology for the Analytical Design of an Axial-Flux PMSG used in Wind Turbines	288
<i>Rolando Gómez Torres, Reynaldo Iracheta Cortez, Norberto Flores Guzmán, Miguel Ángel Hernández Rodríguez, Efraín Dueñas Reyes and José Rafael Dorrego Portela</i>	
MONITORING SYSTEM FOR DANGEROUS GASES EMITTED DURING THE WELDING PROCESS	297
<i>Eric Pérez, Lucas De Morais, Cristian Pinzon and María Vélez</i>	
Implementation of bilateral contracts in an Electricity Wholesale Market, through a Hydrothermal Simulator that considers the Transmission Network	303
<i>Jose Manuel Hermoza Ordoñez and Rodolfo Reta</i>	
Design of virtual distance protection for offline transmission line relay testing	309
<i>David Celeita, Andres Flores, Gustavo Ramos and Mauricio Pohl</i>	
A graphic environment for user interfaces in embedded devices	315
<i>Armando Arce and Antonio González-Torres</i>	
Undimotor Generation Analysis in Galápagos	321
<i>Diego Paul Chacón Troya</i>	
FPGA based point to point Data Transfer System with single clock signal synchronization	327
<i>Daniel Flores</i>	
Levels of Spatial and Temporary Non-Ionizing Radiation produced by EMF from Telecommunications Services	332
<i>Pedro Infante, Sebastian Cárdenas, Tony Fernando Flores Pulgar and Fidel Gilart</i>	
Baseline study of a biodigester in Caluco, El Salvador	338
<i>Rudy Merlos and Orlando Altamirano</i>	
Basic computer vision operators hardware approach model	344
<i>Carlos Ernesto Hernández Orellana and Carlos Guillermo Bran</i>	
A Monte Carlo Simulator of non-WSSUS Rayleigh Fading Channels for Vehicular Communications	349
<i>Jimmy Jaime Rodriguez, Carlos Antonio Gomez Vega, Carlos Gutierrez, Jose Martin Luna Rivera, Daniel Ulises Campos-Delgado and Ramiro Velazquez</i>	
Home automation application for the monitoring and control of an electric water heater using AWS Technology	355
<i>Paulo Guerra and Rafael Kelly</i>	

An Integrated Architecture for Monitoring and Control the Temperature of Different Platforms Based on Internet of Things	361
<i>Sebastian Gutierrez, Emilio Barrientos, Jeronimo Alvarez and Manuel Cardona</i>	
Design and Construction of a New Door Driving Mechanism for Mexico's City Metro	366
<i>Miguel Magos-Rivera, Ramiro Velazquez, Antonio Gómez and Carlos Gutierrez</i>	
Electrical Parameter Evaluation of Photovoltaic Inverters	372
<i>Oliver Gonzalez</i>	
Comparative study of multispectral satellite images and RGB images taken from drones for vegetation cover estimation	377
<i>Luis Moreno, Vladimir Ramos, Mauricio Pohl and Francisco Huguet</i>	
Assessing the Added Value of Coordinated Economic Dispatch in Central America	385
<i>Pritpal Singh and Stephen Suffian</i>	
Design of an electronic scoring system using the Hard Target method for detection and location of the impacts on a shooting target	391
<i>Luis Guevara and Yader Ortiz</i>	
El Rol a desarrollar por el Ingeniero Biomédico como Ingeniero Clínico en los Ambientes Hospitalarios de El Salvador.....	397
<i>Luis Barriere</i>	
Solar flat plate collector manufacturing using materials easily available in El Salvador	402
<i>Anselmo Valdizon and Ronald Marroquin</i>	
The importance of good practices in the development of secure web applications and their repercussions for not implementing them.....	407
<i>Álvaro Zavala and Iván Alvarado</i>	
Arquitectura Empresarial para mejorar la tercerización de los servicios de salud en el seguro social del Perú	412
<i>Francisco Tupia, Jean Guerrero and David Mauricio</i>	
Enterprise architecture for credits in the microfinance sector in Peru	419
<i>David Ugarte, Brenda Santos and David Mauricio</i>	
Optical properties of graphene carbon quantum dots for solar cells applications.....	425
<i>Jorge Cuadra, Hamilton Ponce and Carlos Rudamas</i>	
Development of a Therapeutic Device to Minimize Epilepsy Seizures.....	430
<i>Mauricio Tipan, Jorge Sagbay, Mónica Huerta and Ignacio Castillo</i>	
Impact of a distributed photovoltaic generation on power quality in a low voltage distribution network at Universidad de El Salvador.....	435
<i>Karen Agreda, Juan Erazo and José Ramos</i>	
Evaluating the significance of cutting planes of wood samples when training CNNs for forest species identification	441
<i>Geovanni Figueroa-Mata, Erick Mata-Montero, Dagoberto Arias-Aguilar and Juan Carlos Valverde-Otárola</i>	

A novel application of drones: thermal diagnosis of electrical and telecommunications infrastructure	446
<i>Morris William Diaz and Juan Jose Caceres</i>	
Dynamic DNS Request Monitoring of Android Applications via networking	452
<i>Oscar Somarriba, Luis Carlos Pérez Ramos, Urko Zurutuza and Roberto Uribeetxeberria</i>	
Optimización de un volumen dado de material de Imán Permanente en la excitación de los motores lineales síncronos (PMLSM) con concentradores de flujo	458
<i>Javier Rivas Conde and Moises Guerra</i>	