## **2019 IEEE Canadian Conference** of Electrical and Computer **Engineering (CCECE 2019)**

Edmonton, Alberta, Canada 5 – 8 May 2019



**IEEE Catalog Number: CFP19785-POD ISBN**:

978-1-7281-0320-4

## Copyright $\odot$ 2019 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:
 CFP19758-POD

 ISBN (Print-On-Demand):
 978-1-7281-0320-4

 ISBN (Online):
 978-1-7281-0319-8

ISSN: 0840-7789

## 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



## Papers by title

3
3D Models Recognition Using Overlap Histograms and Machine Learning1
6
64 MHz RF Exposure System for Testing of Implanted Medical Devices in MRI Applications5
A
A Blockchain-based Framework for Detecting Malicious Mobile Applications in App Stores8
A Brief Review on Robotic Grippers Classifications12
A Comparison of Lumped Parameter Models of Modified Hybrid Electromechanical Valve Actuator16
A Discriminant Two-Dimensional Canonical Correlation Analysis22
A GPU Accelerated Path Planner for Multiple Unmanned Aerial Vehicles26
A Light and Secure Healthcare Blockchain for IoT Medical Devices30
A Low Power and Low Noise Voltage-Controlled Oscillator in 28-Nm FDSOI Technology for Wireless Communication Applications35
A Low-Latency Reconfigurable Multistage Interconnection Network40
A Methodology to Forecast the Control Capacity of a Population of Thermostatically Controlled Appliances in a Demand-Side Management44
A New Approach to Fault Detection and Location in AC Transmission Lines Based on Wavelet Correlation Modes48
A Novel Control Methodology for Stand-Alone Photovoltaic Systems Utilizing Maximum Power Point Tracking53
A Parkinson's Disease Classification Method: An Approach Using Gait Dynamics and Detrended Fluctuation Analysis57
A Passive Optical Transmitter Using LC Switches for IoT Smart Dusts61
A Pattern Recognition Method for Partial Discharge Detection on Insulated Overhead Conductors65

- A Preview Neuro-Fuzzy Controller Based on Deep Reinforcement Learning for Backing Up a Truck-Trailer Vehicle.....69
- A Priority-Based Interactive Model for a Microgrid Cluster and the Distribution Network.....73
- A Radiation-Tolerant CML Voltage Controlled Oscillator in 28Nm CMOS FDSOI.....77
- A Review of Intraoperative Surgeries Error Evaluation Methodologies.....81
- A Review of Xilinx Field Programmable Gate Array Radiation Effects Performance Part II.....86
- A Simple and Secured Cryptography System of Cloud Computing.....90
- A Simple Nonlinearity Upgradation Based Method of Enhancing Low Light Images.....93
- A Survey of Different Cooling Methods for Traction Motor Application.....99
- A Survey of Wireless Communications for IoT Echo-Systems.....103
- A Two-Stage Coupled-Inductor-Based Cascaded DC-DC Converter with a High Voltage Gain.....109
- A Ultra Wide Triple-band Antenna for Biomedical Application.....114
- Accurate Energy Forecast in Buildings: A Data Driven Machine Learning Approach.....120
- An Analog Circuit Approach for Optimal Damping of Inter-Area Oscillations Using Wide Area Control of Power Converters.....124
- An Efficient Automated Hybrid Algorithm to Predict Floods in Cloud Environment.....128
- Analysis on Nondispersive Infrared Device Characteristics Using Thermopile.....132
- Approximate Leading One Detector Design for a Hardware-Efficient Mitchell Multiplier.....136
- Assessment of Photovoltaic Hosting Capacity of Existing Distribution Circuits.....140
- Augmenting Feeder Protection Dependability Under High Penetration of DERs.....144
- Automated Classification of Retinal Diseases in STARE Database Using Neural Network Approach.....148
- Automated Identification and Localization of Premature Ventricle Contractions in Standard 12-Lead ECGs.....153
- Automated Melanoma Staging in Lymph Node Biopsy Image Using Deep Learning.....157
- Automatic Detection of Pneumonia on Compressed Sensing Images Using Deep Learning.....161

Blockchair	Education	165
------------	-----------	-----

Blockchain-based Privacy-Preserving Healthcare Architecture.....170

Broken Rotor Bar Fault Diagnosis for Induction Motors Using Power Spectral Density and Complex Continuous Wavelet Transform Methods.....174

C

Classification of Motor Imagery Tasks Using Phase Space Reconstruction and Empirical Mode Decomposition.....178

Co-Optimization of Generation Capacity Planning and Carbon Capture and Storage Using Benders Decomposition.....182

Comparative Analysis of Classifiers for EMG Signals.....187

Comparative Characteristic Analysis of Circular and Double D Power Pads for Electric Vehicle Wireless Charging Systems.....192

Comparison of 3D 360-Degree Video Compression Performance Using Different Projections.....196

Comparisons of Various ELM Based Multi-View Clustering Methods for WDSNs.....202

Computational Tools to Assist Relay Settings of Pilot Scheme....206

Construction of Autonomous Driving Maps Employing LiDAR Odometry.....210

Control of a Mechanical Knee Based on Predictive Control Techniques.....214

D

Day-Ahead Dynamic Thermal Line Rating Using Numerical Weather Prediction.....218

Decoding Motor Imagery Movements Using Area of 2-D Phase Space Reconstruction.....225

Deep Learning: Edge-Cloud Data Analytics for IoT.....229

Defect Detection from X-Ray Images Using A Three-Stage Deep Learning Algorithm....236

Delay Optimization in Resource Allocation of f-OFDM Wireless Networks with Subcarrier Aggregation.....240

Demonstrating Blockchain-Enabled Peer-to-Peer Energy Trading and Sharing.....244

Design and Development of Capacitively Coupled Plasma Monopole Antenna....248

Design and Evaluation of an FPGA-based Hardware Accelerator for Deflate Data Decompression.....252

Design and Testing of Magnetohydrodynamic Propulsion System for a Small Vessel Using Powdered Iron Core Electromagnets258
Design and Verification of a Robust Release Mechanism for CubeSat Deployables262
Design of a Ferrite-Less Power Pad for Wireless Charging Systems of Electric Vehicles266
Detection of Event Related Patterns Using Hilbert Transform in Brain Computer Interface270
Detection of Inappropriate Use of Smartphones in Traffic Using Artificial Neural Networks274
Development of a GF(2) Math Coprocessor278
Development of an IoT Based Open Source SCADA System for PV System Monitoring282
Discrete Fourier Transform Improves the Prediction of the Electronic Properties of Molecules in Quantum Machine Learning286
Discrete Microwave Spectroscopy Using Planar Resonator290
Distributed Optimal Power Flow for Electric Power Systems with High Penetration of Distributed Energy Resources294
Dynamic Modeling and Analysis of a Micro-Hydro Power Plant for Microgrid Applications299
Dynamic Modeling and Simulation of a Hybrid AC-DC Microgrid with Primary Droop Control305
E
Educational Mobile Apps for Negotiation: Evaluation and Design Criteria for Curriculum Designers and Developers311
Effect of Ambient Conditions on Water Management and Faults in PEMFC Systems A Review315
Efficient Implementation of a Power Amplifier Stability Circuit in LTCC320
Efficient Implementation of Volterra Diagonal Bilinear Filter for Nonlinear Active Noise Control324
Electronically Steerable Quasi-Uniform Leaky-Wave Antenna Based on Substrate Integrated Waveguide328
Emotion Recognition from 2D Facial Expressions332
Encrypted Traffic Classification Based ML for Identifying Different Social Media Applications336
Energy-Efficient Coalition Formation in Sensor Networks: a Game-Theoretic Approach341
Enhanced Mobility Load Balancing Algorithm for 5G Small Cell Networks347

Enhancing Power Flow Simulations Using Function Mapping352
Enhancing System Spectral Efficiency in Cellular Networks via Full-Duplex D2D Communications357
ETX: A Flexible Simulation Framework for Design of Transactive Energy Systems361
Evaluation of Massive MU-MIMO Channel Estimation Based on Uplink Achievable-Sum Rate Criteria365
Evaluation of Unsteady Wave Influence on Tidal Stream and Mitigation Strategy370
Event-Triggered State Estimation of High Dimensional Nonlinear Systems with Highly Nonlinear State Space Model Using Cubature Kalman Filter374
Experimental Evaluation of Heating Water by Electromagnetic Induction378
Extended Modulus Optimum Method for Off-Grid Inverter's Voltage Control System382
F
Faster Sorting for Flash Memory Embedded Devices387
Flexible Robust Unit Commitment Considering Sub-hourly Wind Power Ramp Behaviors392
Frequency Scan Based Stability Analysis of an LCC-HVdc System396
From Natural Language to Graph Queries400
G
GA for Task Scheduling on Parallel SystemN/A
Ground Segmentation from Outdoor Environments in Rural Areas404
H
Hardware Accelerator for Nuclei Detection in Histopathology Images408
Hybrid Beamforming for Uniform Circular Arrays in Multi-User Massive MIMO Systems412
I
Implementation and Characterization of a Memristive Memory System416
Implementation of High Speed and Low Area Extended Euclidean Inversion over Ternary Fields420
Implementation of Power System Stabilizers in a Power Grid: A Case Study425
Improve Mobile Positioning by Quasi-Newton Algorithm of Artificial Neural NetworkN/A

*Improved Machine Learning Using Confidence.....429* Improving the Security of Cloud-Based Intelligent Transportation Systems.....434 Inclusion of Abnormal Operation in Modeling of LCC-HVDC Systems Using Dynamic Phasors.....438 Incorrect Operations of Pilot Scheme with Ground Overcurrent Protection.....442 Induction Motor Fault Diagnosis Using Discrete Wavelet Transform.....446 Integrating Privacy Enhancing Techniques into Blockchains Using Sidechains.....450 Intelligent Anomaly Detection for Large-scale Smart Grids.....454 Interference Analysis for LoRa Chirp Spread Spectrum Signals.....458 Investigation of Performance-Complexity Tradeoff in Filtering LoRa Signals.....463 *Is It Enough to Just Rely on Near-End, Middle, and Far-End Points to Get Feasible Relay* Coordination?....471 J Joint Iterative Training-based Hybrid Precoding and Combining for Millimeter Wave Systems.....476 L Learning from Mistakes: Weakly Supervised Learning of Rocks.....480 Linear Regression Models for Fat Free Mass Measurement Based on Bioelectrical Impedance Analysis.....484 Load Model Identification Through a Hybrid Approach.....489 Low Complexity PIC-MMSE Detector for LDS Systems.....493 Low Loss Air-Filled Transmission Lines in LTCC Technology.....497 Lumped Element RF Low Pass Filter with 20 dB Improved Suppression at the Center Frequency of an RF Injection Network for Conductive Emission Testing.....501 M Machine Learning with Digital Microfluidics for Drug Discovery and Development.....503 Magnetic Saturation in Synchronous Generator Dynamic Models for Power System Stability Studies.....509 Managing Ferroresonance Overvoltages in Distribution Systems.....513

ManitobaSat-1: Making Space for Innovation....517 Mathematical Models for Extracellular Fluid Measurement to Detect Hydration Level Based on Bioelectrical Impedance Analysis.....521 Measurement by Images of Mycelial Growth of Fungal Colonies on Petri Dishes.....526 Measurement-based Network Model Reduction of Distribution Systems Using Two-port Networks.....530 Model Predictive Control Based Approach for Microgrid Energy Management.....534 Modulation Assignment in Elastic Optical Networks Using Data Analytics.....538 N NEO Smart Contract for Drought-Based Insurance.....542 Netflix Control Method Using Smartwatches and Continuous Gesture Recognition.....546 Neural Network Model for False Data Detection in Power System State Estimation.....550 Neural Network Models for Stock Selection Based on Fundamental Analysis.....555 Neural Network Music Genre Classification.....559 NIR-Spectroscopic Classification of Blood Glucose Level Using Machine Learning Approach.....563 O On Design of 60 GHz Solid-State Transformers Modeled as Coupled Bitter Coils (Pancakes).....N/A On the Security of Cryptographic Protocols Using the Little Theorem of Witness Functions.....567 Open Interactive Algorithm Visualization....572 Operation Optimization of Household Intelligent Electrical Equipment Based on Time-of-Use Price.....576

Optimal Sizing and Scheduling of Battery Storage System Incorporated with PV for Energy Arbitrage in Three Different Electricity Markets.....582

Optimal Sizing of Power-to-Gas Units Toward Elevated Renewable Power Penetration.....588

P

Parallel GPU-Accelerated Spike Sorting.....592

Parallelized QR Decomposition Using GPUs.....599

Parameter Estimation of Photovoltaic System Using Real Condition Data605
PCB Fabricated Passive RF Balun for 3 T MRI Applications609
Performance Analysis of TCP CERL in Wireless Networks with Random Loss613
Performance and Conformance Analysis of a Commercial Scale PV Inverter617
Performance Testing of Different Configurations of Hybrid Proposed Models for Solar Radiation Prediction Using WNN and ANN621
Peripherally Excited Phased Arrays: Beam Steering with Reduced Number of Antenna Elements625
PI Controller Tuning & Stability Study of the Flyback Converter with an Energy Regenerative Snubber629
Power Transfer Efficiency Evaluation of Different Power Pads for Electric Vehicle's Wireless Charging Systems633
Power-Management Based on Reconfigurable Last- Cache Level on Non-volatile Memories in Chip-Multi Processors637
Q
Quantifying Range Extension Capability of MIMO: a Simulation Study Based on WINNER II Model641
R
Receding Horizon Control of Rate of Penetration in Rotary Drills644
Reconfigurable Hybrid Cache Hierarchy in 3D Chip-Multi Processors Based on a Convex Optimization Method648
Reducing the Loss of Life of Distribution Transformers Affected by Plug-In Electric Vehicles Using Electric Water Heaters654
Robotic Manipulator Control Using PD-type Fuzzy Iterative Learning Control659
RRH Selection and Load Balancing Through Dynamic BBU-RRH Mapping in C-RAN663
S
SARIMA Model Forecasting of Short-Term Electrical Load Data Augmented by Fast Fourier Transform Seasonality Detection668
Scalable Blockchain-based Architecture for Massive IoT Reconfiguration672

Scalable Local Short-Term Energy Consumption Forecasting.....676

Secondary Control of a Multi-Terminal HVDC Grid Using a Consensus-Based Distributed Scheme682
Semiparametric Subsampling and Data Condensation for Large-scale Data Analytics686
Skin Lesion Segmentation Based on Improved U-net692
Sliding Window Regression Based Short-Term Load Forecasting of a Multi-Area Power System696
Smart Phone Anti-counterfeiting System Using A Decentralized Identity Management Framework701
Splitting a PRE-scheme on the Private Blockchain706
Survey of Information Technology Undergraduate Degree Programs in Canada710
Synthesis of Weierstrass Fractional Noise for Validation of Polyscale Algorithms714
System Architecture for a Universal Integrated Energy System720
T
Tactical Backhaul Range Extension Using MIMO: Investigation Based on ITU-R P.530724
Targets Illumination Region Effect on Laser RCS in Random Media for H-Wave Polarization730
Teaching at the Speed of Learning734
Teaching Blockchain for Business738
The Effect of Network Reduction on Overcurrent Relay Coordination in Interconnected Power Networks742
The Impact of Charging Battery Electric Vehicles on the Load Profile in the Presence of Renewable Energy748
The Impact of Rewinding on the Performance Characteristics of Three Phase Induction Machine752
The Instrumentation of a Ride-on Car to Quantitatively Assess Performance and Progress for Children with Mobility Impairments757
The Point at Which Energy Storage is Required for Integrating Renewables in Remote Power Systems761
The Weather Impact on Efficient Home Heating with Smart Thermostats765
The Western University - Nunavut Arctic College CubeSat Project769
Times Series Prediction Used in Treating Municipal Wastewater for Plant Irrigation773
Towards Generating Image Assets Through Deep Learning for Game Development777

Towards Integrated Image Contrast Models in Segmentation of Trees.....781 Towards Natural Scene Rock Image Classification with Convolutional Neural Networks.....785 Towards Sequential Decision-Based Cooperative Spectrum Sensing Using Random Medium Access.....789 U Ultra Low Frequency Electric Field Probes for Gradient Coils Field Measurement During Medical Device Testing.....794 *Universal Functions Originator - Part I: Design.....799* Universal Functions Originator - Part II: Evaluation.....805 Using a Wearable Device to Assist the Training of the Throwing Motion of Baseball Players.....811 Using Geometric Centroid of Voronoi Diagram for Coverage and Lifetime Optimization in Mobile Wireless Sensor Networks.....817 Using Photoplethysmography & ECG Towards a Non-Invasive Cuff Less Blood Pressure Measurement Technique.....822 Using Secondary VAr Controllers to Enhance Integrated Volt-VAr Optimization Benefits.....826 V V2V Communication-Assisted Transmit-Waveform Selection for Cognitive Vehicular Radars.....831

Vehicle-To-Grid Technology in a Micro-grid Using DC Fast Charging Architecture.....837

W

Wireless Sensor Networks Analysis Based on MAC Protocols.....841