

2015 IEEE 10th International Conference on Industrial and Information Systems (ICIIS 2015)

**Peradeniya, Sri Lanka
18 – 20 December 2015**



**IEEE Catalog Number: CFP1558A-POD
ISBN: 978-1-4799-1877-5**

**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:	CFP1558A-POD
ISBN (Print-On-Demand):	978-1-4799-1877-5
ISBN (Online):	978-1-4799-1876-8

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

Cover Page	i
Copyright page	ii
International Advisory Committee	iii
Conference Organizing Committee	iv-v
Technical Program Committee	vi-vii
International Review Panel	viii-ix
Message from General chair	x-xi
Table of Content	xii-xxii

Session 01 -PHV1: Power Systems and High Voltage Engineering

Friday 18th December, 13.30 – 15.00

Venue: Seminar Room 3

Session Chairs: Dr. Sanath Alahakoon, Dr. Sarath Kumara

Voltage Drop and Unbalance Compensation in Long Distance Medium Voltage Distribution Lines - A Feasibility Study N. Wight; S. Alahakoon; P. Pledger	1-6
Evaluation of Two Positive Sequence Filters for an Interface Between Electromagnetic Transient and Phasor Solutions H. Konara; U. Annakkage	7-12
Improving Matrix Pencil and Hankel Total Least Squares Algorithms for Identifying Dominant Oscillations in Power Systems D. Wadduwage; U. Annakkage	13-18
A Methodology for Computing Q Injection in Optimal Distributed Generation Sizing Problem M. L. Prasanna; J. Ranjith Kumar; A. Jain	N/A

Session 01 – CES1: Computer and Embedded Systems

Wednesday 18th December, 13.30 – 15.00

Venue: Seminar Room 2

Session Chairs: Dr. Dhammika Elkaduwe, Dr. Roshan Ragel

Strategy to Design Formally Verified Hardware/Software Implementation of Network Protocols on Reconfigurable Hardware	25-30
P. Abeyrathne; S. Dewasurendra; D. Elkaduwa	
Transformation and Composition of Software Design Models for Model Driven Development	31-36
D. Meedeniya; I. Perera; J. Bowles	
A Traceability Management Framework for Artefacts in Self-Adaptive Systems	37-42
I.Perera; D. Meedeniya; M. Bandara	
Preventing Software Architecture Erosion Through Static Architecture Conformance Checking	43-48
M. De Silva; I. Perera	
RotateCAPTCHA A Novel Interactive CAPTCHA Design Targeting Mobile Devices	49-54
R. Wickramasingha; A. Keerawella; A.Samarasinghe; R. Ragel	
Project Nethra - An Intelligent Assistant for the Visually Disabled to Interact with Internet Services	55-59
A. Weeratunga, S.A.U. Jayawardana, W.P.M. Prashan, P.M.A.K Hasindu, S. Thelijagoda	

Session 01–CIT1: Communications and Information Technology

Friday 18th December, 13.30 – 15.00

Venue: Seminar Room 1

Session Chairs: Dr. Vijitha Herath, Dr. Himal Suraweera

Performance Analysis of Open-Source Linux-Based HIP Implementations	60-65
J. Okwuibe; M. Liyanage; M. Ylianttila	
Optimization of Wireless Sensor Networks Inspired by Small World Phenomenon	66-70
M. Kumar; K. Pattanaik; B. Yadav; R. Verma	
Elevator Group Optimization in a Smart Building	71-76
D. Bamunuarachchi; N. Ranasinghe	
Effect of ART, DPC and ANs on the Performance of AODV Routing	77-81
S. Gupta; R. Saket	
Enhanced Feature Space Clustering Via Spectral Parameter Weighting for Fingerprinting Based Indoor Localization	82-87
C. Perera; S. Amarakoon; D. Weerakoon; G.M. R. I. Godaliyadda; M. P. Ekanayake	

Session 01 – EAI1: Electronics and Instrumentation

Friday 18th December, 13.30 – 15.00

Venue: ConR

Session Chairs: Dr. Janaka Wijayakulasooriya, Dr. Melaka Senadeera

Design and Development of GUI Based Model for Fault Diagnosis of Induction Motor Using Interval Type-2 Fuzzy and Genetically Tuned Interval Type-2 Fuzzy Classifier	88-93
A. Kulkarni; M. Qureshi; M. Jha; V. Jogi	
Computer Guided Product EMC Compliance on User's Workshop by Means of Cloud Computing - Methodologies and Algorithms	94-99
W. WU; Y. Wu	
Drawbacks of Current IVF Incubators and Novel Minimal Embryo Stress Incubator Design	100-105
S. Pramuditha; H. Hapuarachchi; N. Nanayakkara; P. Senanayaka; A. De Silva	
A Cost-effective Decision-Making Algorithm for Integrity of HMSCs: A Multi-Objective Approach	106-110
A. Mohammed; Q. Wang; X. Li	
EMG Based Biofeedback System Using A Virtual Reality Method	111-116
M. Jayarathne; D. Wickramanayake; A. Afsheenjinan; R. Ranaweera; V. Weerasinghe	

Session 02–PHV2: Power Systems and High Voltage Engineering

Friday 18th December, 15.30 – 17.00

Venue: Seminar Room 3

Session Chairs: Dr. Chandima Ekanayake, Dr. Sarath Kumara

Comparative Study to Understand Behaviour of Natural Ester as Transformer Insulating Liquid	117-121
K. Bandara; C. Ekanayake; Tapan K Saha	
Condition Assessment of Field Aged Transformer Oils Up to 40 Years	122-127
S. Samarasinghe; M. Sivasundaram; S. Srikanthan; S. Vivekananthan; R. Fernando; S. Kumara	
Conductor Temperature Based Low Cost Solution for Dynamic Line Rating Calculation of Power Distribution Lines	128-133
A. Wijethunga; J. Wijayakulasooriya; J. Ekanayake; N. De Silva	
Design and Implementation of a Control Strategy for a Transformer with Series Compensation	134-139
L. Wijayarathne; P. Binduhewa; S. Abeyratne; J. Ekanayake	
Individual Power Profile Estimation of Residential Appliances Using Low Frequency Smart Meter Data	140-145
H. G. Dinesh; P. Perera; G. M. R. I. Godaliyadda; M. P. Ekanayake; J. Ekanayake	

Session 02—ISP1: Image and Signal Processing

Friday 18th December, 15.30 – 17.00

Venue: Seminar Room 2

Session Chairs: Dr. Aruna Gunawardena, Dr. Disala Uduwawela

Restoration and Clustering of Overexposed Background Elements for Vision Systems in Dynamic Aquatic Scenes	146-151
G. Jayasinghe; S. Fernando; A. Senerath; M. P. Ekanayake; G. M. R. I. Godaliyadda	
Content-Base Image (Object) Retrieval with Rotational Invariant Bag-of-Visual Words Representation	152-157
Chathurani, N. W. U. D., Geva, S., Chandran, V., Cynthujah V.	
An Effective Content Based Image Retrieval System Based on Global Representation and Multi-Level Searching	158-163
Chathurani, N. W. U. D., Geva, S., Chandran, V., Cynthujah V	
Physically Inspired Synthesis of Santoor and Sarod	164-169
J.Wijayakulasooriya; S. Gunasekera; P. Perera	
Evaluation of Feature-Based Object Identification for Augmented Reality Applications on Mobile Devices	170-175
N. Wajirasena; H. Hewamalage; C.Rajapaksha; B. Hettige; A. Pemasiri; I.Perera	

Session 02—RCA1: Robotics, Control and Automation

Friday 18th December, 15.30 – 17.00

Venue: ConR

Session Chairs: Dr. Sanjeeva Maithripala, Dr. Parakrama Ekanayake

Controller Design Via Reduced Model for DC Servo System: An Experimental Study	176-181
Y. Hote; S. Saxena; A. Jha	
Fractional-Order PI Control of DC Servo System Using the Stability Boundary Locus Approach	182-186
S. Saxena; Y. Hote; S. Sondhi	
Low Cost Torque Estimator for DC Servo Motors	187-192
Z. Farnaz; S. Husain; P. Binduhewa; M. P. Ekanayake; L.Samaranayake	
Review of Developments in BLDC Motor Controllers Along with Study of Four-quadrant Operation and Active Power Factor Correction	193-198
D. K. Thekke Veetil; S. Mahabaleshwara; P. V. Koppal	
Optimising Electric Vehicle Powertrain Components for Enhanced Performance	199-204
A. Jeevithan; M. Ahmed; M. P. Ekanayake; L. Samaranayake	

Session 02 – CIT2: Communications and Information Technology

Friday 18th December, 15.30 – 17.00

Venue: Seminar Room 1

Session Chairs: Dr. Himel Suraweera, Dr. Vijitha Herath

Wideband Koch Snowflake Fractal Dielectric Resonator Antenna Dileep S, D.Venkata Kiran, Biswajeet Mukherjee	205-209
Design of a Linearly-polarized High-Directivity Microstrip Patch Antenna J. Jayasinghe; D. Uduwawala; J. Anguera	210-213
Computation of Effective Dielectric Constant and Electric Field Inside the Human Head: A Preliminary Study for EM Wave Effect on Human Head V. Mishra, N. Kumar, S. Puthucheri, V. Agarwala, D. Singh	214-219
Leveraging LTE Security with SDN and NFV M. Liyanage; I. Ahmad; M. Ylianttila; A. B. Abro; A.Gurtov; E. Montes de Oca	220-225
Low-complexity LDPC Decoder for Physical Layer Network Coded Multi-way Wireless Relay Systems N. Balasuriya; C. Wavegedara	226-231

Session 03 – PHV3: Power Systems and High Voltage Engineering

Saturday 19th December, 08.30 – 10.00

Venue: Seminar Room 3

Session Chairs: Dr. Thiwanika Wijekoon, Dr. Sarath Kumara

Modeling and Simulation of Current Source Converter for Proposed India-Sri Lanka HVDC Interconnection A. Rodrigo; C. Perera	232-237
Forecast Daily Night Peak Electric Power Demand in Sri Lankan Power System A. Anusuya; A. Arulampalam	238-243
Numerical Modelling of Zinc Oxide Nanowire Anti-Reflective Coatings W. Abeygunasekara; L. Samaranayake; V. Karunaratne; P. Hirallal; G. Amaratunga	244-249
Evaluation of Protection Coordination Violations with the Integration of Distributed Generators N. Lidula; R. Kodikara	250-255
Extracting Data From the RSCAD Electromagnetic Simulation Platform to Perform Eigenvalue Analysis A. Rupasinghe; U. Annakkage	256-260

Session 03 – ISP2: Image and Signal Processing

Saturday 19th December, 08.30 – 10.00

Venue: Seminar Room 2

Session Chairs: Prof. Debdoot Sheet, Dr. Roshan Godaliyadda

Frequency Domain ICA Based Signal Restoration From Non-Linearly Distorted Acoustic Signals 261-266

D. Sumanapala; D. Sumanapala; S. Thushan; G. M. R. I. Godaliyadda; M. P. Ekanayake; J. Wijayakulasooriya;

Crackle Separation and Classification From Normal Respiratory Sounds Using Gaussian Mixture Model 267-271

S. O. Maruf; U. Azhar; S. Khawaja; M. U. Akram

Advertisement Detection in Commercial Radio Channels 272-277

F. Afroz, Shashidhar.G.Koolagudi, Shriyak Sridhar, Narendran Elango, Karthik Kumar

An Approach to Monitor Land Cover Changes with Time Series MODIS Data Over Hotspot Region 278-283

T. Ahmed; D. Singh; S. Gupta; R. Balasubramanian

Session 03 – CES2: Computer and Embedded Systems

Saturday 19th December, 08.30 – 10.00

Venue: Seminar Room 1

Session Chairs: Dr. Roshan Ragel, Dr. Dhammika Elkaduwe

Compiler for a Simplified Programming Language Aiming on Multi Core Students' Experimental Processor 284-289

D. Wepathana; G. Anthonys; L. Udugama

3D Signing Avatar for Sinhala Sign Language 290-295

M. Punchimudiyanse; R. Meegama

Unicode Sinhala and Phonetic English Bi-directional Conversion for Sinhala Speech Recognizer 296-301

M. Punchimudiyanse; R. Meegama

CRF Based Named Entity Recognition for Sinhala 302-307

K. Seneviratne; N.S. Attanayake; A.W.M.H. Dhananjanie; W.A.S.U. Weragoda; A. Nugaliyadde; S. Thelijjagoda

Social Interaction Optimised Swarm Intelligence Technique for Travelling Salesman Problem 308-313

C. Wickramage; N. Ranasinghe

Session 03 – RCA2: Robotics, Control and Automation

Saturday 19th December, 08.30 – 10.00

Venue: ConR

Session Chairs: Dr. Parakrama Ekanayake, Dr. Sanjeeva Maithripala

Simplified Controller for Three Wheeled Omni Directional Mobile Robot K. Liyanage; I. Galgamuwa; M. P. Ekanayake; L.Samaranayake	314-319
Depth Map Generation for a Reconnaissance Robot Via Sensor Fusion A. Abeysekara; D. Liyanage; S. Welikala; G.M.R.I. Godaliyadda; M. P. Ekanayake; J. Wijayakulasooriya	320-325
Geometric Feature Extraction From 2D Laser Range Data for Mobile Robot Navigation T. Weerakoon; K. Ishii; A. Nassiraei	326-331
Versatile Non Linear Control Strategy for Reconnaissance Robotic System S. Welikala; D. Liyanage; A. Abeysekara; M. P. Ekanayake; G.M.R.I. Godaliyadda; J. Wijayakulasooriya	332-337

Session 04 – PHV4: Power Systems and High Voltage Engineering

Sunday 20th December, 08.30 – 10.00

Venue: Seminar Room 3

Session Chairs: Dr. Pierluigi Tenca, Dr. Prabath Binduhewa

Electrical Collector Topologies for Offshore Wind Power Plants: A Survey R. Srikakulapu; V. Urundadyngia	338-343
Power Quality Analysis of Grid Connected Wind Power Plants in West Coast of Sri Lanka: A Case Study G. Abeynayake; L. Attanayake; R. Jayawardane; G. Alahendra; M. Pathirathne; H.M. Wijekoon	344-348
Power System Operation by Prediction Interval of Photovoltaic Generation Forecast T. Masuta; J. Gari da Silva Fonseca Junior; A. Murata; T. Oozeki	349-353
Generation Profile Shape Dependent Performance of Mobility Imbalanced Organic Solar Cells W. Abeygunasekara; L. Samaranayake; V. Karunaratne; G. Amaratunga	354-359

Session 04 – ISP3: Image and Signal Processing

Sunday 20th December, 08.30 – 10.00

Venue: Seminar Room 3

Session Chairs: Prof. Dharmendra Singh, Dr. Disala Uduwawela

Improved PCA Based Face Recognition Using Similarity Measurement Fusion A. Vivekananthan; N. Rajasinghe; A. Senerath; M. P. Ekanayake; R. Godaliyadda; J. Wijayakulasooriya	360-365
Efficient Facial Expression Recognition and Classification System Based on Morphological Processing of Frontal Face Images A. Apte; A. Basavaraj; Nithin R. K.	366-371
Bimodal Biometric Verification Mechanism Using Fingerprint and Face Images(BBVMFF) Manjunathswamy B. E., Dr Thriveni J., Dr Venugopal K. R.	372-377
Visual Event Classification with Human Like Perception P. Perera; S. Herath; M. P. Ekanayake; G. M. R. I. Godaliyadda	378-383
A Robust Expression Negation Algorithm for Accurate Face Recognition for Limited Training Data G. Tharshini; H. G. Dinesh; G.M.R.I. Godaliyadda; M. P. Ekanayake	384-389

Session 04 – CES3: Computer and Embedded Systems

Sunday 20th December, 08.30 – 10.00

Venue: Seminar Room 1

Session Chairs: Prof. S.R.H. Hoole, Dr. Dhammika Elkaduwe

<i>Invited Paper:</i>Massive Efficiencies to Be Realized Through GPU Computations in Finite Element Optimization: The Promises and Observations S. R. H. Hoole	390-394
Accelerating Text-based Plagiarism Detection Using GPUs M. Jiffriya; M. A. Jahan; H. Gamaarachchi; R. Ragel	395-400
Improvements to a Complexity Metric: CB Measure D. De Silva; S. Kodituwakku; A.J.Pinidiyaarachchi; N. Kodagoda	401-406
A Unified Framework for Reviewer Reputation Estimation in Online Review Systems S. Kariyawasam, R. Weerasinghe	407-412
High Speed Streaming Data Analysis of Web Generated Log Streams S. Agarwal; B. Prasad	413-418

Session 04 – RCA3: Robotics, Control and Automation

Sunday 20th December, 08.30 – 10.00

Venue: ConR

Session Chairs: Prof. Gamini Dissanayake, Dr. Lilantha Samaranayake

<i>Invited Paper: An Extended Kalman Filter for Localisation in Occupancy Grid Maps</i>	419-424
L. Dantanarayana; G. Dissanayake; R. Ranasinghe; T. Furukawa	
Implementation of an Almost Globally Stable Intrinsic Nonlinear PID Controller for Attitude Stabilization of a Quadrotor	425-428
A. Sandaruwan; K. Gamagedara; S. Maithripala; J. Berg	
A Machine-driven Process for Human Limb Length Estimation Using Inertial Sensors	429-433
S. Karunaratne; S. Li; S. Ekanayake; P. Pathirana	
Enabling Technologies for Enterprise Wide Optimization	434-439
S. Srinivasan; C. Vecchio; L. Glielmo; D. Großmann; V. Balas	

Session 05 – PHV5: Power Systems and High Voltage Engineering

Sunday 20th December, 13.30 – 15.00

Venue: Seminar Room 3

Session Chairs: Prof. Janaka Ekanayake, Dr. Prabath Binduhewa

Implementation of Hybrid Differential Evolution to Solve Unit Commitment	440-445
L. Ravi Srinivas, M. Ramu, S. Tara Kalyani	
Effect of Semiconductor Devices' Output Parasitic Capacitance on Zero-Current Clamping Phenomenon in PWM-VSI Drives	446-451
D. Rathnayake; S. Abeyratne	
Fuzzy Logic Based Stator Resistance Compensation Technique for PWM-VSI Drives	452-457
D. Karunathilake; D. Ranathunga; K. Kaushalya; S. Abeyratne	
Grid Synchronization of DC Energy Storage Using Voltage Source Inverter with ZCD and PLL Techniques	458-462
K. Konara; M. Kolhe; W. Sankalpa	

Session 05 – ISP4: Image and Signal Processing

Sunday 20th December, 13.30 – 15.00

Venue: Seminar Room 2

Session Chairs: Prof. Dharmendra Singh, Dr. Disala Uduwawela

<i>Invited Paper:</i>Critical Analysis of Signal Processing Techniques for Concealed Weapon Identification with MMW (60 GHz) Imaging Radar System	463-468
D. Singh, B. Kumar, R. Upadhyay	
Design of Fractional Order Differintegrators Using Reduced Order s to z Transforms	469-473
K. Battula	
Moment Invariant Features for Automatic Identification of Critical Malaria Parasites	474-479
R. Senanayake; A. Ravendran; K.W. T. R. de Silva	
A Feature Clustering Approach Based on Histogram of Oriented Optical Flow and Superpixels	480-484
R. Bandara; L. Ranathunga; N. A. Abdullah	

Session 05 – CES4: Computer and Embedded Systems

Sunday 20th December, 13.30 – 15.00

Venue: Seminar Room 1

Session Chairs: Prof. S.R.H. Hoole, Dr. Chathurika Dharmagunawardena

Spatial Data Processing with MapReduce	485-490
T. Gunawardena; A. Vicari; G. Mecca	
Feasibility of Using Machine Learning to Access Control in Squid Proxy Server	491-494
S. Weerasekara; R. Kithuldeniya; K. Ihalagedara; S. Deegalla	
Adaptive Free Cylindrical Mixture Model for Foreground Estimation in Rapidly Fluctuating Dynamic Background Conditions	495-500
G. Jayasinghe; S. Fernando; A. Senerath; G.M.R.I. Godaliyadda; M. P. Ekanayake	
The A to Z of Building a Testbed for Power Analysis Attacks	501-506
H. Gamaarachchi; H. Ganegoda; R. Ragel	
A Computational Approach to Prioritize Functionally Significant Variations in Whole Exome Sequencing	507-512
I. Liyanage, Rupika Wijesinghe, Nilakshi Samaranayake, Ruwan Weerasinghe	

Session 05 – CIT3: Communications and Information Technology

Sunday 20th December, 13.30 – 15.00

Venue: ConR

Session Chairs: Dr. Melaka Senadeera, Dr. Himel Suraweera

Pre-configured Backup Protection with Limited Resource Sharing in Elastic Optical Networks **513-518**

S. Satkunarajah; K. Ratnam; R. Ragel

Design and Implementation of a Bi-directional Visible Light Communication System **519-524**

S. Edirisinghe; T. Dissanayake; S. Karunaratna; G.M.R. I. Godaliyadda

An Adaptive Mechanism for Improving Resiliency in Wireless Sensor Networks **525-530**

R. Verma; K. Pattanaik; S. Bharti

The Effects of Radiation Losses on the Measurement of Loss Tangent Using Microstrip Ring Resonators **531-534**

A. Gunawardane; S. Samarasinghe; M. Abdul Careem; R. Fernando

Transmission Performance of Peak-clipped Carrier-suppressed Optical SSB Signal with Variable Clipping Voltage **535-539**

K. I. A. Sampath; K. Takano; M. Sato

Development of Thin Dual-layer Alumina-Iron Composite Coatings for Enhanced Microwave Absorption **540-545**

M. Najim; S. Puthucheri; V. Agarwala; D. Singh

Additional Paper:

Use of Maximum Demand Principles for Optimizing Transformer Design of a Ship Loader **19-24**

S. Graham; S. Alahakoon

Author Index

546-551