

# **2019 16th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology (ECTI-CON 2019)**

**Pattaya, Chonburi, Thailand  
10 – 13 July 2019**

**Pages 1-472**



**IEEE Catalog Number: CFP1906E-POD  
ISBN: 978-1-7281-3362-1**

**Copyright © 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:	CFP1906E-POD
ISBN (Print-On-Demand):	978-1-7281-3362-1
ISBN (Online):	978-1-7281-3361-4

**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

## Communication Systems

Paper ID	Title/Author	Page
1033	<b>Vehicle Sensors Programming Based On Controller Area Network (CAN) Bus Using Canoe</b> Mohamad Khairi Ishak, Lee Shea Qi, Emma Ahmad Sirajuddin, Omer Ali	1
1059	<b>Analysis of Periodic Networks Using the Moment Method</b> P. Sornla, S. Akatimagool, D. Torrungrueng	5
1072	<b>Characterizing Coated Objects with Radar Identification System using Short-time Matrix Pencil Method</b> Lakkhana Bannawat, Santana Burintramart, Akkarat Boonpoonga	9
1073	<b>Designing of UWB Pulse Generation in FPGA based on Delay line method for Human Range Detecting through the wall application</b> Lalida Tantiparimongkol, Pattarapong Phasukkit	13
1091	<b>Channel Estimation and Bit Loading for WPM with Time-Domain MMSE Equalization</b> Sarbagya Buddhacharya, Poompat Saengudomlert	17
1115	<b>Spectrum Sensing through Group Testing for Multicarrier Transmissions Based on Wavelet Packet Modulation</b> Poompat Saengudomlert, Sarbagya Buddhacharya	21
1121	<b>Low Cost Virtual Instrument for Filter Design</b> Kanokwan Ruangsiri, Somsak Akatimagool	25
1153	<b>Rain Attenuation Prediction Modeling for Earth-Space Links using Artificial Neural Networks</b> Phunsak Thiennviboon, Saranyoo Wisutimateekorn	29
1191	<b>Study of Low Power - Almost Blank Subframe for LTE HetNets</b> Chodok Daraphan, Nonthapat Teerasuttakorn, Pichit Thienthong, Kittipong Nuanyai, Soamsiri Chantaraskul	33
1226	<b>Adaptive Parent Selection Algorithm for AMI Network of Smart Grid System</b> Wilaiporn Lee, Buranin Khemapataphan, Yuthapong Khobkoob, Tinnaphob Dindam, Kanabadee Srisomboon, Adisorn Kheaksong	37
1246	<b>Comparison of the GNSS Position Accuracy on Mobile Phones in Vientiane, Laos</b> Dethnaphonexay Soumphonphakdy, Khanpui Southisombath, Donekeo Lakanchanh, Pornchai Supnithi	41

## Computers

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1015	<b>Mobile Robot Control by Tangible programming for Developing of Computer Scientist Thinking skill in Elementary School</b> Siwaporn Meadthaisong, Thiang Meadthaisong	45
1076	<b>The Computing and Information System for study of scenarios for interstate power grids expansion</b> Sergei Podkovalnikov, Ivan Trofimov, Leonid Trofimov, Lyudmila Chudinova	49
1081	<b>SDN aided Mobility Management for Connected Vehicle Networks</b> Kuljaree Tantayakul, Riadh Dhaou, Beatrice Paillassa	53
1094	<b>Implementing Information Technology and Social Media for Promoting Tourism Pongyeang Subdistrict, Chiang Mai, Thailand</b> Pitchayanida Khumwichai, Parot Ratnapinda, Watcharin Sarachai	57
1101	<b>The Study of the Number of Free Electron Bandfilling Effect at Different Flying-Height in TEAMR</b> Suttiapan Aksornniem	61
1107	<b>Scheduling Algorithms for the Revised PDPSort</b> Apisit Rattanatanurak, Surin Kittitornkun	65
1111	<b>A Resource- Limited FPGA Accelerator for Deep Convolutional Neural Networks</b> Attapon Bunwong, Yutana Jewajinda	69
1120	<b>A Hyper- parameter Optimization for Deep Neural Network using an Island-based Genetic Algorithm</b> Rashrita Rattanavorrangant, Yutana Jewajinda	73
1124	<b>Genetic Algorithm for Virtual Machine Allocation using Server Power Profile</b> Benjawan Chanasuwan, Sethavidh Gertpol	77
1151	<b>Rule- Based Sequence Diagram Generation with Application of the Visitor Pattern</b> Bounta Bouphavong, Channa Bou, Nasith Laosen, Ekawit Nantajeewarawat	81
1181	<b>Investigation of Deep Learning Optimizer for Water Pipe Leaking Detection</b> Peerachai Arunsuriyasak, Phattraporn Boonme, Pattarapong Phasukkit	85
1193	<b>The Graphics and Physics Engines for Rapid Development of 3D Web-based Applications</b> Nitikorn Eamnapa, Santi Nuratch, Wanchak Lenwari	89

## Computers (Continued)

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1208	<b>Combinatorial Artificial Bee Colony Optimization with Reinforcement Learning Updating for Travelling Salesman Problem</b> Suthida Fairee, Santitham Prom-On, Booncharoen Sirinaovakul, CharoENCHAI Khompatraporn	93
1224	<b>Snow Scene Segmentation Using CNN- Based Approach with Transfer Learning</b> Parintorn Pooyoi, Punyanuch Borwarnginn, Jason H. Hagay, Worapan Kusakunniran	97
1241	<b>Classification and detection of Arrhythmia in ECG Signal Using Machine Learning Techniques</b> Rekh Ram Janghel, Saroj Kumar Pandey	101
1260	<b>Childbirth Simulation on Virtual Reality Platform</b> Pongsagon Vichitvejpaisal	105
1271	<b>Webcam- based eye- gaze prediction system with automatic calibration for web browser</b> Niphath Karngumpol, Worapoj Kreesuradej	109

**Controls, Instrumentation and Measurements**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1031	<b>An Interactive Simulation between Electric Power System and Motor Drive System in an EV</b> Munetaka Nakata, Atsuhiko Aoki, Kazuhiro Motegi, Yochi Shiraishi	113
1051	<b>Determination of the sensitivity for ultrasonic sensor by comparison method</b> Kornpatsitt Promasa	117
1100	<b>Application of Adaptive Tabu Search to PIDA Controller Design</b> Chitphong Ketthanom, Patcharin Artameeyanant, Vorawut Pratumshat	121
1102	<b>Aluminum mini-cell for thermocouple self-calibration</b> Oijai Ongrai	125
1104	<b>A Flight Formation Control of a Micro Aerial Vehicle Swarm using a Motion Capture</b> Nuttawat Pungigul, Mason Thammawichai, Sanga Srisupapreeda	128
1122	<b>Landslide Terrain Survey/ Reconstruction Using Developed Terrestrial Laser Scanner</b> Pradya Prempraneerach, Ruj Akavipat	132
1123	<b>Reflection image model for Micro-Ellipsometer</b> Weerayuth Khunrattanasiri, Siridech Boonsang	136
1134	<b>Long term stability analysis of VCD and KF for INS/VG</b> Chan Gook Park, Jaehyuck Cha, Hojin Ju	140
1169	<b>Object Levitation using Ultrasonic Cellular Phased-Array</b> Nuttakit Kijshevavithaya, Chatchamon Phoojaroenchanachai, Thanachart Puapan, Chokchai Thanrukprasert, Somsak Kittipiyakul, Bundit Limmeechokchai	143
1205	<b>Prediction of Production Performance for Tapioca Industry using LSTM neural network</b> Pacharaphol Sonthitet, Diew Koolpiruk, Warinthon Songkasiri	147
1207	<b>Kappa number prediction of Pulp Digester Using LSTM neural network</b> Arinchai Phatwong, Diew Koolpiruk	151
1216	<b>Shared Control Strategies of BCI-based Quadcopter Control</b> Eakdanai Kavichai, Ruisen Huang, Seong-Woo Woo	155
1221	<b>A Hybrid SS- CAES System with a Battery</b> Phaisan Omsin, Suleiman M. Sharkh, Mohamed Moshrefi-Torbati	159

**Controls, Instrumentation and Measurements (Continued)**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1245	<b>Adaptive Backstepping Fractional Fuzzy Sliding Mode Control of Microgyroscope</b> Juntao Fei, Xiao Liang	163
1265	<b>Robust Control of Uncertain Nonlinear Systems Using Neural Networks</b> Pornchai Khlaeo-om, Thummaros Rugthum	167

## Device, Circuits and Systems

Paper ID	Title/Author	Page
1001	<b>Implementation of 3-D Multiple Linear Regression in Hardware using the Xilinx Spartan-3AN FPGA</b> Ian Grout, Willian de Assis Pedrobon Ferreira, Alexandre César Rodrigues da Silva	171
1007	<b>The Stochastic Analysis of OTA-C Filter</b> Rawid Banchuin, Roungsan Chaisricharoen	175
1021	<b>A wide-supply-voltage-range CMOS squarer</b> Ittipong Chaisayun	179
1024	<b>Inductance Simulator with Electronic Controllability Using Single VDDDA</b> Kunakorn Pichetpaisan, Winai Jaikla, Surapong Siripongdee, Suchin Adhan, Phamorn Silapan	183
1029	<b>RF Energy Harvesting using Cross-couple Rectifier and DTMOS on SOTB with Phase Effect of Paired RF Inputs</b> Thuy-Linh Nguyen, Shiho Takahashi, Yasuo Sato, Koichiro Ishibash	187
1038	<b>Effects of quenching process on the optical properties of thin film polymers</b> Jitrin Jumpar-ngern, Khanisorn Sompong, Kamol Wasapinyokul	191
1039	<b>Metamaterial-Based Temperature Sensor Comprised of VO<sub>2</sub> Nano-Ribbons</b> M.A. Baqir, P.K. Choudhury, A.-B.M.A. Ibrahim	195
1040	<b>A study of optical properties of thin film polymer spin-coated with different dispensing methods</b> Ronakrit Phatcharawutikul, Kitbordee Tangtrakul, Kamol Wasapinyokul	199
1041	<b>Optical transmittances of spin-coated polymer films with different spin step protocols</b> Peemases Sukjit, Chatchai Jaieau, Kamol Wasapinyokul	203
1126	<b>Velocity Detection by Ultrasonic Doppler base on Multi-Time technique Analysis</b> Sukkan Sudtana, Kriangsak Prompak, Suphawadee Suphramit, Noppadon Sisuk, Surapol Boonjun, Paramote Wardkein	207
1157	<b>FPGA Implementation of Deep Neural Network for Wearable Pre-Seizure Detector on Epileptic Patient</b> Charlie Tahar, Dalta Imam Maulana, Rahmadi Rizki S. Pandia, Trio Adiono	211
1159	<b>Cluster Formation by Distance Adjustment with Various Threshold of Wireless Sensor Networks</b> Rowsan Jahan Bhuiyan, Mohammad Abul Kashem, Md. Mostafizur Rahman, Saiful Islam	215



## Device, Circuits and Systems (Continued)

Paper ID	Title/Author	Page
1173	<b>Design and Development of Multiple Protocols Supported Embedded Gateway for Industrial Networked Electrical Metering Systems</b> Siripong Charukwongsawat, Santi Nuratch, Panuthat Boopramuk	219
1174	<b>Design and Development of Embedded Networked Wireless Digital Controller for Multiple Plants using Bit-Representation Data Formation</b> Kritapras Mee-im, Santi Nuratch, Wanchak Lenwari	223
1184	<b>The improvement of PANI using silver nanoparticles nanocomposite for gas sensor application</b> Chalisa Chairanit, Rina Patramanon, Natnaree Phukkaphan, Teerakiat Kerdcharoen	227
1188	<b>Magnetic FinFET (MAGFinFET)</b> Chanvit Pamonchom, Rattapong Nakachai, Chalin Sutthinet, Amporn Poyai, Toempong Phetchakul	231
1189	<b>Design and Simulation of Thin Film Anti-Reflection Coating on Si-Based Photonic Devices</b> Dalin Prajakkan, Apichai Bhatranand, Yuttapong Jiraraksopakun	235
1215	<b>Reduction of Ambipolar Conduction in Centrally Aligned PNP-DG TFET</b> Bijoy Goswam, Debadipta Basak, Koelgeet Kaur, Ayan Bhattacharya, Sutanni Bhowmick, Subir Kumar Sarkar	239
1243	<b>A Bidirectional Front-End for Discrete Resonating Transducers Based on A Non Ring Oscillator</b> Luca Marchetti, Mehdi Azadmehr, Yngvar Berg	243
1295	<b>Implementation of an adaptive voltage maximum power point tracking method on a Solar LED DC-DC converter for micro grid system</b> Hamed Yahoui, Thanh Kha Tran, Denis Genon-Catalot, Nam Nguyen-Quang, Quoc Dung Phan	247
1296	<b>G3 Power Line Communication for controlling an autonomous DC micro grid</b> Thanh Kha Tran, Hamed Yahoui, Denis Genon-Catalot, Nicolas Siauve, Nicolas Forty	251

## Electrical Power Systems

Paper ID	Title/Author	Page
1008	<b>The Design and Simulation of the External Lightning protection for a Tall building according to IEC 62305</b> Arnon Singhasathein, Nattapong Phanthuna, Somkicat Thongkeaw	256
1014	<b>The Designation of the Lightning Protection for the Photovoltaic Module by using the Protective Angle Method</b> Arnon Singhasathein, Kotchapong Sumanonta	260
1019	<b>Solution of Economic Load Dispatch Problem Using Flower Pollination Algorithm Considering Generator Constraints</b> Deblina Maity, Sumit Banerjee, Chandan Kumar Chanda	264
1020	<b>Distributed Frequency Suppression Method Using Inverter for Photovoltaic Power Generation</b> Koki Kato, Yuji Iwane, Shunsuke Horie, Tadahiro Goda, Kazuto Yukita, Toshiro Matsumura, Yasuyuki Goto, Issarachai Ngamroo	268
1068	<b>Short Term Analysis of PV System Performance in Different Areas of Thailand</b> Supalak Sathiracheewin, Kitichoke Prommaneeewat	272
1096	<b>Health Index Determination of Aged High Voltage Substation in Distribution System</b> Chaiyaboon Somboonchaiwong, Thanapong Suwanasri, Cattareeya Suwanasri	276
1097	<b>Voltage control with PI controller for Four Phase Interleaved Boost Converter</b> I. Laoprom, S.Tunyasirirut, W. Permpoonsinsup, D. Puangdownreong	280
1105	<b>Simulation of PV System Using EMTP-ATPDraw</b> T. Thanasaksiri	284
1112	<b>ESTIMATION OF LOCATIONAL MARGINAL PRICING IN CONTINGENCY MARKET BY DCOPT METHOD</b> Deblina Maity, Sumit Banerjee, Chandan Kumar Chanda	288
1113	<b>Impacts of Overvoltage on Mesh- Distributed and Edge- Distributed Rods in L- Shape Ground Grid Systems of High Voltage Substation</b> Krung Luewattana, Paweena Rattanasena, Sumate Lipirodjanapong	292
1128	<b>An Analysis and Location of Partial Discharges in Power Transformers by Acoustic Emission Sensor</b> Piyapat Pongsri, Chennarong Meesomphong	296

## Electrical Power Systems (Continued)

Paper ID	Title/Author	Page
1158	<b>Power Development Planning Considering Energy Storage System</b> Kirati Rattanapratoom, Kulyos Audomvongseree	300
1167	<b>Set-Valued Power System State Estimation Based on McCormick Relaxation</b> Tanyong Srisathan, Sermsak Uatrongjit	304
1172	<b>Optimal Hybrid Renewable Energy System Considering Maximum Profit from Electrical Energy Sale</b> Veeraya Imcharoenkul, Surachai Chaitusaney	308
1229	<b>Application Intelligent fuzzy PID controller optimized by ALO algorithm in AGC</b> Binod Shaw, Jyoti Nayak	312
1248	<b>A Concept of Demand Charge Subsidy due to Wheeling Charge in Distribution System</b> Surapad Larbwisuthisaroj, Surachai Chaitusaney	316
1249	<b>Evaluation Ratio of Renewable Hybrid Generation and Power Grid for Agriculture Electrical Load in Ratchaburi</b> Sumate Lipirodjanapong, Krung Luewattana	320
1252	<b>Wheeling Charge Calculation with Consideration of Investment Lifetime and Power Transaction Locations</b> Thanapoom Wongkom, Surachai Chaitusaney	324
1256	<b>Electric Field Minimization using Optimal Phase Arrangement Technique for MEA Overhead Power Transmission Lines</b> Suthasinee Nunchuen, Jarin Hapalee, Vuttipon Tarateeraseth	328
1261	<b>Comparison of energy from solar photovoltaic between the solar tracking and fixed panel</b> K. Marut, S. Sumade, Sorakis Srikasem	334
1285	<b>A Study of Partial Discharge Localization in Transformer</b> Thanadol Tiengthong, Sathaporn Promwong	336
1286	<b>Complex Form in Fresnel Region Analysis for Partial Discharge in Transformer</b> Sathaporn Promwong, Thanadol Tiengthong	340

## Electrical Power Systems (Continued)

Paper ID	Title/Author	Page
1287	<b>Compensator Design for a Peak Current Mode Controlled Buck Converter</b> Siripan Trakuldit, Chanin Bunlaksananusorn	344
1288	<b>Dielectric Properties of Stator coil Insulation of Medium Voltage Motor</b> N. Pattanadech, S. Boonsathitthavorn, N. Phumipunepon	348
1289	<b>Dissolved Gas Analysis Caused by Electrical Breakdown of Liquid Impregnated Pressboards</b> Norasage Pattanadech, Kanchanaporn Luk-in, Chantapapa Samerpak, Nattakrit Chumninuan, Nadpakul Piyapatamin, Tassana Hengcharoensuk, Thanapon Nupinit, Jompatara Siriworachanyadee	352
1290	<b>Dissolved Gas Analysis of Liquid Insulation under AC and Impulse Breakdown Voltage Tests</b> Norasage Pattanadech, Kanchanaporn Lukin, Chantapapa Samerpak, Nattakrit Chumninuan, Nadpakul Piyapatamin, Kanin Satirapattanakiat, Kittiphot Atthaphotpong, Korraya Jongvilaikasem	356
1291	<b>Polarization and Depolarization Current Characteristics of Thermally Stressed Stator Bars</b> N. Pattanadech, N. Srichuen, C. Wang, N. Kaewdee, T. Pongpat, C. Raphephat, N. Phumipunepon, A. Kunakorn	360
1292	<b>Polarization and Depolarization Current Measurement Applied for Investigation of Underground Cable System Problems</b> N. Pattanadech, N. Navapittayaratana, T. Jirathipchaisakul, T. Phongsirichairojna, P. Nimsanong, C. Chuayin	364
1293	<b>The Study of Conventional Partial Discharge Measurement for Gas Insulated Line</b> Norasage Pattanadech, Chakkri Hougntaisong, Chalantorn Wichakul, Narinnitiporn Thanormsakdomrong, Natthanon Monklang, Tritod Nganpitak	368

## Information Technology

Paper ID	Title/Author	Page
1011	<b>Improve the Accuracy of SenseComp in Thai Consumer's Review Using Syntactic Analysis</b> Paitoon Porntrakoon	372
1013	<b>Convolutional Neural Network for Pineapple Ripeness Classification Machine</b> Anusorn Chaikaew, Thanawut Thanavanich, Pumipong Duangtang, Kittakorn Sriwanna, Wipobh Jaikhang	376
1025	<b>Comparison of Algorithm Selection to Analyze Elderly Activity Recognition Based on Sensor Data Using R Program</b> Anirut Sriwichian, Jirapond Muangprathub	380
1154	<b>Speech Recognition Approach using Descend-Delta-Mean and MFCC Algorithm</b> Anuruk Nosan, Suchada Sitjongsataporn	384
1168	<b>Fuzziness Detection in Thai Law Texts Using Text Classification</b> Chatchawal Sangkeettrakarn, Choochart Haruechaiyasak, Thanaruk Theeramunkong	388
1186	<b>Digital Watermarking and Image Recovery: Single and Double Embed Analysis</b> Daratpong Gongkham, Jigyasa Bajracharya, Yanisa Boriboon, Toshiaki Kondo	392
1212	<b>Improving Plagiarism Checker Throughput with Apache Storm</b> Thanayut Seethongchuen, Paruj Ratanaworabhan	396
1247	<b>Effects of Antenna Orientation in Ultra Wideband Indoor Positioning System</b> Panthip Chansamood, Sodsai Wisadsud, Kriangkrai Maneerat, Taweesak Sanpechuda, Krisada Chinda, Kamol Kaemarungsi	400
1294	<b>Association between Different Learning Methods and Testing Scores for Student: A Case Study</b> Roungsan Chaisricharoen, Wanus Srimaharaj, Aysha Sohail	404
1301	<b>Effects of Probiotics on Gut Beneficial Microbes in Autistic Children</b> Hathaichanok Kotchapetch, Kingpetch Tharnporn, Sayfon Punacok, Chaisri Thongphuthon, Darat Samranjuk, Pojanee Boonchusorn, Kitiya Thamachotikool, Apinya Thitsomboon, Chayanee Phoratso, Pareeya Jutasri, Keerati Saiyawan, Chaivyavat Chaiyasut, Sasithorn Sirilun, Jarasphol Rintara, Phakkarawat Sittiprapaporn	408

## Information Technology (Continued)

Paper ID	Title/Author	Page
1303	<b>Effects of Synbiotic Supplement in Thai Smokers: A Preliminary Study</b> Parama Pratummas, Thamthiwat Nararatwanchai, Pontree Boonla, Tawatchai Bootsri, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	412
1304	<b>Investigation of Brainwaves Changes in Dynamic Meditation</b> Sangrawee Puttason, Sunisa Thaichinda, Phakharawat Sittiprapaporn	416
1306	<b>A Preliminary Study of Relationship between Epworth Sleepiness Scale and Excessive Sleepiness in Shift Workers</b> Phuttharaksa Phucharoen, Thamthiwat Nararatwanchai, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	420
1307	<b>Preliminary Study of Plukenetia Volubilis Residue to Omega Enriched Egg Preparation</b> Jiraporn Samakayanusorn, Phakharawat Sittiprapaporn	424
1309	<b>Preliminary Study of Probiotics and Kynurenine Pathway in Autism Spectrum Disorder</b> Waranan Tharawadeephimuk, Kingpetch Tharnporn, Sayfon Punacok, Chaisri Thongphuthon, Darat Samranjuk, Pojanee Boonchusorn, Kitiya Thamachotikool, Apinya Thitsomboon, Chayanee Phoratso, Pareeya Jutasri, Keerati Saiyawan, Chaiyavat Chaiyasut, Sasithorn Sirilun, Werner Kurotschka, Phakharawat Sittiprapaporn	428
1312	<b>Preliminary Study of Probiotics in Reducing Common Cold in Children</b> Rungarun Churat, Kingpetch Tharnporn, Sayfon Punacok, Chaisri Thongphuthon, Darat Samranjuk, Pojanee Boonchusorn, Kitiya Thamachotikool, Apinya Thitsomboon, Chayanee Phoratso, Pareeya Jutasri, Keerati Saiyawan, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	432
1313	<b>The Effect of Synbiotics Supplement on Alcohol Use Disorders Identification Test and Biochemical Parameters, Lipopolysaccharide and Immunoglobulin A Levels, in High Risk Alcoholics</b> Vachrintr Sirisapsombat, Thamthiwat Nararatwanchai, Pontree Boonla, Tawatchai Bootsri, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	436
1314	<b>Effect of Mouthwash Containing Dextranase Enzyme on Markers related to Dental Caries</b> Piyachat Thongpong, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	441

## Information Technology (Continued)

Paper ID	Title/Author	Page
1315	<b>A Preliminary Study on Effect of Lactobacillus paracasei HII01 on High-Density and Low-Density Lipoproteins Level in Hypercholesterolemic Patients</b> Chaiyavat Chaiyasut, Bhagavathi Sundaram, Sasithorn Sirilun, Yaowalak Tirawat, Phakharawat Sittiprapaporn	445
1317	<b>The Concept of Tricycle as an Artistic Point of View in Creative Art</b> Ananta Hari Noorsasetya, Prayanto Widyo Harsanto	449
1318	<b>Drawing as a Basic Ability of Design Students in Thinking Visual and Understanding of Form Logic</b> R. Tosan Tri Putro	453
1319	<b>The Effect of Gendhing Gamelan toward the Reducing of Anxiety on Pregnancy</b> Djohan, Phakharawat Sittiprapaporn, Fortunata Tyasrinestu	457
1320	<b>Intellectual Character of Metacognition: Student Thinking Strategies in Playing Music</b> Ayu Niza Machfauzia, Djohan	461
1321	<b>The Correlation of Puppet's Narrativity with Live Experienced in Ceramic Work</b> Dona Prawita Arissuta, Desy Nurcahyanti	465
1322	<b>A Preliminary Study on Effect of Lactobacillus paracasei HII01 on Cortisol in Fatigue Subjects</b> Ekasit Lalitsuradej, Chaiyavat Chaiyasut, Sasithorn Sirilun, Phakharawat Sittiprapaporn	469
1323	<b>Effect of Drinking Green Tea to Stress Reduction: Electroencephalographic Investigation</b> Anjaly Srimanothip, Vichit Boonyahotara, Phakharawat Sittiprapaporn	473
1324	<b>Effect of Use of Dextranase Based Mouthwash on Oral Plaque in Thai People: A Preliminary Report</b> Nucharee Juntarachot, Bhagavathi Sundaram Sivamaruthi, Piyachat Tongpong, Sasithorn Sirilun, Phakharawat Sittiprapaporn, Chaiyavat Chaiyasut, Duangporn Kantachote	477
1326	<b>Multi-Polar Radio Frequency Combined with Pulse Electromagnetic Field and Vacuum System for Cellulite and Circumference Reduction</b> Nutrunit Panyasiripan, Phakharawat Sittiprapaporn	481
1328	<b>Brainwave Activity and Cognitive Performance Investigated by Meditation Yoga</b> Pattiyaporn Supoo, Ariya Sarikaphuti, Phakharawat Sittiprapaporn	485

## Information Technology (Continued)

Paper ID	Title/Author	Page
1330	<b>Study of Brain Activity Analysis of Listening to Ohm Chanting</b> Sasithorn Sachdev, Vichit Boonyahotra, Phakharawat Sittiprapaporn	489
1331	<b>Brain Exercise in Elderly People by Neurosky Smarter Kit</b> Tinnaphol Chaipakornwong, Vichit Boonyahotra, Shao-Chin Chang, Djohan, Phakharawat Sittiprapaporn	493
1332	<b>BrainWare SAFARI Cognitive Skills Development in Thai Children: A Preliminary Study</b> Kingpetch Tharnporn, Kitiya Thamachotikool, Apinya Thitsomboon, Keerati Saiyawan, Sayfon Punacok, Chaisri Thongphuthon, Pojanee Boonchusorn, Darat Samranjuk, Nalinrat Aphichart, Phakharawat Sittiprapaporn	497
1333	<b>Preliminary Study of Neuroscience-based Cognitive Skill Training and Brainwave Changes in Children with Learning Disabilities</b> Kingpetch Tharnporn, Sayfon Punacok, Chaisri Thongphuthon, Pojanee Boonchusorn, Darat Samranjuk, Kitiya Thamachotikool, Apinya Thitsomboon, Keerati Saiyawan1, Nalinrat Aphichart, Phakharawat Sittiprapaporn	502
1334	<b>BEER-Guy Wireless Automated Robot</b> Teerawat Puangdee, Wichapol Phaparkhorn, Chayapol Kamyod	507
1335	<b>Mind Mapping as a Tool to increase Critical Thinking in Music Learning</b> Yunike Juniarti Fitria, Tri Wahyuni Floriasti	512



## Other Related Areas

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1032	<b>Approximate observer error linearization for nonlinear systems</b> Bienvenue Hyacinthe Kouakou Konan, Kaito Yoshinaga, Kotaro Hashikura, Takaaki Suzuki, Kou Yamada	516
1034	<b>Study on low-sensitivity control system with robust stability for time-delay plants using double feedback control system</b> Daisuke Koyama, Kotaro Hashikura, Takaaki Suzuki, Kou Yamada	520
1146	<b>A Simple Sinusoidal Oscillator Based on Single Voltage Differencing Gain Amplifier</b> Thitiporn Janda, Ampawan Yindeemark, Suphaphorn Panikhom, Adirek Jantakun	524
1161	<b>Multi - Channel Free - Space Optical Transmitter /Receiver for Low-Cost Environmental Monitoring System</b> Nithipat Wanisubut, Phnumas Khumsat, Chenchira Michueawong	528
1219	<b>Synchronization of Chaotic Circuit for the Lorenz System in Voice Secure Communications</b> Suphaphorn Panikhom, Adirek Jantakun, Kridsanapong Punsri, Ampawan Yindeemark	532

## Power Electronics

Paper ID	Title/Author	Page
1027	<b>High Step-up Push-Pull Resonant Converter Based on Current Source Class-D Rectifier</b> A. Bilsalam, T. Jinati, W. Wongphasuk, C. Ekkaravarodome, V. Chunkag	536
1028	<b>Design of Digital Robust Control of A2DOF with Push-Pull Convert for Renewable Energy Application</b> Satit Mangkalajan, Chainarin Ekkaravarodome, Surat Sukanna, Kamon Jirasereeamongkul, Kohji Higuchi	540
1055	<b>Slip Regulation Control of An Unsymmetrical Two-Phase Induction Motor Coupling with DC Generator Using Torque Control</b> Navee Rujidam, Wekin Piyarat, Vijit Kinnares	544
1060	<b>The Harmonic Detection for Co- Phase Railway System in Distorted Voltage Source Condition.</b> Chakrit Panpean, Kongpol Areerak, Kongpan Areerak, Sasiya Udomsuk, Phonsit Santiprapan	548
1061	<b>PI Controller Design Using root-locus for Quasi-Z-Source Inverter</b> Patumporn Wongyai, Kongpan Areerak, Kongpol Areerak	552
1080	<b>The application of new boundary equations with the maximum power point tracking model of photovoltaic module by particle swarm optimization method</b> Kotchapong Sumanonta, Pisit Liutanakul	556
1099	<b>Implementation of Novel Circulating Current Control in Direct Parallel PWM Converter</b> Jirawut Benjanarasut, Wara Sadara	560
1103	<b>Development of a Portable Spot Welder</b> Nitipat Eawsakul, Sorarad Hongprapas, Chalernpol Reaungepattanawiwat	564
1209	<b>Development of Long Rail Dynamic Wireless Power Transfer for High-Speed Train</b> Chan Anyapo, Pattana Intani	568
1239	<b>Novel Circulating Current Control of Direct Parallel PWM Converter</b> Decha Panprasert, Bunlung Neammanee	572
1258	<b>Active Damping of PR Based Current Control for LCL Filter for Grid-Connected Inverter</b> C. Tarasantisuk, N. Phankong	576

**Power Electronics (Continued)**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1272	<b>Elimination of Differential- Mode Voltage in Dual-Inverter Drive Fed Open- End Winding Induction Motor Using PWM Techniques</b> Nuttawout Buarat, Yuttana Kumsuwan	580

## Signal Processing

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1006	<b>Novel Alternatives and Derivations of Linear Error-Functions for Phase-Compensator Design</b> Tian-Bo Deng	584
1016	<b>Simulation Evaluation of Noise Suppressing Technique Based on Decision Based Adaptive Median Filter for Salt&amp;Pepper Noise</b> Kornkamol Thakulsukanant, Vorapoj Patanavijit	588
1018	<b>Energy- Constrained Design of Collision- Aware Distributed Detection with Sensors Performing Truncated SPRTs</b> Seksan Laitrakun	592
1036	<b>Hour- Ahead Power Load Demand Time Series Forecasting Using Four Methods in Three Cases</b> Hui Qiao, Kusumal Chalermyanont, Rakkrit Duangsoithong	596
1064	<b>Convergence performance evaluation of MSF-based LMS adaptive algorithm</b> Ravi Vanamadi, Asutosh Kar, Srikanth Burra, Ankita Anandy, Banshidhar Majhi	600
1066	<b>Applying Angular Dynamic Time Warping in Thai Boxing Training Framework</b> Benjarat Chantaprasert, Phadermpong Chumchuena, Somkiat Wangsiripitak	604
1078	<b>Adaptive Channel Equalization using Variable Step-size Least Mean Fourth Algorithm</b> Asutosh Kar, Shilpi Varshney, Shreya Tyagi, Ankita Anand, Banshidhar Majhi	608
1084	<b>Wideband Direction- of- Arrival Estimation with Cross- Sample Matching Technique on L- Shaped Microphone Arrays</b> Bandhit Suksiri, Masahiro Fukumoto	613
1152	<b>Sufficient Simple in- Camera Imaging Processing Pipeline for RAW-Images and sRGB Images</b> Chanchai Techawatcharapaikul, Pradit Mittrapiyanurak, Werapon Chiracharit	617
1162	<b>Pipeline Direction Extraction Algorithm Using Level Set Method</b> A. Leangaramkul, T. Kasetkasemy, Y. Tipsuwanz, T. Isshikix, T. Chanwimaluang, P. Hoonsuwan	621

## Signal Processing (Continued)

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1180	<b>An Elevation Mapping Algorithm Based on a Markov Random Field Model for Underwater Exploration</b> N. Prasatthong, T. Kasetkasemy, Y. Tipsuwanz, T. Isshikix, T. Chanwimaluang, P. Hoonsuwan	625
1183	<b>Speaker Identification using Power Spectral Subtraction Method</b> Win Zaw, Aung Thi Ha Soe	629
1185	<b>The study of EMG channel reduction for hand grasping classification</b> Nantarika Thiamchoo, Pornchai Phukpattaranont	633
1194	<b>VALIDATION OF ACOUSTIC EMISSION RAILWAY TRACK CRACK ANALYSIS USING MFCC</b> Narate Vongserewattana, Wara Suwansin, Pattarapong Phasukkit, Punnavich Phatsornsiri	637
1195	<b>Development of Gaussian filter for Preserving Edge by Edge Template</b> Nattapong Jundang, Surachai Ongkittikul, Kanoksom Chutisowan, Jirawut Suwatcharakulthorn	641
1199	<b>Using Doppler Radar Classify Respiration by MFCC</b> Chayanan Tantasirin, Ratchapon khaemphukhiao, Pattarapong Phasukkit	645
1213	<b>High- Density Salt and Pepper Noise Filter using Anisotropic Diffusion</b> Peerumporn Jiranantanagorn	649
1227	<b>Hand Hygiene Auditing Algorithm using Image Processing for Hand Hygiene Evaluation Machine</b> Kanabadee Srisomboon, Kumthorn Malathum, Sumawadee Skuntaniyom, Jatepiya Duangthongkham, Nattapong Phanthuna	654
1262	<b>on the Use of Class Activation Map for Land Cover Mapping</b> Pongporamat Charuchinda, Teerasit Kasetkasem, Itsuo Kumazawa, Thitiporn Chanwimaluang	658

## Special Session: 5G Technology and Applications

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1057	<b>Link Energy Minimization in Magnetic Induction based Non-Conventional WSNs</b> A Laxmi Prasanna, Vinay Kumar, Sadanand Yadav, Sanjay Dhok, Pankaj Dhule, Vitawat Sittakul, L Wuttisittikulki	662
1067	<b>Application of Deep Learning to Energy- Efficient Power Allocation Scheme for 5G SC-NOMA System with Imperfect SIC</b> Worawit Saetan, Sakchai Thipchaksurat	666
1086	<b>Antenna gain self- calibration for Double Ridged Guide Horn Antenna using bi-directional optical fiber link transceiver</b> Sayaka Matsukawa, Satoru Kurokawa	670
1132	<b>Development of Optical Receiver Device with Frequency Response Model for Radio- over- Fiber Link</b> Sirivat Hongthong, Vitawat Sittakul	674
1135	<b>Wireless Sensor Network for Wildfire Detection and Notification via Walkie - Talkie Network</b> Vitawat Sittakul, Sarinya Pasakawee, Chana Jan-im	678
1170	<b>Performance Analysis of the Traffic Aware Scheduling Algorithm with Local Information</b> S. K. Wijayasekara, P. Sasithong, T. Sriprasert, L. Wuttisittikulki, V. Sittakul, H.-Y. Hsieh	682
1254	<b>Deformation Monitoring Using D-InSAR Technique In Coalfield OF Korba Chhattisgarh, India</b> H. Govil, Monika Besoya, P. Diwan, Mahesh Kumar Tripathi, Subhanil Guha	686
1263	<b>Uplink Wireless Powered Communications of Rate-adaptive IoT Nodes with Intermittent Energy Source</b> Kampol Woradit, Gan Srirutchataboon	690

		Track 10
<b>Special Session: 5G Technology and Applications (Continued)</b>		
Paper ID	Title/Author	Page
1277	<b>Joint Timing Offset and Delay Spread Estimation for OFDM Symbol Synchronization over Multipath Fading Channels</b> Pruk Sasithong, Lunchakorn Wuttisittikulij, Pisit Vanichchanunt	694

		Track 11
<b>Special Session: Algorithms, Protocols and Applications in Wireless Networks and IoT</b>		
Paper ID	Title/Author	Page
1187	<b>An Enhanced Time- based Wireless Indoor Localization Using Synchronized Time-Difference-of-Arrival (TDoA) Technique</b> Yuzana Hlaing, Nyein Aye Maung Maung	698
1206	<b>Evil-Twin Detection on Client-side</b> Songrit Kitisiworapan, Aphirak Jansang, Anan Phonphoem	702
1222	<b>The Effects of Duty Cycle Limit to Small Single Gateway LoRaWAN Protocol Network</b> Apiwat Witayarat, Aphirak Jansang, Anan Phonpheum	706

## Special Session: Analog Integrated Circuit Design and Its Application

Paper ID	Title/Author	Page
1017	<b>Voltage/ Current-Mode Universal Filter Using Single FDCCII</b> Wirote Jongchanachavawat, Montree Kumngern, Somkiat Lerkvaranyu	710
1037	<b>Square/ Triangular Wave Generator Using Single Bulk-Driven FDCCII</b> Usa Torteanchai, Somsak Manman, Montree Kumngern, Somkiat Lerkvaranyu	714
1045	<b>Lossless/ lossy Inductance Simulators Employing Single VDGA and Grounded Element</b> Jirawat Hirunporm, Montree Siripruchyanun	719
1130	<b>Redesign Procedure for Two-Stage CMOS Op amp with Least Error of Frequency Response and Phase Margin</b> Chaiyan Chanapromma, Jirayuth Mahattanakul	723
1136	<b>Estimation of HD3 and IM3 distortion for Fully-Differential Gm-C filter</b> Terdpun Choogorn	727
1203	<b>A 1.5 V, 50 nA, 100 Hz, 73 dB- DR, Subthreshold Lowpass Filter for EEG/ECG Recording</b> Suriya Adirek, Chaiyan Chanapromma, Chuthum Sawigun	731
1268	<b>Simple Structure OTA-C Elliptic Band-pass Filter</b> Pipat Prommee, Natapong Wongprommoon, Fabian Khateb, Narongsak Manositthichai	735



**Special Session: Antennas and Microwave Technologies  
for Modern Wireless Communications**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1009	<b>Dual Feed Vertical Polarization Circular Array Antenna for WLAN and 5G (Sub-6 Ghz) Small-Cell Base Station Applications</b> Wen-Hsiu Hsu, Wei-Yan Chen, Chia-Lun Tang	739
1010	<b>A Multiband Slot Antenna with the Fractal Narrow Slit fed by Capacitive Coupling</b> Chatree Mahatthanajatuphat, Norakamon Wongsin, Thanakarn Suangun, Prayoot Akkaraekthalin	742
1048	<b>Low- Profile, MIMO Antenna Based on Substrate Integrated Waveguide for WLAN Applications</b> Pinit Nuangpirom, Kanokwan Ruangsiri, Somsak Akatimagool	746
1145	<b>Microstrip Slot antenna with a 9-shape Conductor Strip for UWB standard</b> Tuanjai Archevapanich, Pongsathorn chomtung, Prayoot Akkaraekthalin	750
1156	<b>Antipodal Vivaldi Antenna with Non- uniform Corrugation for Breast Cancer Detection</b> Shalermchon Tangwachirapan, Wanwisa Thaiwirot, Prayoot Akkaraekthalin	754
1238	<b>Electrically Small Huygens Source Antennas Based on Complementary Spiral Resonator</b> Vasan Jantarachote, Suramate Chalermwisutkul, Wipat Chansumran, Warakorn Longcharoen	758
1298	<b>A Miniaturized Planar Sensor Using Minkowski Fractal Technique for Material Characterization</b> Nonchanutt Chudpooti, Nattapong Duangrit, Prayoot Akkaraekthalin	762
1299	<b>The experiment of the simple high-frequency sensor to detect the degree of Bix in sucrose solutions</b> Nutdechatorn Puangngernmak, Thanarak Srisurat	766

### Special Session: Automation System

Paper ID	Title/Author	Page
1044	<b>A Consideration on Image Composition of Defects and Background in Appearance Inspection of Plastic Products Based on Machine Learning</b> Ayana Nakajima, Kazuki Nishiya, Kazuhiro Motegi, Yuta Tanaka, Yoichi Shiraishi	769
1052	<b>Thermal Behavior of FDM 3D Printing by Using Arduino Mega 2560 Approach</b> Kasem Promarin, Preecha Somwang	773
1053	<b>Effects of Chilies Dryer by using Heat Energy from Solar</b> Den Kogphimai, Thewin Sakunbunyong, Kritsada Tasuntia	777
1108	<b>Demonstration of Production System and Automation Controller for Industrial 4.0 using PLC</b> Waraporn Luejai, Warunee Srisongkham, Pattharaporn Kanthiya	780
1142	<b>Design of Automatic Control System within the Greenhouse to Maintain the Weather to be Appropriate for the Growth of the Milky Mushroom</b> Nattapong Phanthuna, Surasit Prakobkit, Panisra phrmmmanok, Akaradage Khongkaphan, Sarun Nopkuntod	784
1223	<b>Image Processing for Quality Control in Manufacturing Process</b> Preecha Somwang, Ekbodee Muangklang	788

**Special Session: Big Data Analytics & Digital Image Processing and Its Applications**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1082	<b>A System of Semantic Segmentation on An Autonomous Vehicle</b> Rachmadio Noval Lazuardi, Daffa Sudrajat, Nafitri Aulia, Trio Adiono	792
1114	<b>Effective Horizon Detection on Complex Seas using Back Propagation Neural Network</b> Pisanu Kumeechai, Somchat Jiriwibhakorn	796
1127	<b>Classification of Dementia MRI Images using Blended Biogeography Based Optimization</b> Bharanidharan N, Harikumar Rajaguru	800
1138	<b>Application of Deep Learning in Classification of Rose Apples Species and Their Qualities</b> Nitikarn Nimsuk, Panithan Pruttikul, Natchaya Suttikitibuth	804
1144	<b>Adapting a Stereo Camera System to Determine Coconut Ages</b> Noppon Lertchuwongsa, Nipon Parinyavuttichai	808
1282	<b>Recurrent Neural Networks for Environmental Sound Recognition using Scikit-learn and Tensorflow</b> Chinnavat Jatturas, Sornsawan Chokkoedsakul, Pisitpong Devahasting Na Ayudhya, Sukit Pankaew, Cherdkul Sopavanit, Widhyakorn Asdornwised	812

**Special Session: Data and Information Science**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1085	<b>Plant Disease through Leaf Images Classification with Texture Analysis and Multi-Class SVM</b> Pichate Kunakornvong, Aufa Aulia Fadila Yusuf	P IC
1106	<b>Empirical Analysis using Feature Selection and Bootstrap Data for Small Sample Size Problems</b> Yuying Zhao, Rakkrit Duangsoithong	820
1155	<b>Revealing Frequent Itemsets by Local Power set Transaction Scanning</b> Pitaya Poompuang, Anucha Tungkasthan	824
1163	<b>Rice Cultivation Planning Using a Deep Learning Neural network</b> Thotsawut Mhudchuay, Teerasit Kasetkasem, Witsanu Attavanich, Itsuo Kumazawa, Thitiporn Chanwimaluang	828
1179	<b>Comparison of Classification Algorithms for Movie Reviews</b> Korakot Matarat, Ariya Namvong, Chayada Surawanitkun	832
1281	<b>BER Performance Improvement using Soft-Information Flipping Method in BPMR Systems</b> Wiparat Busyatras, Chanon Warisarn	836

**Special Session: Data science and data storage  
technologies for new perspective in Internet of Things  
(IoT)**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1043	<b>A Patient Monitoring System for Multiple IoT Rehabilitation Devices</b> Dujdow Buranapanichkit, Nattha Jindapetch, Kittikhun Thongpull, Krerckchai Thongnoo, Kanadit Chetpattananondh, Rakkrit Duangsoithong, Kiattisak Sengchuai	840
1083	<b>Detection of Sleep-Disordered Breathing and Sleep Efficiency with Wireless Pillow-Sheet Sensor Network</b> Shongpun Lokavee, Visasiri Tantrakul, Worakot Suwansathit, Janejira Pengjiam, Teerakiat Kercharoen	844
1131	<b>IoT in Pre-Analytical Phase of Breast Cancer Specimens Handling in Thailand Hospitals</b> Krisada Prachumrasee, Nuttachai Juthong, Bongkarn Waisopha, Wichit Suthiporn, Jaruwat Manerutanaporn, Supinda Koonmee	848
1165	<b>Personalized Recommender System Using Social Network Based Collaborative Filtering Technique</b> Tanapattara Wongkhamchan, Ariya Bamvong, Chayada Surawanitkun	852

**Special Session: ECTI-SICE Organized Session on Latest Trend on Systems and Control**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1095	<b>Disturbance observers for constant disturbances</b> Jessada Juntawongso, Chuan Feng Zang, Kotaro Hashikura, Takaaki Suzuki, Kou Yamada	856
1197	<b>Economic Performance Optimization by Set Point and Weighting Parameter Tuning based on LQG Controller Design</b> Sayuri Okayama, Shiro Masuda	860
1230	<b>Iterative PID Regulatory Control Design using Gradient Estimate of LQG evaluation</b> Ji Qiang, Shiro Masuda	864
1231	<b>Data-driven I-PD Gain Tuning Using Closed-loop Step Response Data</b> Sota Takahashi, Shiro Masuda	868
1232	<b>Simultaneous Design of Reference Model and Controller for VRFT using Closed-loop Step Response Data</b> Naoki Ota, Shiro Masuda, Yoshihiro Matsui	872
1250	<b>Development of automatic driving position information positioning system using TACAN technology</b> Takaaki Hagiwara, Hiroki Ishizaki, Naoki Nakazato	876
1297	<b>Application of Model Predictive Control to Traffic Network Systems based on Hierarchical Distributed Control Framework</b> Jeerapat Jitnuant, David Banjerdpongchai	879

**Special Session: Energy storage system management and control in smart grid**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1056	<b>Optimal Operation of Battery Energy Storage System for Mitigating Voltage Fluctuation in Microgrid Using Cuckoo Search Optimization</b> Keerachat Tantrapon, Peerapol Jirapong, Panida Thararak	883
1109	<b>Hierarchical Clustering of Electric Load: Case study in Lower South region of Thailand</b> Phattarawat Phetsangkat, Kusumal Chalermyanont, Rakkrit Duangsoithong	887
1269	<b>Observability Analysis of Instrument Missing in Industrial Zone Power System using Power System State Estimation</b> Sasiporn Pholpaisansak, Yuttana Kongjeen, Krischonme Bhumkittipich	891
1275	<b>Analysis of The 115/ 22 kV Transformer Fault Tripping using Fault Tree Analysis based on Python Platform</b> Radomboon Taksana, Krischonme Bhumkittipich	895

**Special Session: Land Transportation System**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1147	<b>Selecting an Access Point for Indoor Localization System Using Frequency Analysis</b> Piyapan Suwannawach, Sorawat Chivapreecha	899
1149	<b>Circularly Polarized Rectangular Patch Antenna with Thin Slot for GPS Applications</b> Kanawat Nuangwongsa	903
1150	<b>Resource Comparative of Map Matching Algorithm</b> KrerK Puangnak, Thanunchai Threepak	907
1166	<b>An intelligent system for identifying feasible routes for truck routing problem: an application to a Thai Adhesive and Sealant Company (ATASC)</b> Pathawee Phonwiphath, Warut Pannakkong, Pisal Yenradee, Kittipong Ekkachai, Atsushi Takahashi	911
1204	<b>Comparative Study of Threshold Selection for Incident Detection based on California Algorithm</b> Korn Puangnak, Sorawat Chivapreecha	917
1210	<b>Evaluation of MQTT and CoAP for Vehicle Traffic Monitoring</b> Korn Puangnak, Wiput Puisamlee, KerK Puangnak, Natworapol Rachsirivatcharabul	921
1211	<b>Real- time Distance Measuring Evaluation for Accelerometer Sensor on Smartphone</b> Korn Puangnak, Sitisak Waladit, KerK Puangnak, Salakchit Pukjaroon	925
1214	<b>A Review Study of Incident Detection Algorithms with Performance Index Parameter</b> Korn Puangnak, Sorawat Chivapreecha	929



**Special Session: Recent advances in signal and image processing**

<b>Paper ID</b>	<b>Title/Author</b>	<b>Page</b>
1077	<b>Investigation of Image Edge Detection Techniques Based Flood Monitoring in Real-time</b> Qianyu Zhang, Nattha Jindapetch, Dujdow Buranapanichkit	933
1178	<b>Doppler Radar for Dynamic Hand Gesture Recognition based on Signal Image Processing</b> Kongphum Arthamanolap, Somprasong Gabbualoy, Pattarapong Phasukkit	937
1196	<b>A Precipitation Retrieval Algorithm for the Himawari Advanced Himawari Imager</b> Chinnawat Surussavadee	941
1233	<b>Quadcopter Movement Control Using Image Processing Techniques</b> Eakdanai Kavichai, Ruisen Huang, Seong-Woo Woo	945
1257	<b>A Study of Neuro-fuzzy behavior on variance training data in image enhancement</b> Jaturon Ngermplubpla, Orachat Chitsobhuk	949
1284	<b>Obscured 3D Point-of-Gaze Estimation by Multipoint Cloud Data</b> Wudthipong Pichitwong, Kosin Chamnongthai	953