

# **2021 Moratuwa Engineering Research Conference (MERCOn 2021)**

**Moratuwa, Sri Lanka  
27 – 29 July 2021**



**IEEE Catalog Number: CFP21B72-POD  
ISBN: 978-1-6654-3754-7**

**Copyright © 2021 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:	CFP21B72-POD
ISBN (Print-On-Demand):	978-1-6654-3754-7
ISBN (Online):	978-1-6654-3753-0

**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

# TABLE OF CONTENTS

<p>FEASIBILITY STUDY ON, ENABLERS AND BARRIERS FOR THE IMPLEMENTATION OF LEAN CONSTRUCTION AND THE APPLICABILITY OF VISUAL MANAGEMENT PRACTICES THROUGH FORMS OF DIGITAL COMMUNICATION IN THE SRI LANKAN INDUSTRY .....</p> <p style="padding-left: 40px;"><i>D. T Kariyawasam, C. S. A Siriwardana</i></p> <p>APPLICATION OF NANOTECHNOLOGY AND NANOMATERIALS IN THE CONSTRUCTION INDUSTRY: THE CASE OF SRI LANKA .....</p> <p style="padding-left: 40px;"><i>M. I. M. Safshath, K. G. A. S. Waidyasekara, G. A. Tennakoon</i></p> <p>A STUDY TO INVESTIGATE THE FACTORS AFFECTING CONSTRUCTION WORKER PERFORMANCE .....</p> <p style="padding-left: 40px;"><i>T. Anojan, C. S. A Siriwardana</i></p> <p>STUDY ON EFFECTIVENESS OF CAPILLARY BARRIER IN REDUCTION OF RAINFALL INFILTRATION ON A 15° SLOPE .....</p> <p style="padding-left: 40px;"><i>E. Havisanth, S. A. S. Kulathilaka</i></p> <p>PREDICTION OF COMPACTION CHARACTERISTICS OF COAL BOTTOM ASH .....</p> <p style="padding-left: 40px;"><i>S. Suloshini, A. S. Ranathunga, S. A. S. Kulathilaka, W. B. Gunawardana</i></p> <p>MODELING AND SIMULATION OF MICRO SIZE ULTRASONIC CHARACTERISTICS OF LEAD ZIRCONATE TITANATE AND POLYVINYLIDENE FLUORIDE .....</p> <p style="padding-left: 40px;"><i>Parthipan Rajendraseelan, Thasankithan Vijayasingam, Upali Adikary</i></p> <p>INDIVIDUALIZATION OF NANOFIBRILLATED CELLULOSE FROM SRI LANKAN RICE STRAW: STRUCTURAL CHARACTERISTICS AND THERMAL PROPERTIES.....</p> <p style="padding-left: 40px;"><i>A. Ratnakumar, A. M. P. B. Samarasekara, D. A. S. Amarasinghe, L. Karunanayake</i></p> <p>INVESTIGATION OF MECHANICAL PROPERTIES OF RICE STRAW ASH-FILLED NATURAL RUBBER COMPOUNDS .....</p> <p style="padding-left: 40px;"><i>A. N. A. Fernando, W. G. A. Pabasara, K. Y. Gayashini, D. N. Liyanage</i></p> <p>NUMERICAL MODELING OF DRYING BEHAVIOR OF SRI LANKAN KAOLIN .....</p> <p style="padding-left: 40px;"><i>J. M. N. Jayaweera, M. Narayana, S. U. Adikary</i></p> <p>PROCESS OPTIMIZATION OF MICROFIBRILLATED CELLULOSE EXTRACTION FROM COTTON WASTE USING RESPONSE SURFACE METHODOLOGY .....</p> <p style="padding-left: 40px;"><i>J. M. R. Jayasinghe, A. Ratnakumar, A. M. P. B. Samarasekara, D. A. S. Amarasinghe</i></p> <p>LINEAR AND NON LINEAR CREEP MODELING OF TALC FILLED PEEK COMPOSITE.....</p> <p style="padding-left: 40px;"><i>G. I. Janith, D. A. S. Amarasinghe, D. Attygalle, V. S. C Weragoda, A. M. P. B. Samarasekara</i></p> <p>LAGRANGE MULTIPLIER BASED SOLUTION FOR OPTIMIZING DG SIZES IN DISTRIBUTION NETWORKS .....</p> <p style="padding-left: 40px;"><i>K. B. J. Anuradha, U. Jayatunga</i></p> <p>VOLTAGE CONTROL OF THREE PHASE DISTRIBUTION SYSTEMS WITH MINIMUM COST.....</p> <p style="padding-left: 40px;"><i>D. I. Manamperi, Lasanthika H. Dissawa, Lidula N. W. Arachchige, Prabath Binduhewa, Janaka B. Ekanayake</i></p>	<p>1</p> <p>7</p> <p>13</p> <p>19</p> <p>25</p> <p>31</p> <p>37</p> <p>43</p> <p>48</p> <p>54</p> <p>60</p> <p>65</p> <p>71</p>
---	---

MODELING AND SIZING OF HYBRID ENERGY STORAGE SYSTEM FOR VIRTUAL SYNCHRONOUS GENERATOR.....	77
<i>Surindi Vidusika Wijetunge, Sajana Gunasekera, Jeewantha Gamage, Chandima Dedduwa Pathirana, Sheron Bolonne</i>	
A MIXED INTEGER NONLINEAR PROGRAMMING MODEL AND HEURISTIC SOLUTIONS FOR AN AUTOMATED DEMAND RESPONSE SYSTEM FOR LARGE FACILITIES.....	83
<i>Asanka S. Rodrigo, Ama Mandasmitha Ranawaka, Mewan Abeywickrama, Devin Akila Malawara Arachchi</i>	
PERFORMANCE ANALYSIS OF MODIFIED ELLIOT FUNCTION BASED TEMPERATURE CONTROLLER IN THE HEATING MODE OPERATION OF AHU .....	89
<i>Sandali Walgama, Sisil Kumarawadu, Chandima Dedduwa Pathirana</i>	
IMPACT OF ERP IMPLEMENTATION ON EMPLOYEE PERFORMANCE IN HOSPITALITY SECTOR: ROLE OF MANAGEMENT CAPABILITIES.....	95
<i>Dinesh Samarasinghe, Methsiri Suwandaarachchi, Sachen Dharshana Illangasinghe</i>	
THE READINESS OF TEACHERS IN ADOPTING FLIPPED CLASSROOMS AND OPEN EDUCATIONAL RESOURCES IN UNDERGRADUATE BLENDED LEARNING .....	101
<i>Sanjeevanie H. D. Senanayake, T. C. Sandanayake</i>	
A CONCEPTUAL FRAMEWORK FOR THE IDENTIFICATION OF BARRIERS IN AUTOMOTIVE REMANUFACTURING INDUSTRY IN SRI LANKA .....	107
<i>N. M. Kahingala, J. R. Gamage, H. K. G. Punchihewa</i>	
BARRIERS TO USE OF ARTIFICIAL INTELLIGENCE ON ENERGY CONSERVATION IN GOVERNMENT BUILDINGS: AWARENESS AS A MODERATING FUNCTION OF TECHNOLOGY ACCEPTANCE.....	113
<i>W. Jayaratne, S. W. S. B. Dasanayaka, D. Mudalige</i>	
AN MILP-BASED INTRA-FIRM SMART RESOURCE SHARING MODEL.....	119
<i>Indra Mahakalanda, R D S Arunapriya</i>	
SIZE EFFECT AND FIBRE ARRANGEMENT ON MESO-MECHANICAL MODELLING OF WOVEN FIBRE COMPOSITES .....	124
<i>Milindu Jayasekara, Sumudu Herath, Nishangani Gowrikanthan, Chinthaka Mallikarachchi</i>	
CHARACTERISING THE SELF-OPENING BEHAVIOUR OF SINGLE CREASED KAPTAN POLYIMIDE FILMS .....	130
<i>Sutharsanan Navaratnarajah, Chermila Piyumi, Chinthaka Mallikarachchi</i>	
A POWER-FLOW BASED INVESTIGATION INTO THE RESPONSE OF BUILDINGS TO GROUND-BORNE VIBRATION FROM UNDERGROUND RAILWAYS .....	136
<i>Tisal L. Edirisinghe, James P. Talbot</i>	
FIRE PERFORMANCE OF CFRP/CONCRETE COMPOSITES INSULATED WITH RECYCLED EPS-CEMENT BLEND .....	142
<i>A. Selvaratnam, K. A. D. Y. T. Kahandawa Arachchi, J. C. P. H. Gamage</i>	
DEVELOPMENT OF DESIGN GUIDANCE FOR CIRCULAR REINFORCED CONCRETE COLUMNS INCORPORATING CRACK WIDTH .....	148
<i>G. C. S. Jayaweera, H. D. Hidallana-Gamage, W. P. R. Indrajith</i>	

BAMBOO CANE AS AN ALTERNATIVE REINFORCEMENT IN REINFORCED CONCRETE BEAM .....	154
<i>K Yathushan, S Kishok, Bryan E. Thevarajah, M Nithurshan</i>	
PREPARATION AND CHARACTERIZATION OF DENDRO BIOCHAR-HYDROXYAPATITE COMPOSITE: A POTENTIAL MATERIAL FOR DEFLUORIDATION.....	160
<i>Anushka Rathnayake, Oshadi Hettithanthri, Anushka Upamali Rajapaksha, Meththika Vithanage</i>	
MICROFIBRILLATED CELLULOSE FABRICATION AND CHARACTERIZATION FROM SRI LANKAN RICE STRAW: A COMPARISON BETWEEN TRADITIONAL AND HYBRID VARIETY .....	164
<i>A. Ratnakumar, A. M. P. B. Samarasekara, D. A. S. Amarasinghe, L. Karunanayake</i>	
EFFECT OF HALIDE ION IN THE PEROVSKITE ON PEROVSKITE SOLAR CELL PERFORMANCES .....	169
<i>Sarith Sankalpa Ranasinghe, Yehan Laknath Kuruppu, Galhenage A. Sewvandi</i>	
INVESTIGATION OF THE MICROSTRUCTURAL GROWTH OF SULFIDE STRESS CORROSION AT SIMULATED ENVIRONMENTS .....	173
<i>Akesh Deemantha, GIP De Silva</i>	
PREPARATION OF POROUS GRAPHENE WITH ULTRA-HIGH SURFACE AREA FROM SRI-LANKAN GRAPHITE.....	178
<i>Ayesha Sandaruwani, Hansinee Sitinamaluwa</i>	
OPTIMIZATION OF SYNTHESIS OF NANOCRYSTALLINE CELLULOSE EXTRACTED FROM RICE STRAW.....	184
<i>K. M. Weerakkody, K. P. T. Wathsala, V. S. C. Weragoda</i>	
IGRASP HAND: A BIOMIMETIC TRANSRADIAL ROBOTIC HAND PROSTHESIS WITH A CLUTCHING MECHANISM.....	190
<i>N. P. Dasanayake, P. K. P. Viduranga, U. L. S. Perera, S. A. P. K. Siyambalagoda, T. M. G. C. S. P. Cooray, K. R. T. Fernando, R. K. P. S. Ranaweera, R. A. R. C. Gopura</i>	
DESIGN OF A NOVEL 3D-PRINTED SOFT ACTUATOR FOR CLENCHED FIST REHABILITATION.....	196
<i>M. G. I. Sandunika, P. N. Nanayakkara, M. V. C. J. Perera, K. D. S. Ranjana, Kanishka Madusanka, Asitha L. Kulasekera, Damith S. Chathuranga</i>	
DESIGN OF AN ALTERNATING PRESSURE OVERLAY FOR THE TREATMENT OF PRESSURE ULCERS .....	202
<i>Malindu Ehelagastenna, Ishan Sumanasekara, Hishan Wickramasinghe, Indrajith D. Nissanka, Gayani K. Nandasiri</i>	
DEVELOPING A COCONUT DE-SHELLING MECHANISM FOR IMPROVED SAFETY AND PRODUCTIVITY IN VIRGIN COCONUT OIL PRODUCTION .....	208
<i>O. G. S. Pandipperuma, R. P. D. Niranjana, H. K. N. U. Kumarasiri, J. R. Gamage, K. H. J. Mangala</i>	
A COMPARATIVE ANALYSIS OF THE ENVIRONMENTAL AND STRUCTURAL PERFORMANCE OF PET BOTTLE DESIGNS IN SRI LANKA .....	214
<i>S. U. M. Jagoda, J. R. Gamage, Hirushie Karunathilake</i>	

A SINGLE-STROKE 360°-ARC LENGTH PEELING MECHANISM FOR CINNAMON PROCESSING.....	220
<i>Dimuthu Gunawardhana, Vishwa Primal, Malindu Nayanthra, J. R. Gamage, H. K. G. Punchihewa</i>	
EFFECT OF INFLUENT VOLUMETRIC LOADING OF SKIM LATEX WASTEWATER ON ANAEROBIC SULFATE REDUCTION .....	226
<i>Imesha R. Samarathunga, P. G. Rathnasiri</i>	
TRACE METALS IN THE ATMOSPHERIC DEPOSITION AND GASEOUS EMISSIONS AROUND KARADIYANA MUNICIPAL SOLID WASTE DUMPSITE, SRI LANKA.....	231
<i>Savini De Silva, Prabuddhi Wijekoon, Meththika Vithanage</i>	
OPTIMUM UTILIZATION OF DAYLIGHTING IN OFFICE BUILDINGS .....	235
<i>V. H. M. S. Babalagama, S. M. Pathirana</i>	
STUDY OF MOISTURE TRANSPORT IN RICE COOKING.....	240
<i>H. P. A. Jayamini, J. A. Weliwita, M. Narayana, S. Witharana, N. K. Hettiarachchi</i>	
SIMULATION-BASED APPROACH IN SELECTING A WAVE ENERGY CONVERTER FOR SRI LANKAN WAVE CONDITIONS.....	245
<i>K. G. I. Anjana, D. M. T. Deshan, D. S. Haputhanthrie, I. D. Nissanka</i>	
GLOBAL WARMING POTENTIAL OF ENGLISH BRICK MANUFACTURING IN SRI LANKA: A CRADLE TO GATE ANALYSIS.....	251
<i>Indisa Herath, Shiromi Karunaratne, Dilshi Dharmarathna</i>	
TREE-BASED REGRESSION MODELS FOR PREDICTING EXTERNAL WIND PRESSURE OF A BUILDING WITH AN UNCONVENTIONAL CONFIGURATION .....	257
<i>D. P. P. Meddage, Imesh Udara Ekanayake, A. U. Weerasuriya, C. S. Lewangamage</i>	
ENHANCING STRENGTH OF CONCRETE THROUGH MINIMIZED POROSITY .....	263
<i>VS Hewawasam, DDTK Kulathunga</i>	
USING SUB-GIGA HERTZ TECHNOLOGY IN HIGH SAMPLING RATE WIRELESS MONITORING SYSTEMS USED IN HIGH-RISE BUILDINGS.....	269
<i>P. Vishnu, K. Kirishikesan, C. S. Lewangamage, M. T. R. Jayasinghe</i>	
INFLUENCE OF BLENDED FINE AGGREGATES ON THE PERFORMANCE OF LIME - CEMENT MORTAR — A STATISTICAL APPROACH .....	275
<i>Branavan Arulmoly, Chaminda Konthesingha, Anura Nanayakkara</i>	
ENHANCING THE THERMAL PERFORMANCE OF EPOXY ADHESIVE USED IN THE CFRP/CONCRETE BOND.....	281
<i>Chamodi Widanage, J. C. P. H. Gamage, V. Attanayake</i>	
INVESTIGATE THE APPLICABILITY OF DIFFERENT STRUCTURAL CONFIGURATIONS FOR BRIDGE/ VIA DUCT PIER IN LOCAL EXPRESSWAY .....	286
<i>Ganaatheban Mohanakkumaran, H. D. Hidallana-Gamage, Rasika Indrajith</i>	
DEVELOPMENT OF CONTROLLER FOR DISTURBANCES REJECTION OF TORREFACTION REACTOR WITH HIGH THERMAL INERTIA.....	292
<i>Janaka Bandara, Mahinsasa Narayana</i>	

SUSTAINABLE CULTIVATION OF HAEMATOCOCCUS PLUVIALIS FOR THE PRODUCTION OF NATURAL ASTAXANTHIN.....	297
<i>Sanuji Hasara Nishshanka, Vinoj Chamilka Liyanaarachchi, Malith Premaratne, Thilini U. Ariyadasa, Viraj Nimarshana</i>	
CHARACTERISING THE DRYING BEHAVIOUR OF MICROWAVE ASSISTED DRYING OF COCONUT CHIPS .....	303
<i>M. F. H. Muhammed Aadhil, A. D. U. Shantha Amarasinghe, M. Narayana</i>	
DEVELOPMENT OF A COMPETITIVE THERMOPLASTIC VULCANIZATE ROOFING SHEET FROM NATURAL RUBBER AND HIGH-DENSITY POLYETHYLENE.....	309
<i>Wathsala H. Wickramaarachchi, Shantha Walpalage, Shantha M. Egodage</i>	
OPTIMIZATION OF HEMICELLULOSE RECOVERY FROM RICE STRAW FOR BIOREFINERY: DILUTE ACID PRETREATMENT AT REDUCED TEMPERATURES .....	315
<i>Poornima Wanninayake, Mahinsasa Rathnayake, Dilantha Thushara, Sanja Gunawardena</i>	
COMPARATIVE STUDY ON CURE, MECHANICAL AND DYNAMIC-MECHANICAL PROPERTIES OF NATURAL RUBBER COMPOUNDS FORMULATED WITH DIXP, TBZTD, ZBEC AND TBBS ACCELERATORS .....	321
<i>Hasara Samarasinghe, Shantha Walpalage, Dilhara Edirisinghe, Shantha Egodage</i>	
INVESTIGATION OF THE EFFECT OF SOLAR IRRADIATION AND TEMPERATURE ON H. PLUVIALIS PRODUCTION IN PHOTOBIOREACTORS UNDER OUTDOOR CULTIVATION IN SRI LANKA.....	327
<i>Manthila Perera, Kasun Muthunayaka, Dilan Madushanka, Vinoj C Liyanaarachchi, Malith Premaratne, Thilini U. Ariyadasa</i>	
A REVERSE VENDING MACHINE FOR SORTING YOGHURT CUPS AND PET BOTTLES .....	333
<i>S. C. Athukorala, H. M. A. L. Hennayaka, S. M. L. P. Rathnayake, M. Hariluxman, J. R. Gamage, R. A. R. C. Gopura</i>	
EVALUATION OF RANS TURBULENCE MODELS FOR PREDICTION OF LATERAL FILM COOLING EFFECTIVENESS AT LOW BLOWING RATIOS .....	339
<i>Pasan Sanjeeva, Eshan Thilakarathna, Chanaka Mallikarachchi, Chathura Ranasinghe</i>	
PREVENT DATA EXFILTRATION ON SMART PHONES USING AUDIO DISTORTION AND MACHINE LEARNING .....	345
<i>Menaka Moonamaldeniya, V. R. S. C. Priyashantha, M. B. N. B. Gunathilake, Y. M. P. B. Ransinghe, A. L. S. D. Ratnayake, Pradeep K. W. Abeygunawardhana</i>	
GESTURE-BASED SPORTS TRAINING VIDEO RECORDING SYSTEM.....	351
<i>Lakshitha W. Amarasinghe, Ruwan D. Nawarathna</i>	
AN ANALYTICAL DESIGN & OPTIMIZATION APPROACH TO ENHANCE WAREHOUSE OPERATIONS .....	356
<i>Sadna Dissanayake, Thashika Rupasinghe</i>	
RECALIBRATING RETAIL STORE INVENTORY SERVICE LEVELS DURING CREDIT CARD PROMOTIONS .....	362
<i>Randula Jayasinghe, H. Niles Perera</i>	
DEVELOPING AN AIRLINE CHOICE MODEL FOR ECONOMY CLASS PASSENGERS IN SRI LANKA.....	368
<i>Pasindu Nayanashan, Anuja Fernando</i>	

ASSESSING THE OIL SUPPLY CHAIN RISK IN SRI LANKAN PETROLEUM INDUSTRY .....	374
<i>Madushan Fernando, Indika Sigera</i>	
IMPROVE THE LATERAL STABILITY OF VARIABLE HEIGHT STEEL TRUSS TYPE PEDESTRIAN BRIDGES IN SRI LANKA .....	380
<i>M. L. L. N. Liyanage, H. D. Hidallana-Gamage</i>	
COMPARATIVE STUDY ON PROTECTIVE MEASURES AGAINST SPALLING SLAB CONCRETE.....	386
<i>Lakshitha Senevirathne, K. Baskaran</i>	
STUDY ON USE OF BOTTOM ASH IN MANUFACTURING CEMENT BLOCKS.....	392
<i>Dilukshan Sritharan, K. Baskaran, J. R. U. C. Jayakody</i>	
COMPARATIVE STUDY OF DESIGN INPUTS OF OVERHEAD TRANSMISSION LINE TOWERS .....	397
<i>Aluthwaththa A G H A D, Baskaran K</i>	
MANUFACTURED SAND AS RIVER SAND REPLACEMENT FOR MASONRY BINDING MORTAR.....	403
<i>Kosalya Sundaralingam, Arvinthan Peiris, Navaratnarajah Sathiparan</i>	
EFFECTIVE STRESS COEFFICIENT THROUGH MFEM AND CONFINING PRESSURE DEPENDENCY OF BIBAI SANDSTONE.....	409
<i>Anjula Dassanayake, Yoshiaki Fujii, Amirthan Thirukumaran</i>	
RARE EARTH ELEMENT POTENTIAL IN THE BEACH PLACERS ALONG THE SOUTHWEST COAST OF SRI LANKA.....	415
<i>Nadeera Batapola, Nimila Dushyantha, Nalin Ratnayake, Ranjith Premasiri, B. Abeyasinghe, Oscar Dissanayake, Sudath Rohitha, Saman Ilankoon, Pannipitye Dharmaratne</i>	
UPGRADING LOW-GRADE GRAPHITE TAILING INTO HIGH-GRADE GRAPHITE USING AGGLOMERATION.....	421
<i>Mushmika Patikiri Arachchige, Sudath Rohitha, Kithsiri Dissanayake, Prabawa Lakshitha, Rajatha Kusumsiri</i>	
LABILITY AND BIOAVAILABILITY OF TOXIC HEAVY METALS IN RATNAPURA DISTRICT GEM SEDIMENTS, SRI LANKA.....	427
<i>Sandun Sandanayake, Saranga Diyabalanage, Hasintha Wijesekara, Meththika Vithanage</i>	
FINE-TUNING SELF-SUPERVISED MULTILINGUAL SEQUENCE-TO-SEQUENCE MODELS FOR EXTREMELY LOW-RESOURCE NMT.....	432
<i>Sarubi Thillainathan, Surangika Ranathunga, Sanath Jayasena</i>	
IMPROVING BACK-TRANSLATION WITH ITERATIVE FILTERING AND DATA SELECTION FOR SINHALA-ENGLISH NMT .....	438
<i>Koshiya Epaliyana, Surangika Ranathunga, Sanath Jayasena</i>	
SPATIAL ANALYSIS OF COVID-19 AND SOCIO-ECONOMIC FACTORS IN SRI LANKA.....	444
<i>Rumali Perera, Harshana Weligampola, Umar Marikkar, Suren Sritharan, Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Anuruddhika Rathnayake, Samath Dharmaratne</i>	
COLLUSION SET DETECTION WITHIN THE STOCK MARKET USING GRAPH CLUSTERING & ANOMALY DETECTION .....	450
<i>Ranika N. Madurawe, B. K. D Irosh Jayaweera, Thamindu D. Jayawickrama, Indika Perera, Rasika Withanawasam</i>	



END TO END MODEL FOR SPEAKER IDENTIFICATION WITH MINIMAL TRAINING DATA.....	456
<i>Sathiyakugan Balakrishnan, Kanthasamy Jathusan, Uthayasanker Thayasivam</i>	
MULTI-STEP BIDIRECTIONAL LSTM FOR LOW FREQUENT BUS TRAVEL TIME PREDICTION.....	462
<i>Sudeepa Nadeeshan, Amal Shehan Perera</i>	
DEVELOPMENT OF A CELL TRANSMISSION MODEL USING CROWDSOURCED DATA FOR EXPRESSWAYS .....	468
<i>W. M. R. V. Wijepala, G. L. D. I. De Silva</i>	
STUDY ON THE APPLICABILITY OF CAPACITY ESTIMATION METHODS TO EVALUATE MULTILANE HIGHWAY CAPACITY UNDER HETEROGENEOUS CONDITIONS.....	474
<i>U. L. M. A. Uswaththa, H. R. Pasindu, J. M. S. J. Bandara, D. N. D. Jayaratne</i>	
ASSESSMENT OF MEASURE OF EFFECTIVENESS OF TWO-LANE ROADS UNDER NON-HOMOGENEOUS TRAFFIC CONDITIONS.....	480
<i>Gayani Rajapaksha, Saman Bandara</i>	
ACTIVITY PARTICIPATION PATTERNS OF INDIVIDUALS IN SRI LANKA.....	487
<i>T. M. P. Malshan, G. L. D. I. De Silva</i>	
ESTIMATING PASSENGER DELAYS AT AIRPORT TERMINAL SERVICE CENTERS .....	493
<i>Shamain Saparamadu, Saman Bandara</i>	
USE OF GLASS FIBERS IN THIN LIFT STONE MASTIC ASPHALT (SMA) PRODUCTION FOR LOW VOLUME ROADS.....	498
<i>P. M. A. K. Udayakantha, W. R. A. N. Jayantha, W. K. Mampearachchi</i>	
WATER RESOURCES AVAILABILITY AND LOW FLOW DISCHARGE ANALYSIS OF TWO SELECTED RIVER BASINS IN THE DRY ZONE UNDER CHANGING CLIMATE CONDITIONS.....	504
<i>Buveenthiran Mahenthiran, Lalith Rajapakse</i>	
A STUDY ON SURFACE WATER - GROUNDWATER INTERACTION IN THE JAFFNA PENINSULA, SRI LANKA.....	510
<i>Cabila Subramaniam, Lalith Rajapakse</i>	
WATER RESOURCES AVAILABILITY AND LOW FLOW DISCHARGE ANALYSIS OF KELANI RIVER BASIN IN WET ZONE UNDER CHANGING CLIMATE CONDITIONS .....	516
<i>Chamika Punsara, Lalith Rajapakse</i>	
COMPARISON OF EXPERIMENTAL RESULTS WITH EMPIRICAL RELATIONSHIPS FOR ENERGY LOSSES IN PIPE FLOW .....	522
<i>Logeepan Yogaraja, Narmada Liyanagamage, Kasun De Silva</i>	
IMPACT OF DIGITAL ELEVATION MODEL ON RAINFALL-RUNOFF-INUNDATION MODELLING - A CASE STUDY OF LOWER KELANI RIVER BASIN.....	528
<i>Pavithra Sudeshika, Lalith Rajapakse</i>	
MOISTURE TRANSPORTATION IN POLYESTER FABRICS BY PLASMA PRINTED WICKING CHANNELS .....	534
<i>R N P Gunarathna, Thisara Sandanuwan, D A S Amarasinghe, Dinesh Attygalle, Sampath C Weragoda, Nayanathara Hendeniya</i>	

PERFORMANCE INVESTIGATION AND OPTIMIZATION OF PEROVSKITE/CIGS TANDEM SOLAR CELL BY USING SCAPS-1D MODELING AND SIMULATION.....	538
<i>Dinuka R Ratnasinghe, Nipuna L Adihetty, Muthuthanthrige L. C. Attygalle, Hasitha Mahabaduge</i>	
IMPACT OF DRYING TEMPERATURE ON MORPHOLOGY AND THE CRYSTALLINITY OF CH <sub>3</sub> NH <sub>3</sub> PBI <sub>3</sub> THIN FILMS .....	544
<i>M. A. H. Yasassri, Galhenage A. Sewvandi</i>	
OPTIMIZE TECHNICAL PROPERTIES WITH MASTER BATCH BLENDS IN RSS/SCRAP RUBBER TIRE RETREAD COMPOUNDS.....	549
<i>K. G. Alahapperuma</i>	
SYNTHESIS AND CHARACTERIZATION OF CHITOSAN/HYDROXYAPATITE NANOCOMPOSITE FOR BONE TISSUE ENGINEERING APPLICATIONS.....	555
<i>H. D. Rajapakse, S. U. Adikary</i>	
MODELING OF LASER ASSISTED THERMAL REDUCTION OF GRAPHENE OXIDE.....	561
<i>V. S. Rajapakshe, W. M. D. S. Warnakulasooriya, D. A. S. Amarasinghe, D. Attygalle</i>	
MONOLINGUAL SENTENCE SIMILARITY MEASUREMENT USING SIAMESE NEURAL NETWORKS FOR SINHALA AND TAMIL LANGUAGES .....	567
<i>Satkunanantham Nilaxan, Surangika Ranathunga</i>	
QUESTION CLASSIFICATION FOR THE TRAVEL DOMAIN USING DEEP CONTEXTUALIZED WORD EMBEDDING MODELS.....	573
<i>Charmy Weerakoon, Surangika Ranathunga</i>	
BILINGUAL LEXICAL INDUCTION FOR SINHALA-ENGLISH USING CROSS LINGUAL EMBEDDING SPACES .....	579
<i>Anushika Liyanage, Surangika Ranathunga, Sanath Jayasena</i>	
VISION-EMG FUSION METHOD FOR REAL-TIME GRASPING PATTERN CLASSIFICATION SYSTEM.....	585
<i>Dulanjana M. Perera, D. G. K. Madusanka</i>	
TRANSPORTATION ISSUES IN JAFFNA: AN INVESTIGATION.....	591
<i>R. M. D. Rathnayake, K. Mathulan, A. Anburuvel</i>	
METHODS TO ESTIMATE BUS REVENUE FROM PASSENGER BOARDING AND ALIGHTING DATA: CASE STUDY FOR SRI LANKA.....	597
<i>Sabeen Sharic, Saman Bandara, Shehan Fernando</i>	
SHORT-TERM TRAFFIC FORECASTING USING LSTM-BASED DEEP LEARNING MODELS .....	602
<i>Dilantha Haputhanthri, Adeesha Wijayasiri</i>	
MODELING SURFACE CONDUCTIVITY IN A SWEAT ANALYZING WEARABLE SMART TEXTILE PLATFORM .....	608
<i>Madushi H Medagedara, Tharushi Shavindya Peiris, Nandula D Wanasekara</i>	
INFLUENCING FACTORS OF ABSENTEEISM OF A SMALL SCALE GARMENT FACTORY (CASE STUDY).....	614
<i>Vijitha Ratnayake, Subhoda Udawatta</i>	
BARRIERS FOR LEAN IMPLEMENTATION IN APPAREL INDUSTRY .....	620
<i>Tharindu Dhanusha Fernando, Vijitha Ratnayake</i>	

COMPARISON OF TIME SERIES FORECAST MODELS FOR RAINFALL AND DROUGHT PREDICTION .....	626
<i>Narmada Ponnampereuma, Lalith Rajapakse</i>	
BIOCHAR-BASED BARRICADE AND WETLAND AS AN INTEGRATED LANDFILL LEACHATE TREATMENT SYSTEM .....	632
<i>Kusalvin Dabare, Prabuddhi Wijekoon, Asitha Cooray, B. C. L. Athapattu, Meththika Vithanage</i>	
A STUDY ON PEDESTRIAN PAVEMENT THERMAL PERFORMANCE WITH REFERENCE TO ASSOCIATED MATERIALS .....	637
<i>Dinuka Senevirathne, Varuni Jayasooriya, Shobha Muthukumarar</i>	
ATMOSPHERIC PRESSURE PLASMA TREATMENT AS A COST-EFFECTIVE AND ECO-FRIENDLY PRE-TREATMENT METHOD TO ENHANCE SEED PERFORMANCE IN GERMINATION AND EARLY SEEDLING GROWTH .....	643
<i>Nayanathara Hendeniya, Thisara Sandanuwan, D A S Amarasinghe, Dinesh Attygalle, Sampath C Weragoda, Bandula Ranaweera, Kamani Rathnayake, Malki Lalanka</i>	
EFFECTS OF CURRENT DENSITY ON THE SOLDER WETTABILITY OF NICKEL ELECTRODEPOSITED NI20CR ALLOY .....	649
<i>A. Kumarasiri, H. S. Herath, D. A. S. Amarasinghe, D. Attygalle</i>	
ATMOSPHERIC COLD PLASMA TO IMPROVE PRINTABILITY OF POLYETHYLENE TEREPHTHALATE.....	654
<i>Thisara Sandanuwan, Nayanathara Hendeniya, Dinesh Attygalle, D A S Amarasinghe, Sampath C Weragoda, A M P B Samarasekara</i>	
THE EFFECT OF DEEP DEFECTS ON THE EFFICIENCY VARIATION OF CH <sub>3</sub> NH <sub>3</sub> PBI <sub>3</sub> PEROVSKITE SOLAR CELLS .....	659
<i>Nipuna L Adihetty, Dinuka R Ratnasinghe, Muthuthanthrige L. C. Attygalle, Som Narayan, Prafulla K Jha</i>	
MECHANICAL AND THERMAL CHARACTERIZATION OF SRI LANKAN VEIN GRAPHITE POWDER .....	664
<i>Dinelka Somaweera, Gayan Aravinda Abeygunawardane, Sampath Weragoda, Sivahar Vigneswaran</i>	
ISOLATION AND CHARACTERIZATION OF MICROCRYSTALLINE CELLULOSE FROM RICE STRAW.....	670
<i>K. P. T. Wathsala, K. M. Weerakkody, V. S. C. Weragoda</i>	
AN INVESTIGATION OF THE EFFECT OF PRECIPITATE SIZE DISTRIBUTION ON MECHANICAL PROPERTIES OF ALUMINUM 6063 EXTRUDATES USED FOR WINDOW FRAMES.....	676
<i>LWU Ranmini Dilrukshi, GIP De Silva</i>	
SINMORPHY: A MORPHOLOGICAL ANALYZER FOR THE SINHALA LANGUAGE.....	681
<i>Kalindu Kumarasinghe, Gihan Dias, Indu Herath</i>	
EASYBIN: METAGENOMICS BINNING SERVICES FOR NON-SPECIALISTS .....	687
<i>Methma Piumini, Sandani Liyanage, Thilini Bogahawaththa, Indika Perera, Vijini Mallawaarachchi</i>	
FRAMEWORK TO MIGRATE ANGULARJS BASED LEGACY WEB APPLICATION TO REACT COMPONENT ARCHITECTURE.....	693
<i>Thilanka Kaushalya, Indika Perera</i>	

USING DEPENDENCY GRAPH AND GRAPH THEORY CONCEPTS TO IDENTIFY ANTI-PATTERNS IN A MICROSERVICES SYSTEM: A TOOL-BASED APPROACH .....	699
<i>Isuru Udara Piyadigama Gamage, Indika Perera</i>	
STHITHIKA: DISTRIBUTED COMPLEX EVENT PROCESSING WITH QUERY REWRITING .....	705
<i>Thakshila Dilrukshi, Surangika Ranathunga</i>	
ENHANCING THE CAPABILITIES OF APPROACHING TO SERVICE SCENARIOS AND SETTLING FOR INTELLIGENT WHEELCHAIR ROBOTS .....	711
<i>Hiroshaan Vadivel, Kodikarage Sahan Priyanayana, A. G. Buddhika P. Jayasekara</i>	
QUADCOPTER DISTURBANCE ESTIMATION USING DIFFERENT LEARNING METHODS .....	717
<i>Sachithra Atapattu, Oscar De Silva, George Mann, Raymond Gosine</i>	
AN ARTIFICIAL APPENDAGE FOR SWIMMING MICROROBOTS IN NON-NEWTONIAN FLUIDS .....	723
<i>K. N. M. Perera, Y. W. R. Amarasinghe, D. V. Dao</i>	
DESIGN AND SIMULATION OF A 4-DOF VIBRATORY GYROSCOPE .....	728
<i>K. M. T. M. B. Konara, Y. W. R. Amarasinghe</i>	
A REFLECTION ON ASSESSING LEARNING OUTCOMES .....	734
<i>M. T. P. Hettiarachchi</i>	

**Author Index**