

IISE Annual Conference and Expo 2021

Online
22 - 25 May 2021

Volume 1 of 2

ISBN: 978-1-7138-3847-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2021) by Institute of Industrial & Systems Engineers (IISE)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact Institute of Industrial & Systems Engineers (IISE)
at the address below.

Institute of Industrial & Systems Engineers (IISE)
3577 Parkway Lane, Suite 200
Norcross, GA 30092
USA

Phone: (770) 449-0460
Fax: (770) 441-3295

www.iise.org

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
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

FLIPPING OUT FOR PROBABILITY	1
<i>J.H. Wilson, D.P. Morton, E. Chudik, E. Han</i>	
DEVELOPING A DISCRETE EVENT SIMULATION MODEL TO OVERCOME HUMAN TRAFFICKING.....	7
<i>S. Meier, F. Vitor</i>	
A SYSTEMS ENGINEERING APPROACH TO DEVELOPING A PROTOTYPE CYBERSECURE ADDITIVE MANUFACTURING SUPPLY CHAIN FOR THE US ARMY.....	13
<i>D.L. Bartles</i>	
SELF-ORGANIZING MAPS FOR CLUSTER ANALYSIS OF RISK FACTORS OF CHRONIC ABSENTEEISM	19
<i>J. Sivakumar, S.S. Lam</i>	
A STOCHASTIC PROGRAMMING MODEL FOR FOOD BANK DISASTER RELIEF OPERATIONS CONSIDERING TRANSPORTATION CAPACITY LIMITATIONS	25
<i>M. Kothamasu, E. Perez, F.A.M. Mediavilla</i>	
A DISCRETE EVENT SIMULATION FOR BASKETBALL GAMES AND AN ANALYSIS OF THE 2016 NBA FINALS.....	31
<i>M. Martell, C. Salazar</i>	
SAFETY ASSESSMENT OF VEHICLE TRAFFIC AT SIGNALIZED INTERSECTIONS USING VEHICLE-TO-INFRASTRUCTURE COMMUNICATION SYSTEMS	37
<i>N.V. Altekar, D. Das, K.L. Head</i>	
WAKE EFFECT CALIBRATION IN WIND POWER SYSTEMS WITH ADAPTIVE SAMPLING BASED OPTIMIZATION	43
<i>P. Jain, S. Shashaani, E. Byon</i>	
INDUSTRIAL ENGINEERING 4.0 - COMPUTER AIDED INDUSTRIAL ENGINEERING: WORK SYSTEMS ANALYSIS IN INDUSTRY 4.0	49
<i>K.V.S.S.N. Rao, A. Rathod</i>	
SUPPLY CHAIN MANAGEMENT: A NOVEL APPROACH FOR RISK MITIGATION TO MULTIPLE PHASE-IN AND PHASE-OUT COMPONENTS.....	55
<i>A. Renteria, I.A. Renteria-Marquez, T. Tseng</i>	
IMPACTS OF THE COVID-19 PANDEMIC ON THE U.S. EXERCISE EQUIPMENT SUPPLY CHAIN	61
<i>M.A. Bataclan, K. Camp, A. Glassey, J. Zakaria, C. Yap, M. Awwad</i>	
PREDICTING HEATWAVES USING CLASSIFICATION AND REGRESSION TREES	67
<i>G.M.D. Iqbal, J.M. Rosenberger, M.S. Alam, T. Mazzone</i>	
MODELING THE CONTAINMENT BEHAVIOR OF INTERACTING POPULATIONS IN RESPONSE TO AN EPIDEMIC	73
<i>M. Soltanolkottabi, D. Ben-Arieh, C.H. Wu</i>	

A ROOT CAUSE ANALYSIS USING TEXT MINING FOR PATIENT NO-SHOWS: A CASE STUDY OF PRIMARY CARE CENTERS SERVING RURAL AREAS.....	79
<i>L.A. Lekham, Y. Wang, M.T. Khasawneh, E. Hey</i>	
INVESTIGATING SUPPLY CHAIN RESILIENCY OF US COMPANIES DURING COVID-19	85
<i>D. Richmond, X. Qu, S. Jiang</i>	
MANAGING A LEAN SIX SIGMA PROJECT IN A REMOTE ENVIRONMENT	91
<i>J. Enos, A. Burris, L. Caulfield, T. DeYoung, S. Houng, C. Kubitz</i>	
OPTIMAL SELECTION OF DEPOTS TO FACILITATE RIDESHARING DURING A DISASTER.....	97
<i>F. Enayaty-Ahangar, A. Schmidt, L.A. Albert</i>	
MANAGING CAPACITY FOR CURB SPACES IN URBAN TRANSPORTATION SYSTEM.....	103
<i>Y. Guo, A. Bayram</i>	
AN OPTIMIZATION FORMULATION FOR MULTIPLE-MODALITY SENSOR-SUITE SELECTION AND PLACEMENT	109
<i>W.B. Leonard, C.H. Rinaudo, K.M. Houte, J.E. Richards, J.K. Alt, R.K. Buchanan, S.R. Goerger</i>	
WAVE POWER HOTSPOTS AND BEHAVIORS IDENTIFICATION USING DEEP CONVOLUTIONAL NEURAL NETWORKS.....	115
<i>C. Gu, H. Li</i>	
AMBULANCE DISPATCH POLICIES WITH IN-PLACE TREATMENT FOR LOW-ACUITY CALLS	121
<i>M. Palmer, A. Schmidt, L.A. Albert</i>	
CAMPUS UNDERGRADUATE RESEARCH AWARENESS AND ITS EFFECT ON RETENTION AND INTEREST OF STEM MAJORS.....	127
<i>M.T. Khasawneh, J.R. Dmello, Y.S. Franco, J.C. Kilburn</i>	
OPTIMIZATION MODELS TO FIND MAXIMUM APPOINTMENT CAPACITY IN A PEDIATRIC ORTHOPEDIC CLINIC – A COVID EXPERIENCE	133
<i>S.K. Vijayan</i>	
GUIDING PRINCIPLES FOR OMNICHANNEL PHYSICAL STORE REDESIGN.....	139
<i>M. Thomas, J. Pazour</i>	
SELECTION OF INDUSTRY 4.0 TECHNOLOGIES: A RESEARCH AGENDA.....	145
<i>R.C. Santos, E.P. de Lima, S.E.G. da Costa, F. Deschamps</i>	
THE TECHNOLOGY TRANSFER NETWORK DYNAMIC IN THE INFORMATION TECHNOLOGY INDUSTRY OF YUCATAN, MEXICO.....	151
<i>F. Cima, P. Pazos, A.M. Canto</i>	
EVALUATING NEURAL NETWORK METHODS FOR BRAIN HEMORRHAGE IDENTIFICATION AND CLASSIFICATION FROM COMPUTED TOMOGRAPHY IMAGERY	157
<i>O. Akinbolajo, H. Li</i>	
CAN AUGMENTED-REALITY HEAD-UP DISPLAY IMPROVE DRIVING PERFORMANCE ON MONOTONOUS DRIVES?.....	163
<i>A. Nachiappan, N.D.O. Faria, J.L. Gabbard</i>	

ALL-TERMINAL NETWORK RELIABILITY ESTIMATION WITH MONTE CARLO AND DEEP NEURAL NETWORKS.....	169
<i>A. Davila-Frias, O.P. Yadav, S. Salem, B. Nepal</i>	
CHALLENGES OF DATA COLLECTION ON MTURK: A HUMAN-AI JOINT FACE-MATCHING TASK.....	175
<i>M. Mancenido, P. Salehi, E. Chiou, A. Mosallanezhad, A. Shah, M. Cohen</i>	
A BI-OBJECTIVE GREEN VEHICLE ROUTING PROBLEM WITH A MIXED-FLEET OF HEAVY-DUTY ELECTRIC AND CONVENTIONAL VEHICLES.....	181
<i>A. Amiri, S.H. Amin, H. Zolfagharinia</i>	
ACTIVE DOWNSAMPLING FOR BINARY CLASSIFICATION WITH AN IMBALANCED DATASET.....	187
<i>W. Lee, K. Seo</i>	
CONDITION-BASED NODE DEPLOYMENT POLICIES FOR RELIABLE WIRELESS SENSOR NETWORKS.....	193
<i>N.T. Boardman, K.M. Sullivan</i>	
A NEW FUZZY GROUP DECISION-MAKING APPROACH FOR EVALUATING SUSTAINABILITY OF FOOD SUPPLY CHAINS.....	199
<i>E. Sharifi, S.H. Amin, L. Fang</i>	
STAFF PLANNING TO IMPROVE DISCHARGE PROCESS.....	205
<i>P. Wasilewski, P. Damodaran, S. Muthuswamy, C. McKinney, B. Lindley, R. Iyer</i>	
IMPROVING PATIENT DISCHARGE PROCESS.....	211
<i>N.B. Mathews, L. Ghayeb, V.S.N. Chintala, S. Muthuswamy, P. Damodaran, C. McKinney, B. Lindley, R. Iyer</i>	
UTILIZING BUSINESS PROCESS RE-ENGINEERING FOR OPTIMIZATION OF A THIRD-PARTY LOGISTICS COMPANY.....	217
<i>A. Das, K. Dominguez, A. Elbanna, Q. Williams, J. Abiade, J. Huang</i>	
A TWO-STAGE STOCHASTIC AGGREGATE PRODUCTION PLANNING MODEL WITH RENEWABLE ENERGY PROSUMERS.....	223
<i>S.R. Islam, C. Nova, T. Jin</i>	
DEEP FUSION METHODOLOGY OF INFRARED AND ULTRASONIC DATA FOR POROSITY DETECTION IN ADDITIVE MANUFACTURING.....	229
<i>C. Zamiela, W. Tian, L. Bian, J. Zhipeng, Z. Tian</i>	
A QUANTUM APPROXIMATE BAYESIAN OPTIMIZATION ALGORITHM FOR CONTINUOUS PROBLEMS.....	235
<i>Y. Wang</i>	
A HEURISTIC TO REDUCE THE MAXIMUM WORK-IN-PROCESS AND THE AVERAGE WAIT TIME FOR AIRCRAFT MAINTENANCE.....	241
<i>H.M. Verhine, S.R. Schultz, P. Biswas, D. Julien</i>	
IMPACT OF NATURAL DISASTER ON FOOD BANK OPERATIONS.....	247
<i>K. Odubela, S. Jiang, L. Davis</i>	
INDUSTRIAL AND SYSTEMS ENGINEERING EDUCATION AND ENTREPRENEURIAL MINDSET: A SYSTEMATIC LITERATURE REVIEW.....	253
<i>N.O. Erdil</i>	

RAPID FABRICATION OF BRANCHED MICROFIBERS BY NEAR-FIELD-ELECTROSPINNING	259
<i>I. Qavi, D. Sooriyaarachchi, A. Mathews, G.Z. Tan</i>	
PHYSICS-CONSTRAINED DICTIONARY LEARNING FOR SELECTIVE LASER MELTING PROCESS MONITORING	265
<i>Y. Lu, Y. Wang</i>	
A COMBINED APPROACH OF SYSTEM AND MULTIPLE FACTORS THEORIES FOR ACCIDENT CAUSATION ANALYSIS OF AN AVIATION ACCIDENT	271
<i>J. Han, J. Fu</i>	
ERGONOMICS IN A CRAFT BREWERY IN CHILE: A CASE STUDY	276
<i>V. Nino, M. Marquez</i>	
AN EFFICIENT APPROACH FOR PREDICTING RATE OF PENETRATION USING AUTOMATED ARTIFICIAL INTELLIGENCE	282
<i>K. Mokhtari, G. Caputo, A. Nickolay</i>	
OPTIMAL NURSING HOME SERVICE SCHEDULING UNDER COVID-19 RELATED PROBABILISTIC STAFF SHORTAGE: A TWO-STAGE STOCHASTIC PROGRAMMING APPROACH.....	286
<i>S. Jiang, Y. Yih, N. Kong, K. Abrahamson, M. Li</i>	
ASSESSMENT OF THE MATURITY OF RESEARCH ON KAIZEN EVENTS IN HOSPITALS.....	292
<i>K. Harry</i>	
HUMAN CHARACTERISTICS IMPACT ON STRATEGIC DECISIONS IN A HUMAN-IN-THE-LOOP SIMULATION.....	298
<i>A.J. Collins, S. Etemadidavan</i>	
RISK MANAGEMENT IN WHOLESALE ELECTRICITY MARKETS: A SIGNAL PROCESSING APPROACH	304
<i>B.P. Fram, R. Rrukaj, L.K. Sandal</i>	
DESIGNING AN INTERCHANGEABLE MULTI-MATERIAL NOZZLE SYSTEM FOR MULTI-HEAD 3D BIO-PRINTER	310
<i>C. Nelson, S. Tuladhar, A. Habib</i>	
RHEOLOGICAL STUDY OF HIGHLY THIXOTROPIC HYDROGELS FOR 3D BIO-PRINTING PROCESSES	316
<i>S. Tuladhar, C. Nelson, A. Habib</i>	
IMPROVING FOOD BANK OPERATIONS THROUGH VEHICLE ROUTING AND SERVICE GAP MAPPING	322
<i>W. Chen, C.H. Mowrey, K. Schneider</i>	
USING PEDESTRIAN SIMULATION MODELING FOR A LOGISTICS WORLD	328
<i>S. Varigonda</i>	
EFFECTIVENESS OF MULTI-TASK LEARNING FOR DEEP LEARNING ON THE PREDICTION PERFORMANCE OF EEG-BASED COGNITIVE STATE RECOGNITION.....	334
<i>S. Choo, C.S. Nam, Y. Ghasemi, H. Jeong</i>	

INVESTIGATING PERFORMANCE OF A MACHINE LEARNING ALGORITHM FOR FORECASTING TIME SERIES ELECTRICAL DEMANDS BASED ON A SIMULATION APPROACH.....	340
<i>M.R. Hassan, H.W. Jeon</i>	
MAXIMIZING STORAGE DENSITY OF STEEL PIPES: OPTIMIZATION MODELING.....	346
<i>K.T. Gumushian, E. Masehian, P. Parsa, J.H. Cortez, M.H. Gaytan</i>	
EVALUATING A REAL-TIME AMBULANCE REDEPLOYMENT FRAMEWORK UNDER IMPLEMENTATION OF COMMUNITY-BASED CITIZEN RESPONDER PROGRAM.....	351
<i>J.C. Paz, N. Kong, S. Lee</i>	
BIBLIOMETRIC ANALYSIS OF LEAN PRODUCTION APPLICATIONS WITHIN LOCAL GOVERNMENT ORGANIZATIONS.....	357
<i>M. Alrezq</i>	
LASER FABRICATION OF POLYMERIC MICRONEEDLES FOR TRANSDERMAL DRUG DELIVERY	363
<i>F.K. Aldawood, S. Desai, A. Andar</i>	
FUEL OPTIMIZATION IN MINING TRUCKS USING MACHINE LEARNING	369
<i>V.J. Terpstra, O. Lara-Yejas, K. Mokhtari, J.F.H.S. Cruz, M.P. de Mattos</i>	
SYSTEMS ENGINEERING AND VIRTUAL SIMULATION: LEADERSHIP APPLICATION	375
<i>C.W. Davis, L. Rabelo, W.S.A. Fredericks, P. Stuckey</i>	
COMPARISON OF SIMULATION APPROACHES TO EVALUATE DRIVER BEHAVIORS AT TRANSFER-OF-CONTROL SITUATIONS DURING AUTOMATED DRIVING	381
<i>G. Pai, S. Widrow, J. Radadiya, C.D. Fitzpatrick, M. Knodler, A.K. Pradhan</i>	
DISASTER PLANNING IN THE AGE OF PANDEMICS.....	387
<i>C.J. Hollan, S. Long</i>	
VARIOGRAM ROUGHNESS: AN OBJECTIVE DIGITAL METHOD TO MEASURE THE SURFACE ROUGHNESS OF CASTINGS.....	393
<i>D. Schimpf, F. Peters</i>	
SYSTEMS THINKING FOR TACKLING ORGANIZATIONAL PROBLEMS: A HEALTHCARE SETTING CASE STUDY	399
<i>M.A. Mahyoub, Y. Wang, M.T. Khasawneh</i>	
ACTIVE LEARNING USING INTER-UNIVERSITY NETWORKS IN LATIN AMERICA WITH SUPPLY CHAIN RESILIENCE PROJECTS IN MICRO AND SMALL ENTERPRISES.....	405
<i>M. Ilena Ruiz-Cantisani, J. Vargas-Florez, C.A. Castro-Zuluaga</i>	
MODELING THE CONTAINMENT BEHAVIOR OF INTERACTING POPULATIONS IN RESPONSE TO AN EPIDEMIC	411
<i>M. Soltanolkottabi, D. Ben-Arieh</i>	
STANDARDIZATION AND FULFILMENT OF ABS MANAGEMENT SYSTEM OPERATIONAL EXCELLENCE	417
<i>V.S.P. Martinez, M.T.D. Sotomayor, E.P.P. Flores, E.M. Donjuan, M.A.C. Ramirez, A.H. Compean, J.A.C. Ramirez</i>	
SEASON-DEPENDENT PARAMETER CALIBRATION IN BUILDING ENERGY SIMULATION	423
<i>Z. Xu, C. Jeong, E. Byon, K. Cetin</i>	

AN AUTOMATED TOOL FOR OPTIMAL CLASSROOM SEATING ASSIGNMENT WITH SOCIAL DISTANCING CONSTRAINTS.....	429
<i>K.K. Greenberg, T. Hensel, Q. Zhu, S. Aarts, D.B. Shmoys, S.C. Gutekunst</i>	
EFFECTIVE TEACHING OF THERMOFLUID PRATICAL COURSES DURING COVID-19.....	435
<i>O.L. Fadipe, M. Salimian</i>	
PATIENT DIVERSION ACROSS PRIMARY HEALTH CENTERS USING REAL-TIME DELAY PREDICTORS	441
<i>N. Fatma, V. Ramamohan</i>	
SIMULATION MODELLING AND ANALYSIS OF COMMUNITY HEALTH CENTRE OPERATIONS	447
<i>M. Shoaib, V. Ramamohan</i>	
OPTIMIZATION OF PARACHUTE FLYING TIME AND SELECTION OF BEST MODEL	453
<i>J. Perez-Barbosa, D. Rivera, R.E. Rodriguez, R.G. Rosa, A.G. Mendez</i>	
UNDERSTANDING CHANGE IN PUBLIC ORGANIZATIONS: A SYSTEMATIC AND INTEGRATIVE REVIEW	459
<i>S. Vanhengel, G. Letens, B. George, H. Keathley, K. Verweire</i>	
LONG-TERM INVENTORY-AWARE EQUIPMENT PLANNING IN SERVICE NETWORKS.....	465
<i>R. Ojha, A. Erera, N. Boland, M. Savelsbergh</i>	
A THREE-STAGE HEURISTIC FOR THE PICKUP AND DELIVERY PROBLEM WITH OCCASIONAL DRIVERS AND TRANSSHIPMENT	471
<i>Z. Lyu, A.J. Yu</i>	
QUANTITATIVE ASSESSMENT OF PRODUCT REMANUFACTURABILITY.....	477
<i>A. Ali, C. Enyoghasi, F. Badurdeen</i>	
DETECTING ROAD DEFECTS USING A LOW-COST SENSING DEVICE	483
<i>A. Alrajhi, Y. Cai</i>	
ECONOMIC ANALYSIS OF CONSTRUCTION PROJECTS IN THE PUBLIC SECTOR OF PUERTO RICO	489
<i>M.E. Maldonado-Toledo, P. Perez-Torres</i>	
LEARNING EXPERIENCES ABOUT FOOD SUPPLY CHAINS DISRUPTIONS OVER THE COVID-19 PANDEMIC IN METROPOLIS OF LATIN AMERICA.....	495
<i>D.E. Salinas-Navarro, A. Alanis-Uribe, A.C. Da Silva-Ovando</i>	
LARGE SCALE PARALLEL 3D PRINTING OF PATTERNS FOR METAL CASTING.....	501
<i>E. Weflen, M. Bindel, K. Wyatt, F. Peters</i>	
INTEGRATED CONDITION BASED MAINTENANCE AND SPARE PARTS SUPPLY WITH INCOMING QUALITY CONTROL AND INSPECTION ERRORS	507
<i>A. Al Hanbali, H.H. Saleh, O.G. Alsawafy</i>	
GRAPH DEEP LEARNING-BASED ATTENTION-DEFICIT/HYPERACTIVITY DISORDER DIAGNOSIS FOR BRAIN NETWORK.....	513
<i>Y. Wang, M. Marufuzzaman, H. Wang</i>	
IMPACTS OF APPROXIMATE POWER FLOW MODELS ON OPTIMAL FLOOD MITIGATION IN A STOCHASTIC PROGRAM.....	518
<i>B. Austgen, J. Hasenbein, E. Kutanoglu</i>	

A PROBABILISTIC CONCEPTUALIZATION OF VALUE.....	524
<i>J.D. Elder, M.G. Beruvides</i>	
WOOD-BASED BIOFUEL OPTIONS TO CREATE ZERO-FOSSIL FUEL DISTRICT HEATING SYSTEMS	530
<i>T. Cheney, B.S. Deo</i>	
AUTOMATIC FAULT DETECTION BASELINE CONSTRUCTION FOR BUILDING HVAC SYSTEMS USING JOINT ENTROPY AND ENTHALPY	536
<i>J. Huang, T. Wu, H. Yoon, O. Pradhan, J. Win, Z. O'Neill</i>	
OPTIMIZING HYDRAULIC FRACTURING PARAMETERS USING A FULLY INTEGRATED DATA AND ARTIFICIAL INTELLIGENCE PLATFORM.....	542
<i>V. Mishra, K. Mokhtari</i>	
ORGANIZATIONAL FIT AND BUSINESS PROCESS MANAGEMENT IMPLEMENTATION.....	548
<i>N. Neufeld, B. Deo</i>	
PERSONAL CARBON TRADING CONCEPT & MARKET IMPLICATIONS	554
<i>B.S. Deo</i>	
A SIMULATION TESTBED FOR THE EVALUATION OF PRODUCT AND INFORMATION FLOWS IN A MANUFACTURING SYSTEM.....	560
<i>M. Evans, A. Yarbrough, G. Harris, G.T. Purdy</i>	
DESIGN AND DEVELOPMENT OF A PORTABLE AUDITORY SITUATION AWARENESS TRAINING (PASAT) SYSTEM.....	566
<i>B.S. Thompson, J.G. Casali, K. Lee, K.M. Cave</i>	
DETECTING DEFECTS OF RAILWAY TRACKS BY USING COMPUTER VISION METHODOLOGY	572
<i>P. Ravishankar, B.E. Tokgoz, X. Zhang, J. Zhang, S. Hwang</i>	
THE IMPORTANCE OF ACCURATE TERMINAL VELOCITIES FOR HAIL IMPACT TESTING PROCEDURES	578
<i>C. Dieling, M. Smith, M. Beruvides</i>	
THE CHALLENGE OF BECOMING A WORKER 4.0 – A HUMAN-CENTERED MATURITY MODEL FOR INDUSTRY 4.0 ADOPTION.....	584
<i>B.L. Trevino-Elizondo, H. Garcia-Reyes</i>	
SYSTEM AVAILABILITY CONSIDERING REDUNDANCY, MAINTENANCE AND SPARE PARTS WITH DUAL REPAIR PROCESSES	590
<i>T. Jin, H. Li, F. Sun</i>	
USING DISCRETE EVENT SIMULATION TO EVALUATE PREEMPTIVE CARE STRATEGIES FOR PEDIATRIC ASTHMA.....	596
<i>E. Utey, N. Adamek, J.A. Heim</i>	
TWO-STAGE STOCHASTIC HUB-AND-SPOKE MODEL FOR MULTI-BIOMASS LOGISTICS NETWORK DESIGN WITH BYPRODUCTS.....	602
<i>K. Keith, K.K. Castillo-Villar</i>	

VOLUME 2

NEGOTIATING CHANGE ORDERS WITH SUPPLIERS DURING NEW PRODUCT DEVELOPMENT USING MCDM AND BAYESIAN GAME THEORY	608
<i>S. Gupta</i>	
AUCTION-BASED PREFERENTIAL SHIFT SCHEDULING: A CASE STUDY ON THE LEHIGH UNIVERSITY LIBRARIES.....	614
<i>S. Metha, V. Patel, A.S. Berahas</i>	
DESIGN OF A MODULAR HIGH-DENSITY PARKING LOT.....	620
<i>P. Siddique, J. Usher, K. Gue</i>	
UNDERSTANDING HOW SAFETY POSTERS AFFECT PERCEPTION OF SAFETY CULTURE USING VIRTUAL REALITY	626
<i>B. MacLaren, A. Gates, J. Huffman, B. Jose, L. Strawderman</i>	
A ROBUST ENSEMBLE-DEEP LEARNING MODEL FOR COVID-19 DIAGNOSIS BASED ON AN INTEGRATED CT SCAN IMAGES DATABASE	632
<i>M. Maftouni, A.C.C. Law, B. Shen, Z.K. Grado, Y. Zhou, N.A. Yazdi</i>	
AGILE METHODS FOR PROJECT CONTROLS	638
<i>C. Kenney</i>	
EVALUATION OF SIMULATION MODELING OF UNIVERSITY DINING HALL COVID-19 REOPENING PLANS.....	644
<i>P. Imbornoni, J.G. Lazo, I.G. Lee, A. Agarwal, S. Kwon, S.W. Yon</i>	
ANALYSIS OF COVID-19 COLLEGE TESTING FACILITY DURING MOVE-IN DAYS USING DISCRETE EVENT SIMULATION MODEL	650
<i>J.G. Lazo, P. Imbornoni, I.G. Lee, A. Agarwal, S. Kwon, S.W. Yoon</i>	
EXPLORING THE EFFECT OF CLUSTERING ALGORITHMS ON SAMPLE AVERAGE APPROXIMATION	656
<i>D. Jacobson, M. Hassan, Z.S. Dong</i>	
THE DOCTOR IS IN: MONITORING AND VISUALIZING SUPPLY CHAIN HEALTH THROUGH MACHINE LEARNING.....	662
<i>F. Stoll, S. Lee, S.J. Mason, R. Renu, B. Shields, L. Cintron-Gonzalez, D. Warren, E. Vasseur, S. Chodha</i>	
A COMPARISON OF MACHINE LEARNING AND TRADITIONAL DEMAND FORECASTING METHODS	668
<i>F. Stoll, S. Lee, S.J. Mason</i>	
DECISION ENGINEERING: THERMODYNAMICS AND THE ENTROPY DECISION RISK MODEL UTILITY (EDRM-U).....	674
<i>T.J. Monroe, M.G. Beruvides</i>	
A GOAL PROGRAMMING APPROACH TO THE TRAY OPTIMIZATION PROBLEM.....	680
<i>S. Harris, D. Claudio</i>	
SEARCHING FOR THE INSCRUTABLE: A SEARCH FOR CLARITY IN DIGITAL MANUFACTURING DEFINITIONS, TERMINOLOGIES, AND TECHNOLOGIES	686
<i>C. Wittekind, G. Harris</i>	

OPEN EDUCATIONAL RESOURCES FOR INDUSTRIAL ENGINEERING UNDERGRADUATE COURSES	692
<i>B. Boardman</i>	
POLL WORKER SECURITY: ASSESSMENT AND DESIGN OF USABILITY AND PERFORMANCE	698
<i>J. Dehlinger, S. Harrison, N.M. Scala</i>	
A STOCHASTIC MODEL TO DETERMINE THE REQUIRED NUMBER OF TRUCKS IN SUGARCANE HARVEST SYSTEMS	704
<i>F. Munoz, S. Lee</i>	
THE ELECTRIC LOCATION ROUTING PROBLEM UNDER AMBIENT TEMPERATURE.....	710
<i>A. Aghalari, D. Salamah, M. Marufuzzaman, C. Marino</i>	
PELLET PRODUCTION OPTIMIZATION USING A PARALLELIZED PROGRESSIVE HEDGING ALGORITHM.....	716
<i>A. Aghalari, B. Aladwan, M. Marufuzzaman, S. Tanger, B. Silva, V.G. Gude</i>	
ACCESSIBILITY AND AVAILABILITY OF GAS STATIONS FOR LIQUID FUEL SUPPLY DURING SEVERE WEATHER EVENTS.....	722
<i>B. Kar, O.A. Omिताomu, N. Roberts, J. Brewer, A. Iyengar, R. Hoesly</i>	
ASSESSING MULTI-PURPOSE FORECASTING ACCURACY	728
<i>X. Pan, B. Montreuil</i>	
SIMULATION ANALYSIS OF WAREHOUSES UTILIZING BULK AND RACK STORAGE SYSTEMS.....	734
<i>R.A. Bhisti, M.E. Kuhl</i>	
RISK-INFORMED PRIORITIZATION OF OPERATIONAL CONDITION ASSESSMENTS.....	740
<i>J.K. Alt, J.P. Richards, G.E. Gallarno, W.H. Brown</i>	
PLANNING THE SUPPLY OF EMERGENCY MEDICAL PRODUCTS TO COPE WITH PANDEMICS.....	746
<i>S. Salman, S. Alaswad, R. Hammami, I. Nouira</i>	
OPPORTUNITIES RELATED TO MULTIDOSE MANAGEMENT AND ADHERENCE MONITORING TECHNOLOGIES IN PHARMACIES	752
<i>A. Lingam, Y. Wang, S. Kwon, S.W. Yoon</i>	
DEEP-TIER SUPPLY CHAIN TWO STAGE STOCHASTIC RESILIENCE MANAGEMENT: AUTOMATIVE INDUSTRY	758
<i>E. Taghizadeh</i>	
IMPACT OF SOCIAL PRESENCE ON THEFT RELATED RETAIL SHRINK.....	764
<i>A. Singh, B. Deo</i>	
A LOCAL SEARCH ALGORITHM TO COMBINED MAINTENANCE ROUTING OPTIMIZATION PROBLEM FOR VEHICLES SUBJECT TO FAILURES.....	770
<i>E.R. Lopez-Santana, C. Franco</i>	
REVIEW OF RISK OF EPIDEMIOLOGICAL VECTORS IN PUBLIC HEALTH THROUGH DATA SCIENCE AND SIMULATION TECHNIQUES	776
<i>E.R. Lopez-Santana, D. Rodriguez-Garzon</i>	

BENEFIT- COST ANALYSIS OF A LOW CAPITAL COST BUS RAPID TRANSIT SYSTEM UNDER DEFAULT RATING: CASE OF LEBANON.....	782
<i>N. Nehme, N. Ghayad, Z. Massaad</i>	
DATA-DRIVEN PREDICTION OF DEMAND IN A PANDEMIC FOR CRITICAL CONSUMABLES OVER A SHARED DISTRIBUTION NETWORK.....	788
<i>J. Yim, B. Montreuil, S. Yang, N. Kim</i>	
SPEECH RECOGNITION IN BACKGROUND NOISE BY A CONVOLUTION NEURAL NETWORKS MODEL.....	794
<i>A. Kabirkopaei, F. Vitor</i>	
EVALUATION OF ‘CROWD-INFORMING’ ON PARKING PERFORMANCE AND ENVIRONMENTAL EMISSIONS: AN AGENT-BASED SIMULATION OF AN URBAN UNIVERSITY CAMPUS.....	800
<i>M.M. Rahman, M.A. Galvez, Y. Zhou</i>	
NEURAL NETWORK MODEL FOR VEHICLE ROUTING PROBLEM, APPLYING A CONTINUOUS HOPFIELD NETWORK.....	806
<i>J.A. Lopez-Rosas, E.N. Escobar-Gomez, S. Velazquez-Trujillo, H.R. Hernandez-de-Leon, C.V. de-Coss-Perez, L.M. Blanco-Gonzalez, E. Chandomi-Castellanos, R.O. Solorzano-de-Leon</i>	
SUSTAINABLE WASTE MANAGEMENT IN SCHOOLS.....	812
<i>E. Orr, V. Maier-Speredelozzi</i>	
A NOVEL METAHEURISTIC FOR THE OFFICE BUS ROUTING PROBLEM.....	818
<i>A. Groswami, A. Modi, B.K. Sahoo, R. Sewani, R. Singhanian, S. Garg, H. Ravichandran, M.K. Tiwari</i>	
DESIGN OF A 3D PRINTER PET WASTE PROTOTYPE PRODUCT USING.....	824
<i>N.D.O. Faria, J. Hernandez, M. Cabrera-Rios</i>	
OPTIMIZATION MODEL FOR STREAMLINING OF BIOMASS PROCESSING SYSTEMS.....	830
<i>D. Liu, S. Eksioglu, M. Roni, F.N. Kucuksayacigil</i>	
APPLICATION OF OPTIMAL CUSTOMER SEGMENTATION BASED ON DUAL MACHINE LEARNING SCORES IN SMALL BUSINESS LENDING.....	836
<i>X. Han, J. Xue</i>	
FLEXIBLE MULTI-CONSTRAINT OPTIMIZER: A NOVEL CREDIT RISK SEGMENTATION SYSTEM FOR SMALL BUSINESS LENDING.....	842
<i>X. Han, J. Xue</i>	
A PRELIMINARY STUDY ON MANUFACTURING SYSTEMS RESILIENCY IN THE INDUSTRY 4.0 ERA.....	848
<i>A.E. Elhabashy, H. Fors, A. Harfoush</i>	
PREDICTING CORROSION GROWTH PROCESS OF PIPELINE USING ISOTONIC REGRESSION MODEL.....	854
<i>A.A. Alqarni, O.P. Yadav</i>	
SCENARIO GENERATION FOR ASSET RETURNS IN A CROSS-SECTIONAL MOMENTUM STRATEGY.....	860
<i>X. Guo, S.M. Ryan</i>	
A PRACTICAL AID FOR MATERIAL HANDLING EQUIPMENT SELECTION.....	866
<i>Q. Lee</i>	

TRANSMISSION AND CAPACITY EXPANSION PLANNING AGAINST RISING TEMPERATURES: A CASE STUDY IN ARIZONA	872
<i>J.K. Skolfield, A.R. Escobedo, J. Ramirez-Vergara</i>	
MAXIMUM-POSTERIOR EVALUATION FOR PARTIALLY OBSERVABLE MULTISTAGE STOCHASTIC PROGRAMMING	878
<i>M. Siddig, Y. Song, A. Khademl</i>	
A MULTISTAGE STOCHASTIC PROGRAMMING MODEL FOR HURRICANE RELIEF LOGISTICS PLANNING	884
<i>M. Siddig, Y. Song</i>	
MODEL PREDICTIVE CONTROL STRATEGY FOR PRODUCTION CONTROL IN A RECONFIGURABLE MANUFACTURING SYSTEMS	890
<i>J. Imseitif, N. Nezamoddini</i>	
QUALITY ANALYSIS OF TAT FOR SUPPLY RESTORATION PROCESS.....	896
<i>N.L. Gawas, R. Shengale, C.M. Greene</i>	
A DROPOUT-BASED NEURAL NETWORK FRAMEWORK FOR TOOL WEAR	902
<i>A. Dey, N. Yodo</i>	
ROBUST RESPONSE SURFACE OPTIMIZATION UNDER MODEL PARAMETER UNCERTAINTY.....	908
<i>A. Dey, N. Yodo</i>	
A MULTIDISCIPLINARY TEAM FORMATION PROBLEM FOR PROJECTS IN THE AEROSPACE INDUSTRY	914
<i>G. Asatourian, K. Maramot, D.M. Reyes, J. Seif</i>	
BLOCKCHAIN AND ARTIFICIAL INTELLIGENCE ENABLED AUTONOMOUS SMART MANUFACTURING CONSORTIUM.....	920
<i>M. Hasan, T. Mullick</i>	
AN INTEGRATED MAINTENANCE AND PRODUCTION PLANNING OPTIMIZATION MODEL CONSIDERING DOWNTIME REDUCTION	926
<i>S.S. Rabbanian, G.M. Knapp</i>	
A DEEP REINFORCEMENT LEARNING APPROACH FOR MAINTENANCE PLANNING	932
<i>S.S. Rabbanian, M. Nemati, G.M. Knapp</i>	
LINKAGE, INNOVATION, AND TECHNOLOGY TRANSFER CAPACITIES IN TECHNOLOGICAL INSTITUTES FOR INDUSTRY 4.0: CASE YUCATÁN, MÉXICO.....	938
<i>R. Canul, P. Murillo, A.M. Canto</i>	
A DECISION SUPPORT TOOL FOR CALCULATING WASTE COLLECTION NEEDS	944
<i>Z. Kassem, V.S. Gudivada, A.R. Escobedo, W.F. Campbell</i>	
OPTIMIZATION OF RESOURCE ALLOCATION FOR CALIFORNIA WILDFIRES	950
<i>A. Preciado, S. Jaworski, L. Ta, J. Seif</i>	
DYNAMIC TIME-BASED PARCEL CONSOLIDATION AND CONTAINER LOADING IN HYPERCONNECTED LOGISTIC HUBS	956
<i>N. Grover, B. Montreuil</i>	

BRAIN-TO-BRAIN INTERFACES: TOWARDS ADVANCING HUMAN COMMUNICATION AND COLLABORATION	962
<i>Z. Traylor, C.S. Nam</i>	
CORRELATED TRAFFIC DATA PREDICTION TOWARDS ROBUST TRAFFIC MANAGEMENT SYSTEM.....	968
<i>T. Afrin, N. Yodo</i>	
AN INVESTIGATION OF RESILIENCE IN MANUAL DRIVING AND AUTOMATIC DRIVING IN FREIGHT TRANSPORTATION SYSTEM.....	974
<i>R. Zhao, Y. Liu, Y. Li, B. Tokgoz</i>	
A BAYESIAN NETWORK-BASED PROBABILISTIC ESTIMATION OF TRAFFIC CONGESTION	980
<i>T. Afrin, N. Yodo</i>	
AN INVESTIGATION OF THE IMPACT OF AUTONOMOUS DRIVING ON DRIVING BEHAVIOR IN TRAFFIC JAM.....	986
<i>Y. Liu, R. Zhao, T. Li, Y. Li</i>	
THE RELATIONSHIP BETWEEN SMARTPHONE USE AND MUSCULOSKELETAL SYMPTOMS AMONG UNIVERSITY STUDENTS UNDER THE INFLUENCE OF COVID-19.....	992
<i>R. Zhao, Y. Li, B. Craig</i>	
A FUZZY ROBUST DESIGN OPTIMIZATION MODEL WITH CONTROLLABLE DESIGN FACTORS UNDER UNCERTAINTY	998
<i>A. Ozdemir, M. Turkoz, S. Kim</i>	
A SCENARIO-BASED OPTIMIZATION APPROACH FOR ELECTRIC GRID SUBSTATION HARDENING AGAINST STORM SURGE FLOODING.....	1004
<i>A. Shukla, J. Hasenbein, E. Kutanoglu</i>	
A PROBABILISTIC APPROACH TO MODELING POWER NETWORK COMPONENT IMPORTANCE CONSIDERING ECONOMIC IMPACTS.....	1010
<i>H. Anand, M. Darayi</i>	
FRESH PRODUCE ANALYTICAL FRAMEWORK.....	1016
<i>X. Hernandez-Cruz, G. Neal, G. Runger, J.R. Villalobos</i>	
INTELLIGENT TUTOR ASSISTANT: PREDICTING CONFUSION FROM PUPILLOMETRY DATA WITH MULTIPLE CLASSIFICATION MODELS	1022
<i>D. Schechter, H. Patel, K. Aiyar, J. Vasquez</i>	
LASSO BASED CAUSAL VARIABLE SELECTION ADDRESSING TIME-VARYING CONFOUNDING IN INTERDISCIPLINARY PAIN MANAGEMENT	1028
<i>A.A. Farahani, A. Viswanatha, V.C.P. Chen, J.M. Rosenberger</i>	
RETAIL STORE LAYOUT: SHOPPER PREFERENCE VS. SHOPPER ACCESS.....	1034
<i>C.H. Mowrey, J.K. Beagle, S. Gune, S. Hirpara, P.J. Parikh</i>	
SPATIAL ANALYSIS USING INTERACTIVE HEAT MAPS FOR OPTIMIZING THE INTRAHOSPITAL PATIENT TRANSPORTATION SYSTEM.....	1040
<i>S. Gurrala, Y. Wang, M. Khasawneh, H. Nguyen</i>	
INVESTIGATING TRAFFIC CRASHES INVOLVING AUTONOMOUS VEHICLES	1046
<i>J. Torres, Y. Li, J. Zhang</i>	

MISSION SCHEDULING MAXIMIZATION SUBJECT TO AIRCRAFT SYSTEM RELIABILITY AND MISSION REQUIREMENTS.....	1052
<i>J. Thompson, E. Hilario, J. Seif</i>	
APPLICATION OF THE TAGUCHI DESIGN METHOD TO ANALYZE THE PRODUCTION PROCESS OF CELLULOSE ACETATE FIBERS BY USING ELECTROSPINNING	1058
<i>A.S. Riveros-Gonzales, L. Bedoya-Valencia, Y. Correa-Martinez, R. Farrer</i>	
LEARNING CURVES AND THE ORGANIC EVOLUTION OF WORKCELLS— CONTINUOUS IMPROVEMENT VS. INSTANT PERFECTION.....	1064
<i>Q. Lee</i>	
A STOCHASTIC MIXED INTEGER LINEAR PROGRAMMING APPROACH TO SKILL- BASED WORKFORCE ALLOCATION IN SERUS.....	1070
<i>S. Khlalafallah, G. Egilmez</i>	
DATA-DRIVEN PREDICTION OF POWER AT WIND FARM LEVEL	1076
<i>M. Arrieta-Prieto, K.R. Schell</i>	
ENABLING SCIENTIFIC ASSESSMENT OF LARGE SCALE HYPERCONNECTED URBAN PARCEL LOGISTICS: SYSTEM CONFIGURATION AND ASSESSMENT	1082
<i>M. Campos, B. Montreuil, L. McGinnis, S. Kaboudvand, S. Kwon, Z.B. Bidoni, L. Faugere, S. Buckley</i>	
AN INNOVATION CASE STUDY: A PROCESS, PRACTICE AND LEARNING PERSPECTIVE FROM A LARGE HOSPITALITY AND ENTERTAINMENT BUSINESS.....	1088
<i>B.G. Miller, I. Garibay, R. Hoekstra</i>	
ENABLING SCIENTIFIC ASSESSMENT OF LARGE SCALE HYPERCONNECTED URBAN PARCEL LOGISTICS: AGENT-BASED SIMULATOR DESIGN.....	1094
<i>S. Khlalafallah, M. Campos, B. Montreuil</i>	
DETERMINING COORDINATES FOR IMPLEMENTING VEHICLE ROUTING CONSTRUCTION HEURISTICS	1100
<i>M. Tilashalski, K. Ellis</i>	
LAST MILE DELIVERY ROUTE PLANNING FOR GROCERY STORES	1106
<i>S. Azadiamin, D.T. Masel</i>	
TECHNOLOGY ACCEPTANCE FOR PARTIALLY AUTOMATED VEHICLES IN THE UNITED STATES AND GERMANY	1112
<i>S. Bujanov, V. Maier-Speredelozzi</i>	
ENABLING SCIENTIFIC ASSESSMENT OF LARGE SCALE HYPERCONNECTED URBAN PARCEL LOGISTICS: SCENARIO-BASED DEMAND AND CUSTOMER BEHAVIOR MODELING.....	1118
<i>Z.B. Bidoni, B. Montreuil</i>	
REDEFINING A CAMPUS TOUR EXPERIENCE BY INCORPORATING IMMERSIVE TECHNOLOGIES: CASE STUDY AT VIRGINIA TECH	1124
<i>N.D.O. Faria, C. Nadri, W. Brown, J. Leeds, R. Patrick, J.L. Gabbard</i>	
A STUDY OF STUDENT KNOWLEDGE AND PARTICIPATION IN ENTREPRENEURSHIP AND INNOVATION ECOSYSTEM	1130
<i>Y. Rivera, G.G. Rodriguez, K.N. Espada, L.A. Medina, A. Garcia, M. De Hoyos</i>	

MYCELIUM AUTOMATED PACKAGING PRODUCTION SYSTEM.....	1136
<i>J. Cabral, D. Carey, J. Roa-Medina, M. Zhao</i>	
COMPARISON OF SEMANTIC SEGMENTATION DEEP LEARNING MODELS FOR LAND USE MAPPING: SITE CHARACTERIZATION FOR CONSTRUCTION SITE PREPARATION	1142
<i>A.M. Lobato, M. Juston, W.R. Norris, R. Nagi, A. Soylemezoglu, D. Nottage</i>	
REALTIMEPC 2020: OVERCOMING THE CHALLENGE OF OFFERING AN INTERACTIVE VIRTUAL EXPERIENCE	1148
<i>L.A. Medina, K.M. Solorzano, J.O. Padilla, G. Morales, N. Lopez, Y. Rivera, M.A. Hernandez, K.N. Espada, F.J. Vazquez</i>	
CONDITIONAL CONVERGENCE OF GEOMETRIC MEAN METHOD OF GENERATING PAIRWISE COMPARISON MATRICES FOR A MULTISTAGE, MULTIOBJECTIVE OPTIMIZATION PROBLEM.....	1154
<i>P.K. Tarun, V.C.P. Chen, H.W. Corley</i>	
ELECTRIC VEHICLE CHARGING STATION LOCATION DETERMINATION WITH CONSIDERATION OF ROUTING SELECTION POLICIES AND DRIVER'S RISK PREFERENCE.....	1160
<i>A. Yazdekhasti, J. Ma</i>	
APPLYING MACHINE LEARNING TO DETERMINE DEVELOPMENT OF ECUADORIANS NEONATES.....	1166
<i>J.C.L. Moran, A.V. Moran, I. Alcivar, J.P. Villegas</i>	
OPTIMAL DEPLOYMENT OF INDOOR SENSORS FOR A REAL-TIME LOCATION TRACKING SYSTEM.....	1171
<i>B.D.B. Chowdhury, T. Islam, Y.J. Son, R. Tronstad</i>	
BI-OBJECTIVE OPTIMIZATION OF A LARGE-SCALE CO-FIRING BIOMASS SUPPLY CHAIN	1177
<i>M. Aranguren, K.K. Castillo-Villar</i>	
PREVENTIVE SURFACE TREATMENT DECISION ON ASPHALT ROAD UNDER MAINTENANCE COST UNCERTAINTY	1183
<i>Z. Zhao, K.J. Min</i>	
A HYBRID APPROACH FOR RAPID PREDICTIVE AND PROGNOSTIC MODEL DEVELOPMENT LEVERAGING TIME-SERIES AND MAINTENANCE EVENT DATA	1189
<i>W.G. Bond, H.R. Dozier, T.L. Arnold</i>	
PREDICTIVE RELIABILITY MODELING APPROACHES FOR IMPROVING EARLY LIFECYCLE RELIABILITY ESTIMATION	1195
<i>G.E. Gallarno, M.L. Lagarde, C.H. Rinaudo, R.K. Buchanan</i>	
A PROCESS MAP AND RISK ASSESSMENT FOR MAIL-BASED VOTING.....	1201
<i>N.M. Scala, I. Bloomquist, Y. Mezgebe, B. Jilcha, P.L. Goethals, J. Dehlinger</i>	
DESIGNING UNIT-LOAD WAREHOUSES: USE DETERMINISTIC OR PROBABILISTIC MODELS?.....	1207
<i>M. Tutam, J. Liu, J.A. White, H. Liao</i>	

Author Index