

2024 Systems and Information Engineering Design Symposium (SIEDS 2024)

**Charlottesville, Virginia, USA
3 May 2024**



**IEEE Catalog Number: CFP24SIE-POD
ISBN: 979-8-3503-8515-1**

**Copyright © 2024 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:	CFP24SIE-POD
ISBN (Print-On-Demand):	979-8-3503-8515-1
ISBN (Online):	979-8-3503-8514-4
ISSN:	2639-7439

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Towards an Adaptive System for Investigating Human-Agent Teaming: Let's Get Cooking!	1
<i>Ramsey J. Long, Abdulmalik G. Ariyo, Zoe I. Iwu, David P. Azari, Anna M. Madison, Stéphane Aroca-Ouellette, Alessandro Roncone, Chad C. Tossell, Anthony J. Ries</i>	
Evolutionary-Based Coordination of Multi-Robot Systems with Dynamic Constraints	7
<i>Vihar Shah, Matthew Heeter, Jose Vallarino, Patrick Sherman, Lauren Bramblett, Nicola Bezzo</i>	
An In-Depth Financial Analysis of Cost-Intensive Programs at Bicol University: Pathways to Inclusive Education	13
<i>Hennie P. Lomibao, Pee Jay N. Gealone, John Raymond Barajas, Ray Artimus Hinlo, Baby Boy Benjamin Nebres, Daves Tonga</i>	
Application of RFID Inventory Tracking Technology in the Hospital Pharmacy Setting	18
<i>Carrighan G. Brittain, Isabela Guilarte Lau, Avery L. Jones</i>	
Ethical Approaches to Sustainable Water Resource Solutions	24
<i>Brendan Durkin, Ryan Grimes, Lance Hamilton, Sienna Robinson</i>	
Psycho Acoustic Testing to Determine Optimal Frequency for Audible Safety Alerts for Freediving.....	29
<i>Arnav Nanda, Mohammad Zoraiz, Dhruva Barua, Raghad Mohamed</i>	
Associations Between Brain Connectivity and Psychiatric Symptoms in Children: Insights into Adolescent Mental Health	36
<i>Dongyuan Mutu, Kurt Ji, Xiaofu He, Seonjoo Lee, Stephanie Sequeira, Aiying Zhang</i>	
Design and Fabrication of a 2D Plant Tending Gantry.....	42
<i>Benjamin T. Trainum, Blake Hament</i>	
LoRa Wireless Mesh Network for Lake Biology Study	47
<i>Trey Lindquist, Kolton Chambers, Noah Benish, Devin R. Berg, Ahmet Turkmen</i>	
An Ant Colony Algorithm Approach to the Vehicle Routing Problem and Variants	51
<i>Tulio Tablada, Cleon Davis, Neil Palumbo</i>	
ScanMatch Versus MultiMatch: A Comparison of the Sensitivity of Scanpath Similarity Metrics to Changes in Workload.....	57
<i>Jad A. Atweh, Sara L. Riggs</i>	
Exploring the Indian Stock Market Through Minimum Spanning Trees and Planar Maximally Filtered Graphs: A Network Analysis Approach.....	63
<i>Shubhra Prakash, Mohammed Irfan Thayyil</i>	
Development and Evaluation of SAVI: Simple Automated Vulnerability Inspector	69
<i>Philip Isaacs, Anthony Walters, Ahmad Salman</i>	
Simulation and Process Improvement of a Golf Car Manufacturing Line	75
<i>Elias Pagurko, Jackson Seely, Anna Aintablian, Yazan Abbasi, Michael Zamperini</i>	
Enhancing Cybersecurity: The Development of a Flexible Deep Learning Model for Enhanced Anomaly Detection.....	79
<i>Hari Gonaygunta, Geeta Sandeep Nadella, Priyanka Pramod Pawar, Deepak Kumar</i>	

Impact of Explainable AI on Reduction of Algorithm Bias in Facial Recognition Technologies	85
<i>Ankita B, Chienchen H, Lauren P, Lydia O</i>	
Assessing the Reliability of Likert Scale Statements in an E-Commerce Quantitative Study: A Cronbach Alpha Analysis using SPSS Statistics.....	90
<i>Tshepo A. Malapane, Nkanyiso K. Ndlovu</i>	
Towards a Policy Framework for E-Commerce Risk Management: A Case of South African Online Shopping.....	96
<i>Tshepo Alex Malapane, Nkanyiso K. Ndlovu</i>	
Equity in Emergency Care: A Predictive Analysis of Cultural and Racial Impacts on Health Outcomes.....	102
<i>Nikhil Arora, Aram Bahrini</i>	
Predicting Winter California Precipitation with Convolutional Neural Networks	106
<i>Anthony Chiado, Kristian Olsson, Luke Rohlwing, Michael Vaden, Antonios Mamalakis</i>	
Fuzzy-Based Weighted Federated Machine Learning Approach for Sustainable Energy Management with IoE Integration.....	112
<i>Taher M. Ghazal, Jamshaid Iqbal Janjua, Sagheer Abbas, Areej Fatima, Muhammad Saleem, Muhammad Adnan Khan, Abdulrahman Alqarafi</i>	
Enhancing Road Safety with AI: A Secure System for Detecting Impairment Through Horizontal Gaze Nystagmus.....	118
<i>Chase Coleman, James Coulthard, Patrick Dodds, Ahmad Salman, Rod Macdonald</i>	
Machine Learning Analysis of Horse-Rider Dyad Performance in Show Jumping	124
<i>John D. Hutchinson, Diana J. Schwerha</i>	
Designing Pilot Treatment Systems for Evaluation of Passive Nitrogen and Phosphorus Filtration in Stormwater	130
<i>Lauren Hill, Seth Wolter, William T. Pluer, Scott Wolter, Tate Rogers, Jeffrey Johnson, Graham H. Miller, Sebastian Acosta-Calle, Brian R. Stoner, Julia W. Darcy</i>	
An Analysis of Vehicular Telematics and Geo-Location Data to Maximize Road Safety	136
<i>Hoang Minh V. Nguyen, Sunho C. Oh, Goirick Saha, Terrence L. Blunt, Matthew J. Ball, Michael E. Duffy, Ahmed F Abdelzaher, B. Brian Park</i>	
VMFMAX: Improving Virtual Machine Utilization in VNF Placement.....	142
<i>Seyedreza Taghizadeh, Parnian Emami, Hamid Reza Taleghani, Ali Tarmah, Seyedehnarjes Taghizadeh</i>	
Optimizing the ALMA Research Proposal Process with Machine Learning.....	148
<i>Arnav Boppudi, Ryan Lipps, Noah McIntire, Kaleigh O'Hara, Brendan Puglisi, Antonios Mamalakis</i>	
Troop to Task Optimization: Algorithmic Scheduling for USMC.....	154
<i>Rami Ghaleb, Sean Sy, Corey Crum, Roy Hayes</i>	
Expanding VIABLE Employment for Adults with Autism: A Systems Approach to Increase Nonprofit Sales.....	160
<i>Sophia Kikuchi, River Robins, Kate Kasko, Olivia Conner, Paul Pincombe, Robert J. Riggs, Sara L. Riggs</i>	
Study on Empowering Cyber Security by using Adaptive Machine Learning Methods	166
<i>Hari Gonaygunta, Geeta Sandeep Nadella, Priyanka Pramod Pawar, Deepak Kumar</i>	

Framework for a Case Study-Based Course in Safety and Mission Assurance for Space Systems.....	172
<i>Liz M. Bosch, Joshua B. McGurn, Radu Babiceanu</i>	
A Systems Methodology for Informed Solar Energy Decision-Making.....	177
<i>Lauren Beachy, Hannah Billing, Jack Dreesen-Higginbotham, Morgan Griffin, Liam Shields, Julia Lombardi, Reid Bailey</i>	
Evaluating the Implications of Regional Variability Under Proposed Policy Targets to Understand Its Impact on the Dynamics of Electric Vehicle (EV) Ownership	183
<i>Carolina Lugo Mejia, Diana Schwerha</i>	
Ethical Advancements from the Tuskegee Experiment	189
<i>Markisha Ford, Ayla Grandpre, Nya Harmon, Tumpe Mwenechanya, Nan Wang</i>	
Criteria Weighting of Micromobility Modes via Extracted Framework Element Effect (EFEE) Methodology	195
<i>Esra Çakir</i>	
Provably Clean: A Formal Analysis of Hand Hygiene During Anesthesiology Induction	200
<i>Isabella Holloman, Austin Campbell, Neha Pavuluru, Sergio Darquea, Gabriel A Lawrence, Matthew L. Bolton, Olivia Claire Rose, Michael A. Miller</i>	
Plant Organelle Segmentation using 3D Point Clouds and PointNet	206
<i>Rony Dahdal, Blake Hament</i>	
Optimizing Outpatient Cancer Infusion Center Access Operations using a Systems-Based Approach.....	211
<i>Simona A. Brkic, Jameson B. Knotts, Justin N. Ortega, Lauren E. Petty, Rupa S. Valdez</i>	
Water Quality Analysis of Permeable and Impermeable Paver Systems	217
<i>Sidney Lowe, Bethany Brinkman</i>	
Electrification of Utility Tractors at Maritime Container Ports	221
<i>Bethany K. Bazemore, Matthew W. Cha, Zachary J. Goss, Henry B. Haywood, Brodie K. Dye, Megan E. Gunn, Davis C. Loose, Thomas J. Polmateer, Daniel C. Hendrickson, James H. Lambert</i>	
Capacitive Touch Dielectric Constant Validation	227
<i>Nishu Hoque, Emely Claros, Jonathan Bender</i>	
An Innovative Design for Improving U.S. Airports' Cybersecurity Based on Blockchain Technology	232
<i>Mosladdin M. Shueb, Chuyang Yang, Xiangdong Che</i>	
Explaining Tree-Based Regression Model Predictions with Nearest Training Neighbors	238
<i>Srimoudgalya Sanagavarapu, Rishu Jain, Harikumaran Rani Dwarakanathan</i>	
DFit: Cloud-Based Service and Business Case	244
<i>Franklin Glance, Mitch Mitchell, Esther Yi</i>	
Assessing the Potential for Renewable Energy Development in Appalachia	250
<i>Charlotte H. Browder, Abby H. Dawley, Luke K. Mathe, Conor W. Murphy, Frederick S. Van Winkle, Julianne D. Quinn</i>	
Improvement of Government Contractor Procurement Process Utilizing DMAIC.....	256
<i>Austin Aber, Madison Ancosky, Benjamin Smith, Harrison Westfall, Makenzie Dolly</i>	

Exploring the Ethical Implications of CRISPR-Cas9 Genetic Modification on Viable Embryos	262
<i>Myleisha Bolden, Michael Croly, Lyuxi Liu, Genai Veal</i>	
Optimized Transmission Expansion Planning with Bus-Splitting in Grids with High VRE Penetration.....	268
<i>Pee Jay N. Gealone, Adonis Emmanuel D. Tio</i>	
Adapting Transformer-Based Multi-Style Networks for Human Pose Prediction with a Custom Data Pipeline in Industrial Human-Robot Collaboration.....	274
<i>Mohammadreza Mowlai, Mahdi Mahdavimanshadi, Iman Sayyadzadeh</i>	
Enhancing Lung Cancer Detection and Localization with a Hybrid VGG-19 and Adaptive Neuro-Fuzzy Inference System (ANFIS) Approach on Imaging Data	280
<i>K Nithish Kumar, Sai Santhosh V C, Aniket Mane, Rahimunnisa K, G. Nirmal, Maitreya Vaghulade</i>	
Reducing Barriers in Analyzing Eye Tracking Data: The Development of a GUI to Preprocess Eye Tracking Data	286
<i>Jad A. Atweh, Ihab Tabbara, Ghady Nasrallah, Sara L. Riggs</i>	
3D Data Collection for Individual Plant Farming	292
<i>Jacob Karty, Blake Hament</i>	
Artificial Intelligence (AI) Voice Module for Robot Service Dog	296
<i>Amalie J. Keefe, Blake Hament</i>	
Cyber Threat Modeling for Water and Wastewater Systems: Contextualizing STRIDE and DREAD with the Current Cyber Threat Landscape.....	301
<i>Rian Davis, Omer F. Keskin</i>	
Exploring the Ethical Dimensions of Engineering Processes for Solar Energy Production	307
<i>Dillon Finkenbinder, Donovan Nicholas, John Sanders, Cassidy Valinski</i>	
Non-Motorised Vehicle Recognition System Based on Drone Aerial Images and YOLOv8	313
<i>Meijia Zhou, Yi Yang, Xuefen Wan</i>	
Detecting Illegal, Unreported, and Unregulated Fishing Through AIS Data and Machine Learning Approaches.....	319
<i>Samuel Brown, Danielle Katz, Dana Korotovskikh, Stephen Kullman</i>	
Exploring Discrepancies: Analyzing EMR Data Against Direct Observations	325
<i>Avery Schebell, Grace Fitzgerald, Catherine Irons, Colin Miehe, Sammy Park, Eunice Lee, Shantanu Malhotra, Kimberly Dowdell, Karen Measells, Robert J. Riggs</i>	
Accessible Navigation Mapping: Supporting People with Mobility Disabilities for Wayfinding	331
<i>Iris Chen, Manasi Srigiriraju, Shiyu Liu, Christopher Cook, Tariq Iqbal, Rupa Valdez</i>	
Reducing Lead Times in Manufacturing with Real-Time Data Visualizations.....	337
<i>Sidney Stern, Dagmawie Getnet, Eric Van Hoorde, Jaime Cucalon, Natalie Cherbaka</i>	
Enhancing Shop Floor Information Through Digitalization for an Architectural Veneer Process.....	343
<i>Sean Kemp, Kason Westfall, Samuel Pittman, Farouk Elalaily, Makenzie Dolly</i>	
Minimizing D.C. Metrorail Disturbances: A Multi-Objective Decision Making Analysis Framework for Strategic Resilience.....	348
<i>Claire Foley, Amaya Walker, Ziqian Yang, Salah Mohammed, Eric Dano, Adam Jachimowicz</i>	

Ethical Groundings: Uncovering Boeing's Moral Responsibility for the 737 MAX Crashes	354
<i>Quinn Conner, Keith Shiminski, Peyton Taylor, Jayden Vaughan</i>	
Exploratory Data Analysis of Artificial Intelligence Integration in Philippine Engineering Programs Offered by State Universities and Colleges: A Preliminary Assessment	360
<i>John Raymond Barajas, Maria Jihan Sangil, Nico Aspra, Pee Jay Gealone, Arpon Lucero, Marben Ramos, Oliver Padua, Ronell Oropesa</i>	
Analyzing STEM Competencies Among Filipino High School Students: An Item Response Theory Approach	366
<i>Marites Olesco, Nico Aspra, John Raymond Barajas, Pee Jay Gealone, Reynato Andal Gamboa</i>	
Respirable Crystalline Silica Exposure in University Concrete Labs.....	372
<i>Emma Myer, Johanna Enzmann, Heather Kirkvold, Daniel I. Castaneda</i>	
Deep Learning-based EEG Analysis for Sleep Apnea Detection	376
<i>Matthew Bonner, Benjamin Nikolai, Quinn Glovier, Augustus Lamb, Addison Gambhir</i>	
A Multistage Stochastic Optimization Model for Resilient Pharmaceutical Supply Chain in COVID-19 Pandemic Based on Patient Group Priority	382
<i>Mahdi Mahdavimanshadi, Matin Ghasempour Anaraki, Mohammadreza Mowlai, Zahra Ahmadirad</i>	
Concrete Composition and Effects on Properties and Performance	388
<i>Gabriel N. Nicholas, Bethany M. Brinkman</i>	
Capacitive Touch Air Gap Measurement.....	392
<i>Tonima Shib Priva, Shimi Afsarsa</i>	
Operating Room Throughput Efficiency Improvement at LewisGale Medical Center, Salem VA	397
<i>B. Atkins, C. Braun, R. Bromwell, N. Kennedy, N. Cherbaka</i>	
Optimizing Hysteresis-Based Reinforcement Learning to Improve Collision Avoidance for Self- Driving Vehicles	403
<i>Erwin J. Wunderlich, E. Korman</i>	
Enhancing Focused Ultrasound Literature Review Through Natural Language Processing-Driven Text Classification.....	409
<i>Reanna Panagides, Skye Jung, Sean Fu, Abhishek Singh, Rose Eluvathingal Muttikkal</i>	
Improvement of Material Handling Processes for High-Volume Manufacturing.....	415
<i>Issabella Colegrande, Andrew Levis, Malia Richardson, Ryan Stas, Makenzie Dolly</i>	
Resource Optimization Tool.....	420
<i>Kelli Carpenter, James Williams, Nikolas Rocha, Sophia Margarella</i>	
Forecasting Breakthroughs: Identifying Future Leaders in the Semiconductor Industry	425
<i>Adam Rogers, Carter Dibsie, Ethan Kuzneski, David Underwood, Robert Brozey, Lauren Sullivan, Donald Robinson, Michael D. Porter</i>	
Empowering Enterprise Architecture: Leveraging NLP for Time Efficiency and Strategic Alignment.....	431
<i>Sunidhi Goyal, Fadumo Hussein, Isha Thukral, Taryn Trimble</i>	

Developing Design Features to Facilitate AI-Assisted User Interactions	437
<i>S. Meng, R. Dollahite, A. Kaur, P. Schell, A. Sharma, G. Ventre, I. Kranz, G. Nudelman, G. J. Gerling</i>	
Exploring Post-Graduation Perspectives of Recipients of the Universal Access to Quality Tertiary Education Act via Association Rule Mining: A Case Study	443
<i>Lea Austerio, John Raymond Barajas, Lany Maceda, Jennifer Llovido, Arlene Satuito, Michael Angelo Brogada, Maria Jihan Sangil</i>	
The Impact of Generative AI and LLM on the Cybersecurity Profession	448
<i>Noelle Capodieci, Christopher Sanchez-Adames, Joesph Harris, Unal Tatar</i>	
Experimentally Determining the Convection Coefficient for a Vehicle Surface	454
<i>Abigail McAllister, Holly Lakner, Kate Campbell, Timothy Scott, Jonathan Bender</i>	
Braille Learning using Haptic Feedback	460
<i>Megan Caulfield, Jason Forsyth, Laura Deportes, Daniel Castaneda</i>	
The Ethics of Disaster Resilient Infrastructure Maintenance and Social Equity	466
<i>Fortune Aberra, Carrington Harrod, Malcolm Mays, Hugo Stevenson</i>	
Sensorized Fur for Tactile Human Robot Interaction	472
<i>Zoë Scherbier, Blake Hament</i>	
Ethical Considerations in Water Transportation and Dam Management: Protecting Environmental Integrity, Social Fairness, and Long-Term Sustainability.....	476
<i>Andrews Boateng, Hope George, Jalen Jackson</i>	
Steel Extendable Arm SIEDS Report	481
<i>Emily Trunk, Devin Montogomery, Dominique Cunningham</i>	
Resource Allocation Playbook.....	487
<i>Caitlyn Sanford, Sarah Valley, Kaylee Keegan, Reed Foote, Natalie Cherbaka</i>	
Analysis of Satellite Systems' Dependencies and Their Cascading Impacts	493
<i>J. Trenton Hanan, Ethan Fowler, Sebastian Hernandez, Matthew Niemczyk, Unal Tatar, Omer F. Keskin</i>	
An Affordable Approach to Runway Incursion Prevention	499
<i>Luigi Raphael I. Dy, John H. Mott</i>	
Analyzing Candidates for Home Electronic Incarceration on Return-to-Custody Rates for Inmates	505
<i>Stella Banino, George Boulos, Chris Craft, Laura Phillips, Sally Sydnor, Loreto Peter Alonzi, Michael Smith, K. Preston White, Matthew Vitale</i>	
Enhancing Malware Classification: A Comparative Study of Feature Selection Models with Parameter Optimization.....	511
<i>Faruk Curebal, Hasan Dag</i>	

Author Index