

22nd IFAC Conference on Technology, Culture and International Stability (TECIS 2024)

IFAC PapersOnline Volume 58, Issue 3

Waterford, Ireland
29-31 May 2024

Editors:

Larry Stapleton

ISBN: 979-8-3313-0071-5

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.

To the extent permissible under applicable laws, no responsibility is assumed by the Owner, the Publisher or the Licensee for any injury and/or damage to persons or property as a result of any actual or alleged libelous statements, infringement of intellectual property or privacy rights, or products liability, whether resulting from negligence or otherwise, or from any use or operation of any ideas, instructions, procedures, products or methods contained in the material therein.

The publication of an advertisement in the POD Edition does not constitute on the part of the Owner, the Publisher or the Licensee a guarantee or endorsement of the quality or value of the advertised products or services described therein or of any of the representations or the claims made by the advertisers with respect to such products or services.

Copyright© (2024) by the authors
Open access publication under the CC-BY-NC-ND License
<https://creativecommons.org/licenses/by-nc-nd/4.0/>
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
The Boulevard, Langford Lane
Kidlington
Oxford OX5 1GB UK

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

Dancing Like No One is Looking: LGBTQ+ Visibility, Equity and Belonging in Digital Automation and Control Systems and Communities.....	1
<i>Noeleen Donnelly, Larry Stapleton</i>	
What are the Benefits of More Women in Engineering?	8
<i>Orlagh Costello</i>	
Enabling Indian Women Career Reentry in Technology – A Learning Journey	14
<i>Ramalatha Marimuthu, Harivardhagini Subhadra, Bozenna P. Duncan, Mary Doyle-Kent, Cinzia Davia</i>	
Women in Engineering in Eastern Partnership Countries: Case Study in Ukraine and Moldova.....	20
<i>Natalia Shyriaieva, Corina Gutu-Chetrusca, Galia Marinova, Mary Doyle-Kent, Fahmida Chowdhury</i>	
From Philosophy to Praxis: A Framework for Investigating Equality, Diversity and Inclusion Manifestation in Higher Education Institutions.....	26
<i>Peter J. Carew, Breda W. Shanahan, Mary Doyle-Kent</i>	
Prediction of Pregnancy Complication and Child Mortality Using Regression Analysis.....	32
<i>S. N. Shivappriya, Sneha Nagarajan, E. S. Srima, K. Sriram</i>	
Factors to Achieve Cost Efficiency in Operation and Manufacturing Projects in VUCA Environment	38
<i>Kienl Johannes, Blokhina Tatiana</i>	
Industry 4.0 in Ireland: Further Developing the “Three I’s” Framework.....	44
<i>Jordan Neville, Mary Doyle-Kent</i>	
Accessibility of Braille Texts for the Visually Impaired Produced with Different 3D Printing Technologies.....	50
<i>Mira Tzvetkova-Arsova, Margarita Tomova, Nikolay Stoimenov, Gabriela Kotseva, Nayden Chivarov, Danka S. Nikolova, Slavina Lozanova</i>	
What do European Stakeholders Think About Open Social Innovation?	55
<i>Eleni N. Arvaniti, Chrysostomos D. Stylios, Agapi Dima</i>	
Can Deepfakes Benefit the Metaverse in an Era of Disinformation? Insights from a Systematic Review	61
<i>Alexandru Stanciu, Ella-Magdalena Ciuperca</i>	
On the Issue of Validating Certain Scenario Analysis Models	66
<i>Vadim R. Feyzov</i>	
Macro-Scale Pattern Recognition and Coordinate Identification in Real-Time Spatio-Temporal Overlap for Photonics Engineering Applications	70
<i>Haider Al-Juboori</i>	
Acousto-Optical Receiver for Passive Radar System.....	74
<i>A. R. Rustamov, B. G. Ibrahimov, I. J. Islamov</i>	

Deep Learning-Based Diabetic Retinopathy Severity Classification and Progression Time Estimation.....	78
<i>S. N. Shivappriya, M. Alagumeenaakshi, S. Sasikala</i>	
Essential Competencies and Educational Skills for the Emerging Quantum 2.0 Industry: Challenges and Prospectives	84
<i>Haider Al-Juboori, Gina Noonan</i>	
Control Engineering and Mathematics: A New Hands-On Pedagogical Approach Through the Perspective of Art	88
<i>M. Cojan, F. Colas, P. Fritz, A. Renout, C. Stoica, M. Ung</i>	
Integrated Intelligent Educational Environment – Opportunities for STEM Education.....	94
<i>Valentina Terzieva, Svetozar Ilchev, Edita Djambazova</i>	
Methodology for Complex Thinking in Solving Problems in Engineering Training	100
<i>Petko Stoev, Maya Stoeva</i>	
Trends, Challenges, Opportunities, and Innovations in STEM Education	106
<i>Valentina Terzieva, Elena Paunova-Hubenova, Savina Slavcheva</i>	
Interdisciplinary Approaches in Engineering Education: Preparing Young Minds for Complex Challenges	112
<i>Ille C. Gebeshuber, Pia M. Graves, Inez Wardzinska, Ruth Mateus-Berr, Breda W. Shanahan</i>	
Integrating Digital Tools in Engineering Education: Social Impact of Technological Integration	118
<i>Ines B. Bunjaku, Shejnaze Gagica, Mary D. Kent</i>	
Criteria and Approaches for Optimization of Innovative Methods for STEM Education	123
<i>E. Trichkova-Kashamova, E. Paunova-Hubenova, Y. Boneva, S. Dimitrov</i>	
Beyond Boundaries: Harnessing Unique Intellectual Abilities through Inclusive Engineering Education.....	129
<i>Ille C. Gebeshuber, Marion Hersh</i>	
Innovations and Challenges in Engineering Education for the Future: Contributing to the UN Sustainable Development Goals (SDGs).....	134
<i>Ille C. Gebeshuber, Mary Doyle-Kent</i>	
Prescriptive Manufacturing in Society 5.0: Human Autonomous Organizations and “On-Demand” Smart Services	139
<i>Xiao Wang, Jun Huang, Jing Yang, Xiaoxing Wang, Fei-Yue Wang</i>	
The Cybernetic Artificial Intelligence (CAI): A New Scientific Field for Modelling and Controlling Complex Dynamical Systems.....	145
<i>Peter P. Groumpas</i>	
The United Nations Sustainable Development Goals: An IFAC Agenda	153
<i>Pramod P. Khargonekar, Tariq Samad</i>	
Society 5.0: Metaverse Facilitated Human-Centric “5H” Services Across Cyber-Physical-Social Spaces.....	159
<i>Xiao Wang, Jun Huang, Qinghua Ni, Zhe Wan, Huadan Xue, Larry Stapleton, Fei-Yue Wang</i>	
Systems and Control for Societal Impact: IFAC TC 9.2 Visions and UN SDGs	165
<i>Mariana Netto, Christos Emmanouilidis, Pramod P. Khargonekar</i>	

Control and Automation Education and UN SDGs: Alignment of TC 9.4 - Current Status and Future Directions	171
<i>Antonio Visioli, Larry Stapleton</i>	
Technology, International Stability and Culture (TECIS) – TC9-5: Exploring the Alignment of Control and Automation Systems with the United Nations Sustainable Development Goals (UN SDGs).....	176
<i>Bahadur Ibrahimov, Larry Stapleton</i>	
Students Understanding for AI in Different Educational Levels	182
<i>Maya Staikova, Valentina Ivanova, Nayden Chivarov</i>	
Intelligent Adaptation of Difficulty and NPC Behavior in Serious Video Games for Learning.....	187
<i>Boyan Bontchev, Ivan Naydenov, Ilko Adamov</i>	
A Web-Based Application in EDA-DYV Platform for Analyzing Mergers and Acquisitions in the EDA.....	193
<i>Blerim Zylfiu, Galia Marinova</i>	
Combining Software Algorithms and Machine Learning in Business Data Processing	198
<i>Valentina Ivanova, Nayden Chivarov, Maya Staikova</i>	
Virtual Reality in Maritime Training: A Mini Literature Review and Open Issues	203
<i>Athanasios Christopoulos, Chrysostomos Stylios</i>	
Data Processing and Modeling for CEEPUS Academic Event Optimal Management in the IMA-NET Platform	209
<i>Krisel Tola, Galia Marinova</i>	
Design of a Micromobility Transportation Unit with AI	215
<i>Rosen Fichero, Petko Stoev, Momchil Georgiev, Maya Stoeva</i>	
Development of a Mobile Robot for Distribution of Medicine in Hospitals	221
<i>Petko Stoev, Rosen Fichero, Momchil Georgiev</i>	
The Impact of Optimal Climate Change Control on Rice Production in Critical Regions: The Case of Southeast Asia	226
<i>Sabrina De Nardi, Lucia Sangiorgi, Sara Raccagni, Claudio Carnevale</i>	
Digital Solutions in Elderly Healthcare: A Literature Review and Research Agenda	232
<i>Mateja Buzina, Tanita Knežević, Salkunic Šefik</i>	
Surface Modification Enhancement Frequency Stability of Tuning Fork Sensor	238
<i>Shibo Cai</i>	
Design of Steel Profiles with Similar Characteristics to the Aluminum Profiles Used in Solar Panels.....	244
<i>Ecenur Calis, Sibel Surener, Ali B. Tekyalcin, Ismail Bogrekci, Pinar Demircioglu</i>	
The Use of Mobile Applications in Communication Between Elderly Individuals and Their Families: Literature Review and Research Agenda.....	250
<i>Danijela Sopić</i>	
Enhancing Digital Government Engagement Among Older Adults: Literature Review and Research Agenda	256
<i>Ivan Jurišić, David Bogataj</i>	

Impact of Technology on the Quality of Life of Elderly People in Smart Villages: Literature Review	262
<i>Jelena Lucan, Marija Pokmajevic, Urška Kuncic</i>	
Smart Villages as Infrastructure of Rural Areas: Literature Review and Research Agenda	268
<i>Visar Emerllahu, David Bogataj</i>	
Measuring the Acceptance of Smart Home-Based Technologies Among the Older Adults: Systematic Literature Review.....	274
<i>Ajda Šeme, David Bogataj, Boštjan Kerbler</i>	
Social Technologies for Healthy and Active Aging: Literature Review and Research Agenda.....	280
<i>Aleksandra Ločičnik</i>	
The Impact of ICT Usage on Older Adults Residing in Institutional Settings Amidst the Coronavirus Disease Pandemic - Enhancing Emotional Experiences	286
<i>Mihael Nedeljko, Barbara T. Perovic, Miran Grah, Boris M. Kaucic</i>	
How the Digital Culture of Financial Organizations Impacts National/International Stability	292
<i>Darren Byrne, Aisling Tuite, John Organ</i>	
Competencies for Smart City Challenges.....	298
<i>Alenka T. Salaj, Olav Torp, Elham Andalib</i>	
Impact of Digital Technology on the Quality of Life of Older Adults - Literature Review.....	304
<i>Valentina Vincek, Željka K. Rogina, David Bogataj</i>	
Insights from Operationalizing, Testing and Evaluating the ENRICHER Method: INSYTE-Cooley Research Lab Case Study	310
<i>Brenda O'Neill, Larry Stapleton, Peter Carew</i>	
Students Attitude to Serious Games for Cultural Heritage	316
<i>Boyan Bontchev, Valentina Terzieva, Dessislava Vassileva, Yavor Dankov</i>	
Human-Centred Machine Learning Approaches for Smart Cultural Heritage Spaces: A Multicontinental Review	322
<i>Cian Murphy, Peter J. Carew, Larry Stapleton</i>	
The Role of Digital Cultural Heritage in Software Engineering Education: Using Assets from the Digital Repository of Ireland as a Teaching Aid.....	328
<i>Brenda O'Neill, Larry Stapleton, Peter Carew, Jennifer Cullinan, S. Conroy, Joseph Mather, Rafal Krzempek, Stephen Nolan, Eoghan Walsh, Aleksa Grubjesic</i>	
From Project to Sea: The Journey of the Robot to the Mediterranean.....	334
<i>Jason Berry</i>	
Minimizing Carbon Footprint and Enhancing Energy Savings Using Premium-Efficiency Motors.....	340
<i>Sudharsan Srinivasan, Zak Cullen, Robert Connolly, Ben Breen, Abdulaleem Albadawi</i>	
Towards Sustainable Cyber-Physical Manufacturing Systems.....	345
<i>Robert W. Brennan, Guolin Lyu</i>	
Urban Farming for Social Benefit	351
<i>S. Akbarnezhad Nesheli, A. Temeljotov Salaj</i>	
The Art of Memory: Archiving Street Art using the CIDOC Conceptual Reference Model	357
<i>Patrick McInerney, Brenda O'Neill</i>	

A Conception of an Instrument Supporting the Design of Educational Video Games for Cultural Heritage	363
<i>Yavor Dankov</i>	
Hierarchical Modelling of Smart Digital Cultural Heritage Spaces: An XML-Based Approach	369
<i>Cian Murphy, Peter J. Carew, Larry Stapleton</i>	
Effect and Sustainability of Work from Home (WFH) in the Engineering Space	375
<i>Diseph Emma-Ikata, Orlagh Costello</i>	
Intelligent Electronic Control Module for Laser Light Projection Systems in Industrial and Educational Environments.....	381
<i>Svetozar Ilchev</i>	
Evaluating the Impact of Cyberattacks on PLC Performance: A Systematic Implementation and Empirical Investigation	387
<i>Alfred Ocaka, Diarmuid O' Briain, Keara Barrett</i>	
Improving Antenna Array Efficiency for Automatic Control Systems.....	393
<i>I. J. Islamov, N. A. Malikova Akhmadova</i>	

Author Index