

2021 12th International Conference on Information, Intelligence, Systems & Applications (IISA 2021)

**Chania Crete, Greece
12-14 July 2021**



**IEEE Catalog Number: CFP2134V-POD
ISBN: 978-1-6654-0033-6**

**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:	CFP2134V-POD
ISBN (Print-On-Demand):	978-1-6654-0033-6
ISBN (Online):	978-1-6654-0032-9

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

CURRAN ASSOCIATES INC.
proceedings
.com

**2021 The 12th International Conference on Information,
Intelligence, Systems and Applications (2021)**

Table of Contents

MM-1

- 1 **Exploring Aspects of Reasoning in Neuro-Symbolic Rules and Connectionist Expert Systems**
Jim Prentzas, Ioannis Hatzilygeroudis
- 9 **Reasoning over Bayesian Networks using Semantic Artificial Neural Networks**
Sotirios Batsakis, Grigoris Antoniou
- 13 **Robustness of Compressed Deep Neural Networks with Adversarial Training**
Yunchun Zhang, Chengjie Li, Wangwang Wang, Yuting Zhong, Xin Zhang, Yulin Zhang
- 20 **Genetic Algorithm Based Quantum Circuits Optimization for Quantum Computing Simulation**
Lu Wei, Zhong Ma
- 28 **Differentially Private Synthetic Mixed-Type Data Generation For Unsupervised Learning**
Uthaipon Tao, Tantipongpipat, Chris Waites, Digvijay Boob, Amaresh Ankit Siva, Rachel Cummings

MM-2

- 37 **Forecasting of shortterm PV production in energy communities through Machine Learning and Deep Learning algorithms**
Nikolaos Dimitropoulos, Nikolaos Sofias, Panagiotis Kapsalis, Zoi Mylona, Vangelis Marinakis, Niccolo Primo, Haris Doukas
- 43 **Innovative Personalised Applications to Motivate and Support Behavioural Energy Efficiency**
Konstantinos Koasidis, John Psarras
- 49 **A Data-Driven Decision Support Tool at the service of Energy suppliers and Utilities for Tackling Energy Poverty: A case study in Greece**
Apostolos Arsenopoulos, Elissaios Sarmas, Andriana Stavrakaki, Ioanna Giannouli, John Psarras
- 55 **Integrating Integrated Assessment Modelling in Support of the Paris Agreement: The IZAM PARIS Platform**
Alexandros Nikas, Stavros Skalidakis, Alevgul Sorman, Ester Galende-Sanchez, Konstantinos Koasidis, Filippos Serepas, Dirk-Jan Van de Ven, Jorge Moreno, Anastasios Karamaneas, Themistoklis Koutsellis, Eleni Kanellou, Haris Doukas

MM-3

- 63 **Evaluating the user experience of a fuzzy based Intelligent Tutoring System**
Konstantina Chrysafiadi, Maria Virvou
- 70 **A Scenario Editor to Create and Modify Virtual Simulations and Serious Games for Mental Health Education**
Andrei Torres, Bill Kapralos, Celina Da Silva, Eva Hava Peisachovich, Adam Dubrowski
- 74 **Primary school teachers' attitudes towards digital educational games: Preliminary findings from the Multiplication Game evaluation**
Angeliki Leonardou, Maria Rigou, John Garofalakis
- 82 **Formative Evaluation for Intelligence Quality Management in an Education Program. Case Study**
Dimitris Tspianitis, Ifigeneia Roumelioti

MA-1

- 87 **Fuzzy Integration of kernel-based Gaussian Processes applied to Anomaly Detection in Nuclear Security**
Miltos Alamaniotis
- 91 **Optimization of motion and energy consumption of an industrial automated ground vehicle**

Theodora Liangou, Argyris Dentsoras

- 98 **Exploring the Effectiveness of Employing Limited Resources for Deep Neural Pairwise Evaluation of Machine Translation**

Despoina Mouratidis, Katia Lida Kermanidis

- 103 **CNN-based affective states recognition in ambulatory settings**

Leonidas Liakopoulos, Nikolaos Stagakis, Evangelia I. Zacharaki, Konstantinos Moustakas

MA-2

- 111 **Attempting to reconstruct a 3D indoor space scene with a mobile device using ARCore**

Dimitrios Tsoukalos, Vangelis Drosos, Dimitrios Tsolis

- 117 **Motivating Item Annotations In Cultural Portals With UI/UX Based On Behavioral Economics**

Georgios Drakopoulos, Yorghos Voutos, Phivos Mylonas, Spyros Sioutas

- 123 **Combining 3D Surveying with Archaeological Uncertainty: the metopes of the Athenian Treasury at Delphi**

Katerina Mania, Athanasia Psalti, Dimitra- Maria Lala, Marilena Tsakoumaki, Andreas Polychronakis, Anastasia Rempoulaki, Michael Xinogalos, Emmanuel Maravelakis

- 127 **Aspect-Based Community Detection of Cultural Heritage Streaming Data**

Elias Dritsas, Maria Trigka, Gerasimos Vonitsanos, Andreas Kanavos, Phivos Mylonas

- 131 **Preliminary research on the design of an ambient intelligence application utilizing the exploitation of landmarks for the promotion of ancient greek technology exhibits**

Konstantinos Kotsopoulos, Konstantinos G. Kotsanas, Asimina N. Mitsomponou, Theofanis Alexandridis

MA-3

- 135 **Personalized Academic Thesis Management**

Eythymios Tsatsaris, Evangelos Sakkopoulos

- 143 **Automatic Generation of Tutorial Systems on PC for Smartphone Applications**

Sixin Hua, Yoshiaki Fukazawa

- 151 **A Teaching Assistant for Microelectronic Circuits Problems**

Salam Nachawi, Vincent Gaudet, Mohamed Elmasry

- 155 **Optimal Team Pairing of Elder Office Employees with Machine Learning on Synthetic Data**

Elias Dritsas, Nikos Fazakis, Otilia Kocsis, Konstantinos Moustakas, Nikos Fakotakis

TM-1

- 159 **Enhancing the accessibility of Serious Games: A case study with Foodbot Factory**

Robert Savaglio, Jacqueline M. Brown, Bill Kapralos, Ann LeSage, Beatriz Franco Arellano, Janette Hughes, JoAnne Arcand

- 163 **Deep Learning for Bone Metastasis Localisation in Nuclear Imaging data of Breast Cancer Patients**

Serafeim Moustakidis, Athanasios Siouras, Nikolaos Papandrianos, Charis Ntakolia, Elpiniki Papageorgiou

- 171 **VRESS: Designing a platform for the development of personalized Virtual Reality scenarios to support individuals with Autism**

Konstantinos Kotsopoulos, Matthaios Katsounas, Alexandros Sofjos, Christos Skaloumbakas, Alexandros Papadopoulos, Athanassios Kanellopoulos

- 175 **Classification of Medical Big-Data collected using IoT Devices**

Eirini Zoumi, Emmanouil Skondras, Angelos Michalas, Dimitrios D. Vergados

TM-2

- 182 **Expert Intelligence Tools for Proactive Energy Management in Buildings**

Dimitris Tsiapanitis, Peter Groumpos, Stefanos Michos

- 186 **Quantum Neural Network Parameter Estimation for PV Fault Detection**

Glen Uehara, Sunil Rao, Matthew Dobson, Cihan Tepedelenlioglu, Andreas Spanias

193 **PV Array Soiling Detection using Machine Learning**
Joshua Martin, Kristen, Jaskie, Yiannis Tofis, Andreas Spanias

197 **Renewable Energy Sources and Impact on GDP Growth**
Maria Karasimou, Olga Mousiari, Lefteris H. Tsoukalas

TM-3

203 **A Network Slicing Algorithm for 5G Vehicular Networks**
Emmanouil Skondras, Angelos Michalas, Dimitrios J. Vergados, Emmanouel T. Michailidis, Nikolaos I. Miridakis

210 **An AI-based Prediction-as-a- Service Model for Estimating Machine Bearing Health Status in Industry 4.0 5G Applications**
Dimitrios Batistakis, Apostolos Xenakis, Georgios Papastergiou, Periklis Chatzimisios, Vassilis Gerogiannis

218 **Optical Frequency Hopping Techniques for Secure Fiber-Optic networks**
Charalampos Papapavlou, Konstantinos Paximadis, Giannis Tzimas, Ioanna Savelona

222 **Design and Analysis of a New SDM Submarine Optical Network for Greece**
Charalampos Papapavlou, Konstantinos Paximadis, Giannis Tzimas

230 **Near-Far Problem as a Function of Analog to Digital Converter Resolution in Software Defined Radio Tactical Network**
Kashif Shahzad, Muhammad Zeeshan, Muhammad Umar Farooq, Shoab Ahmed Khan

TA-1

234 **Applied Artificial Neural Networks and Genetic Algorithms in Simulation Strategy for Trajectory in Collaborative Robotic**
Marcio Mendonca, Rodrigo Palacios, Elpiniki Papageorgiou, Ivan Chrun, Lillyane Cintra, Konstantinos Papageorgiou

242 **Semantic Scene Segmentation for Robotics Applications**
Maria Tzelepi, Anastasios Tefas

246 **Comparison of Image segmentation, HOG and CNN Techniques for the Animal Detection using Thermography Images in Automobile Applications**
Yuvaraj Munian, Antonio Martinez-Molina, Miltiadis Alamaniotis

254 **Sharpness Enhancement of Stereo Images Using a Depth-Based Per-Pixel Regularization**
Juan Andrade

TA-2

262 **Smart Cities and Intelligent Transportation in Traditional Cities. Ten Design Principles and One Case Study**
Sotiris Lycourghiotis, Vassiliki Mpelogianni, Peter Groumpos

269 **Forecasting Winter Precipitation based on Weather Sensors Data in Apache Spark**
Andreas Kanavos, Theodor Panagiotakopoulos, Gerasimos Vonitsanos Manolis Maragoudakis, Yiannis Kiouvreki

275 **A FIWARE-based IoT Framework for Smart Water Distribution Management**
Theodor Panagiotakopoulos, Dimitrios Vlachos, Thanasis Bakalakos, Andreas Kanavos, Achilles Kameas

281 **Smart Home Assistance for humans with episodic memory decline problems using a fuzzy rule-based mechanism: The case of stove usage**
Konstantina Chrysaftadi, Evangelia-Aikaterini Tsichrintzi

286 **The application of Blockchain technology in Copyright field: formalities and “smart contracts”**
Evangelia Kokotsaki, Galateia Kapellakou, Spyros Sioutas, Dimitrios Tsolis, Anastasios Giannaros

TA-3

294 **Secure Decision Making and Inference in Critical Systems**
Styliani Pantopoulou, Maria Pantopoulou, Lefteri H. Tsoukalas

- 298 **“Coordinates’ Line Subtitles”**: a Spicy Feature in VR360 Videos for Events’ Locations
Nikolaos Tsatsakis, Nikolaos Papadakis, Panagiotis Bariamis
- 303 **Evaluation of Public Funding Processes by Mining Event Logs**
Aimilia Zisimou, Ioanna Kalaitzoglou, Georgia Theodoropoulou, Alexandros Bousdekis, Georgios Miaoulis
- 310 **Modeling of Medical Devices Classification with Computational Argumentation**
Sofia Almpani, Yiannis Kiouvrekis, Petros Stefanias

WM-1

- 316 **In the Fog: Application Deployment for the Cloud Continuum**
Dimitris Apostolou, Yiannis Verginadis, Gregoris Mentzas
- 323 **Cloud Computing: Serverless**
Arne Koschel, Irina Astrova, Marc Schaaf
- 330 **A Look at Service Meshes**
Arne Koschel, Irina Astrova, Marc Schaaf
- 338 **Transforming procedures to web applications using IFML: The new Greek Citizenship Test**
Stavros Pliotopoulos, Evangelos Sakkopoulos

WM-2

- 344 **Quantum Information Processing Algorithms with Emphasis on Machine Learning**
Glen Uehara, Andreas Spanias, William Clark
- 355 **Hybrid Quantum Differential Evolution**
Clara Pizzuti
- 363 **Dynamic k determination in k - NN classifier: A literature review**
Merkourios Papanikolaou, Georgios Evangelidis, Stefanos Ougiaroglou
- 371 **A comparative study of validity indices on estimating the optimal number of clusters**
Aikaterini Karanikola, Charalampos M. Liapis, Sotiris Kotsiantis

WM-3

- 379 **Data Mining for Targeted Inspections Against Undeclared Work by Applying the CRISP-DM Methodology**
Eleni Alogogianni, Maria Virvou
- 387 **Nutritional Biomarkers and Machine Learning for Personalized Nutrition Applications and Health Optimization**
Dimitrios P. Panagoulas, Dionisios N. Sotiropoulos, George A. Tsihrintzis
- 393 **Stock Trend Prediction by Fusing Prices and Indices with LSTM Neural Networks**
Vasilis Karlis, Katerina Lepenioti, Alexandros Bousdekis, Gregoris Mentzas
- 400 **Short Survey of Artificial Intelligent Technologies for Defect Detection in Manufacturing**
Elpiniki Papageorgiou, Theodosia Theodosiou, George Margetis, Nikolaos Dimitriou, Paschalis Charalampous, Ioannis Samakovlis
- 407 **Discovering Influential Twitter Authors Via Clustering And Ranking On Apache Storm**
Christina Saravanou, Georgios Drakopoulos, Andreas Kanavos, Eleanna Kafeza, Christos Makris

WA-1

- 415 **Web of Things Functionality in IoT: A Service Oriented Perspective**
Euripides Petrakis, Aimilios Tzavaras
- 423 **Covid-19 Mobile Tracking Application Utilizing Smart Sensors**
Efthimios Alepis, Maria Virvou, Polychronis Kontomaris
- 431 **A Factoid based Question Answering System based on Dependency Analysis and Wikidata**
Thomas Ploumis, Isidoros Perikos, Foteini Grivokostopoulou, Ioannis Hatzilygeroudis

- 438 **Five-Factor Musical Preference Prediction for Solving New User Cold-Start Problem in Content-Based Music Recommender System**
Keisuke Okada, Tan Phan Xuan, Eiji Kamioka
- 445 **Hybrid NR Video Quality Metric with Decodable Payload**
Chulhee Lee

WA-2

- 450 **Bayesian Optimization in High- Dimensional Spaces: A Brief Survey**
Mohit Malu, Gautam Dasarathy, Andreas Spanias
- 458 **Semantic Information in Gating Patterns of Dynamic Convolutional Neural Networks**
Ilias Theodorakopoulos, George Economou
- 466 **A comparison of the optimized LSTM , XGBOOST and ARIMA in Time Series forecasting**
Iliana Paliari, Aikaterini Karanikola, Sotiris Kotsiantis
- 473 **Bayesian optimization for the design of deep neural networks**
Nikolas Giannakis, Nikolaos Gorgolis, Ioannis Hatzilygeroudis
- 481 **Prototype Selection and Generation with Minority Classes Preservation**
Konstantinos Xouveroudis, Stefanos Ougiaroglou, Georgios Evangelidis, Dimitris Dervos

WA-3

- 489 **Deep Learning with hyper-parameter tuning for COVID-19 Cough Detection**
Sunil Rao, Vivek Narayanaswamy, Michael Esposito, Jayaraman Thiagarajan, Andreas Spanias
- 494 **A Study of Dimensionality Reduction's Influence on Heart Disease Prediction**
Gaoshuai Wang, Fabrice Lauri, Amir Hajjam El Hassani
- 500 **An improved CNN model based on fused time frequency features for mental fatigue detection in BCIs**
Chen Kun, Li Zhilei, Ai Qingsong, Liu Quan, Wang lei
- 505 **Transfer Learning in sEMG-based Gesture Recognition**
Panagiotis Tsinganos, Jan Cornelis, Bruno Cornelis, Bart Jansen, Athanassios Skodras
- 512 **Handling Uncertainty in Predictive Business Process Monitoring with Bayesian Networks**
Ioannis Prasadis, Nikolaos – Paraskevas Theodoropoulos, Alexandros Bousdekis, Georgia Theodoropoulou, Georgios Miaoulis