

Editorial

Special Collection of Extended Selected Papers on “Novel Research Results Presented in The 12th International Conference on Information, Intelligence, Systems and Applications (IISA2021), 12–14 July 2021, Chania, Crete, Greece <https://easyconferences.eu/iisa2021/>”

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Information is widely available and accessible, but frequently leads to information overload and overexposure, while the effort for coding, storing, hiding, securing, transmitting and retrieving it may be excessive.

Intelligence is required to manage information and extract knowledge from it and is usually inspired by biological and other paradigms. **Information and Multimedia Systems**, with an increasing level of Intelligence, are constantly being developed that incorporate these advances. As a result, new Technologies, Protocols and **Applications** are continuously emerging.

The Intelligent Decision Technologies (IDT) Journal, IOS Press is devoting the special collection at hand to “Novel Research Results Presented in the 12th Inter-

national Conference on Information, Intelligence, Systems and Applications (IISA2021).” IISA2021 was organized by the University of Piraeus, Greece and the Hellenic Mediterranean University, Greece and offered a forum for the constructive interaction and prolific exchange of ideas among scientists and practitioners from a broad variety of research fields. The goal of IISA2021 was to develop methodologies and tools for the solution of complex problems in diverse areas of (biological, artificial and hybrid) intelligence, including assistive technologies, healthcare, medical diagnosis, security, monitoring, surveillance, sustainability in energy sources, governance, education, commerce, and their integration.

More specifically, the special collection at hand consists of an editorial note and an additional twelve (12) papers. All papers were selected among the top works submitted and accepted into IISA2021. Moreover, all

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papers in this collection were rigorously reviewed and revised according to the reviewers' comments and suggestions.

In more detail, the papers in the special collection are organized as follows:

The first three papers fall within the field of *Intelligence in Medical Diagnosis and Smart Healthcare*. Specifically, the first paper, by Dimitrios Panagoulas, George A. Tsihrintzis and Dionisios N. Sotiropoulos, is on "**Nutritional Biomarkers and Machine Learning for Personalized Nutrition Applications and Health Optimization**". The authors employ machine learning-based methodologies to formulate a general evaluation chart of nutritional biomarkers. They also investigate an optimised prediction method for body to mass index with the aim to discover dietary patterns.

The second paper, by Sunil Rao, Michael Esposito, Jayaraman J Thiagarajan, Vivek Narayanaswamy and Andreas Spanias, is on "**COVID-19 Detection using Cough Sound Analysis and Deep Learning Algorithms**". The authors explore the use of a deep neural network with fully connected layers in reliable and rapid non-invasive testing for COVID-19 diagnosis and tracking statistics. They show that a unique ensembling of the VGG-13 architecture, trained using a combination of binary cross entropy and focal losses with data augmentation, significantly outperforms the fully connected networks and other recently proposed baselines.

The third paper, authored by Evgenia Psarra, Dimitris Apostolou, Gregoris Mentzas, Ioannis Patiniotakis and Yiannis Verginadis, is on "**Accessing Electronic Health Records in Critical Incidents using Context-aware Attribute-Based Access Control**". The authors use the Attribute Based Access Control (ABAC) paradigm in order to grant access to Electronic Health Records based on contextual information. Specifically, they introduce an ABAC approach using personalized context handlers, in which raw contextual information can be uplifted in order to recognize critical situations and grant access to healthcare data.

The next three papers fall within the field of *Aspects of Smart Society*. Specifically, the fourth paper, by Konstantina Chrysafiadi and Evangelia-Aikaterini Tsihrintzi, is on "**An Intelligent Fuzzy-based Emergency Alert Generation for People with Episodic Memory Decline Problems**". The authors present a fuzzy rule-based mechanism that generates emergency alerts when a dangerous situation arises as a result of inconsistency in a person's actions in his/her home environment. Specifically, the system protects people with episodic memory decline problems or lapses of atten-

tion from dangerous situations that may be due to their memory disorder and allows them to complete everyday activities safely.

The fifth paper, by Nikos Dimitropoulos, Haris Doukas, Panagiotis Kapsalis, Yannis Maniatis, Vangelis Marinakis and Zoi Mylona, is on "**Comparative Analysis of AI-based Models for Short-term Photovoltaic Power Forecasting in Energy Cooperatives**". The authors compare Machine Learning and Deep Learning algorithms for short-term production of a solar plant under an energy cooperative operation, identify the most accurate algorithm and test its performance accuracy in further forecasting horizons of three, six and twenty four hours.

The sixth paper, by Yuvaraj Munian, Miltiadis Alamaniotis and Antonio Martinez-Molina, is on "**Active Advanced Arousal System to Alert and Avoid the Crepuscular Animal-based Vehicle Collision**". The authors work on wildlife-vehicle collision mitigation during night-time hours using highly efficient artificial intelligence. Specifically, they focus mainly on arousal mechanisms of the "Histogram of Oriented Gradients (HOG)" intelligent system with extracted thermography image features. These features are, subsequently, processed by a trained convolutional neural network (1D-CNN), achieving an accuracy between 94% and 96% on the arousal mechanisms with the empowered real-time data set utilization.

The next two papers fall within the field of *Applications of Intelligent Techniques*. Specifically, the seventh paper, by Eleni Alogogianni and Maria Virvou, is on "**Addressing the Issue of Undeclared work – Part I: Applying Associative Classification per the CRISP-DM Methodology**". The authors present a detailed analysis of a data mining project per the CRISP-DM methodology aiming at assisting labour inspectorates in dealing with undeclared work and other labour law violations. Specifically, they use real data from past inspections merged with companies and their employment details and examine the application of two Associative Classification algorithms.

The eighth paper, by Keisuke Okada, Eiji Kamioka, Manami Kanamaru and Tan Phan Xuan, is on "**Exploiting MUSIC Model to Solve Cold-Start User Problem in Content-Based Music Recommender Systems**". The authors propose a rating prediction framework towards addressing the new user cold-start problem in content-based music recommender systems. Specifically, they leverage the so-called MUSIC model, i.e., a five-factor musical preference model, which is characterized by Mellow, Unpretentious, Sophisticated, In-

tense, and Contemporary as the user's musical preference profiles.

The next three papers fall within the field of *Theoretical Advances in Intelligent and Learning Paradigms*. Specifically, the ninth paper, by Jim Prentzas and Ioannis Hatzilygeroudis, is on "**Neurules and Connectionist Expert Systems: Unexplored Neuro-Symbolic Reasoning Aspects**". The authors explore aspects regarding the reasoning mechanisms of two neuro-symbolic approaches, that is, neurules (which a type of neuro-symbolic rules tightly integrating the neural and symbolic components, giving pre-eminence to the symbolic component) and connectionist expert systems (which give pre-eminence to the connectionist component).

The tenth paper, authored by Rachel Cummings, Digvijay Boob, Amaresh Siva, Uthaiapon Tantipongpipat and Chris Waites, is on "**Differentially Private Synthetic Mixed-Type Data Generation for Unsupervised Learning**". The authors introduce the DP-autoGAN framework for synthetic data generation, which combines the low dimensional representation of autoencoders with the flexibility of Generative Adversarial Networks (GANs). The proposed framework can be used to take in raw sensitive data and privately train a model for generating synthetic data that will satisfy similar statistical properties as the original data.

The eleventh paper, authored by Aikaterini Karanikola, Sotiris Kotsiantis and Charalampos Liapis, is on "**Investigating Cluster Validation Metrics for Optimal Number of Clusters Determination**". The authors

address the problem of finding an optimal number of partitions in a clustering process, as selecting an unsuitable number of clusters might lead to incorrect conclusions and, consequently, to wrong decisions. Specifically, they investigate a total of 26 cluster validation measures in two distinct case studies, one in real-world and one in artificially-generated data, and under the schemes of 9 different clustering methods which incorporate 5 different distance metrics.

The next and final paper falls within the field of *Architectures for Intelligent Services in the Cloud*. Specifically, the twelfth paper, by Irina Astrova, Kerim Jdiya, Klassen Klassen, Arne Koschel and Marc Schaaf, is on "**Serverless, FaaS and Why Organizations Need Them**". The authors provide organizations with help to understand what they can expect from a serverless architecture in the future and how they can make sound decisions about the choice between microservice and serverless architectures in the present.

It is the hope of the editors of the special collection that its readers, including professors, researchers, scientists, engineers and students in intelligence-related disciplines, will find it useful and inspiring in their works and researches. On the other hand, societal demand continues to pose challenging problems, which require ever more efficient tools, methodologies, systems and technologies to be devised to address them. Thus, the reader may expect that additional related works will appear in future issues of the IDT journal.