1

Guest Editorial

Soft computing and advances in intelligent systems

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1. Introduction

This Special Issue is based on the extended versions of papers submitted to the International Workshop on Soft Computing and Advances in Intelligent Systems, SC-AIS-2021, held on October 25–30, 2021, in Mexico City and dedicated to the 100th Anniversary of Lotfi A. Zadeh's Birth.

The paper "A Fast Clustering Algorithm for Evolving Fuzzy Classifier Based on Samples Mean" proposes a new evolving fuzzy classifier, named evolving Fuzzy Mean Classifier (eFMC), with a low computational cost and without user-defined parameters. Experimental results and comparisons against alternative state-of-the-art evolving classifiers show that the eFMC is accurate and fast, especially in online and real-time environments.

The authors of the paper "Genetic algorithm-based adaptive weighted fuzzy logic control (awFLC) for traction power control" propose an adaptive weighted fuzzy logic control (awFLC) method, which weights the inputs instead of the rules. The weighting of inputs performs communication between inputs, and the resultant weight value provides the mapping between inputs-outputs. The genetic algorithm searches for the optimal values for input weights and variable parameters. The simulation results showed that the proposed approach could be used more efficiently for traction control.

The authors of the paper "Layer-specific Evaluation-based Hierarchical Fuzzy Failure Mode and Effect Analysis" propose a methodological approach to the implementation of fuzzy rule-based Hierarchical Failure Modes and Effect Analysis system. Such a system can be used as a part of reliability analysis tools in the development of new automotive equipment and quality management systems.

The paper "Measures of Association of Local Trends and Networks of Foreign Exchange Market in Analysis of Currency Co-Movement" proposes the methods of constructing foreign exchange market networks based on an analysis of co-movements of currency exchange rates. The paper shows that the Pearson correlation, often used as a measure of co-movement of financial time series, could be misleading in analyzing their co-movements. The paper's authors propose to use the measure of local trends associations (LTA) for analyzing the co-movement of exchange rates. They present several methods for network summary visualization showing the highest

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associations between nodes. The paper shows that the LTA-based currency association network is better explainable, reflecting geographical, political, or economic relationships between countries than the correlation network based on the Pearson correlation coefficient.

In many applications, including analysis of seismic signals, Daubechies wavelets perform much better than other families of wavelets. The paper "Why Daubechies wavelets are so successful" provides a possible theoretical explanation for the empirical success of Daubechies wavelets. Specifically, the authors of the paper show that these wavelets are optimal with respect to any optimality criteria that satisfy the natural properties of scale- and shift-invariance.

The paper "A Review on Modeling Tumor Dynamics and Agent Reward Functions in Reinforcement Learning Based Therapy Optimization" considers the problem of undesirable side effects of such standard cancer treatments as chemotherapy and radiotherapy. The paper surveys the works on therapy optimization based on reinforcement learning. Some selected tumor growth models, reinforcement learning based solutions, and especially agent reward functions are reviewed and compared, providing a summary of the state-of-the-art approaches.

The paper "Why neural networks in the first place: a theoretical explanation" tries to understand, on a theoretical level, why in many cases, neural networks provide a better approximation to real-life dependencies than other universal approximators. The paper explains it by proving that approximations corresponding to neural networks are, in a reasonable sense, optimal.

Sentiment analysis is an important task in natural language processing. To solve this task, the authors of the paper "Evaluation of deep learning models for sentiment analysis" use word embeddings such as Word2Vec, GloVe, and Doc2Vec with various numbers of dimensions. The resulting word vectors are used to train recurring neural networks. The paper gives an evaluation of the results of sentiment analysis by neural networks LSTM, BiLSTM, GRU, and BiGRU.

In recent years, methods based on word embedding models have been widely used to solve lexical semantic change detection problems. The paper "Testing of Statistical Significance of Semantic Changes Detected by Diachronic Word Embedding" discusses the problem of testing the statistical significance of the semantic change. The approach proposed by the authors is based on resampling a training set of texts.

The authors of the paper "Multidigraph Representation of Analogies from Oneiric Stories" define a relationship, called analogy, between certain two concepts connected by a path in a directed multigraph of concepts. The authors enriched the concept graph by adding information from ConceptNet and WordNet. They propose a learning method for association rules that allow reaching a destination concept, given the degree of the analogy and a starting concept. The authors experimented with a structure built from real oneiric stories obtained from psychoanalysis descriptions. Using the proposed method, one can learn analogies between concepts by reconstructing paths of different lengths based on local decisions considering concept, property, and degree of analogy.

The paper "A Comparative Study of Syllables and Character Level N-grams for Dravidian Multi-Script and Code-Mixed Offensive Language Identification" presents the analysis of the offensive content detection for code-mixed and multi-script scenarios. The paper considers three Dravidian languages together with English. Namely, Malayalam-English, Tamil-English, and Kannada-English are considered. The performances of ML classifiers prove the effectiveness of syllable and character n-grams features for this scenario.

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