Guest Editorial Preface

Special Issue on Computational Intelligence-Based System Modelling and Design for Knowledge Extraction

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Knowledge extraction aims at creation of knowledge from structured and unstructured sources. The resulting knowledge needs to be in a machine-readable and machine-interpretable format and must represent knowledge in a manner that facilitates inferencing. Computational Intelligence based systems are playing a key role in extracting meaningful information from the huge amount of digital data which is readily available these days.

This special issue presents the latest developments in the domain of computational intelligence based system modelling and design for knowledge extraction. The methods that are close to the human's way of reasoning, i.e., it uses inexact and incomplete knowledge, and it is able to produce control actions in an adaptive way. Knowledge extraction is a complex and instantaneous human process that happens in the minds of people. This special issue provided a forum for innovative findings in the development of knowledge extraction and generation using computational intelligence-based system modelling and design.

We are pleased to present the Special Issue of the *International Journal of Information System Modeling and Design* entitled "Innovations in System Design and Methodologies" published as volume 13, issue 10. This special issue contains total of four articles. All these papers in this special issue cover a range of aspects of system design. Each of these papers has undergone full double blind peer review, prior to being selected for this special issue.

It opens with the research paper "Automated Knowledge Extraction of Liver Cyst From CT Images Using Modified Whale Optimization and Fuzzy C Means Clustering Algorithm" by Ramanjot Kaur and Dr. Baljit Singh Khehra. In this paper they have presented a study that integrated Modified Whale optimization and Modified Fuzzy C-Means clustering algorithm using morphological operations are developed and implemented for appropriate knowledge extraction of a cyst from Computer Tomography (CT) images of the liver to facilitate modern intelligent healthcare systems. The proposed approach plays an efficient role in diagnosing the liver cyst. To evaluate the efficiency, the outcomes of the proposed approach have been compared with the minimum cross entropy based modified whale optimization algorithm (MCE & MWOA), teaching-learning optimization algorithm based upon minimum cross entropy (MCE & TLBO), Particle swarm Intelligence algorithm (PSO), Genetic Algorithm (GA), Differential Evolution (DE) algorithm and K-means clustering algorithm. For this, various parameters such as uniformity (U), Mean structured similarity index (MSSIM), Structured similarity index (SSIM), Random index (RI) and Peak Signal to Noise ratio (PSNR) have been considered. The experimental results show that the proposed approach is more efficient, accurate than others.

The next paper is by Ms. Sonika Malik and Dr. Sarika Jain, titled "Knowledge-Infused Text Classification for Biomedical Domain." It focuses on extracting knowledge from unstructured text and then classifying it is gaining importance after the data explosion on the web. The traditional text classification approaches are becoming ubiquitous, but the hybrid of semantic knowledge representation with statistical techniques can be more promising. The developed method attempts to fabricate neural networks to expedite and improve the simulation of Ontology-Based Classification. This paper weighs upon the accurate results between the Ontology-Based Text Classification and traditional Classification based on the Artificial Neural Network (ANN) using distinguished parameters such as accuracy, precision etc. The experimental analysis shows that the proposed findings are substantially better than the conventional text classification, taking the course of action into account. We also ran tests to compare the results of the proposed research model with one of the latest researches, resulting in a cut above Accuracy and F1-Score of the proposed model for various experiments performed at the different number of hidden layers and neurons.

The next paper is by Tsui-Ping Chang et al. and titled "Deep Learning Model for Dynamic Hand Gesture Recognition for Natural Human-Machine Interface on End Devices." It presents the use of natural human–machine interfaces has become an important topic. Many researchers have proposed the frameworks to improve the performance of dynamic hand gesture recognition. Some CNN models are widely used to increase the accuracy of dynamic hand gesture recognition. However, most CNN models are not suitable for end devices. This is because image frames are captured continuously and result in lower hand gesture recognition accuracy. In addition, the trained models need to be efficiently deployed on end device. To solve the problems, our study proposes a dynamic hand gesture recognition framework on end devices. we provide a method (i.e., ModelOps) to deploy the trained model on end devices, by building an edge computing architecture using Kubernetes. Our research provides developers with a real-time gesture recognition component. Our experimental results show that the framework is suitable on end devices.

The last title in the special issue is "Hurricane Damage Detection From Satellite Imagery Using Convolutional Neural Networks" by Miss Swapandeep Kaur et al. This paper presents method for the assessment of the damage caused by the hurricanes for which a windshield survey is commonly used which is an error- prone and time-consuming method. For solving this problem, computer vision comes into the picture. In this paper, a Convolutional Neural Network based architecture has been proposed to classify the post- hurricane satellite imagery into Damaged and Undamaged building classes accurately with a good accuracy. The model consists of five convolutional and five pooling layers followed by a flattening layer and two dense layers. For this, a dataset of Harvey Hurricane has been considered having 23000 satellite images each of size 128 X 128 pixels. With the proposed model, the author has achieved an accuracy of 92.91%, F1-score of 93%, sensitivity of 93.34%, specificity of 92.47% and precision of 92.65% at a learning rate of 0.0001 and 30 epochs. Also, low false positive rate of 7.53% and false negative rate of 6.66% was obtained.

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