Advanced computer science and applications for soft computing of converged IT environments

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1 Introduction

This special issue is to gather new soft computing trends and methodological recent advances on a wide range of problems arising in different fields to handle practical data of converged environment. Many advanced computational methods have been successfully applied to a range of optimization and classification problems in soft computing, but there are still many practical problems tackled by traditional methods that are generally difficult to solve experimentally in practical converged data. More specifically, many computational problems arising in the fields of scientific programming have been addressed in AI, HPC, large-scale data mining, etc., that handles practical converged data. Submissions are welcomed on scientific programming applied to optimization in practical data. We invite researchers and practitioners to submit their original research articles and theoretical articles.

This special issue is soliciting high-quality technical papers addressing research practices and challenges in the areas of ubiquitous computing. It will reflect the state of the art of the computational methods, involving theory, algorithm, numerical simulation, error and uncertainty analysis, and/or novel application of new processing techniques in engineering, science, and other disciplines related to ubiquitous computing.

2 Human-centric interactive technology for multimedia devices

Park et al. (2016) introduce an anomaly detection framework to detect network intrusions using anomaly detection technique based on probabilistic analysis. Particularly, by applying Mahalanobis distance and threshold decision, normal and abnormal data are discriminated.

Abdel-Basset et al. (2017) explain a method to construct a complete preference relation with additive approximation consistency from $(n - 1)$ restricted triangular neutrosophic preference values and to define the consensus degree among triangular neutrosophic additive reciprocal preference relations.

Shin et al. (2017) propose a relevance link information model (RLIM) techniques that can present the semantic relationships and the traceability among research documents and development documents. As a result, a relevance link information model and a design guideline model are utilized.

Liu et al. (2017) introduce an effective method for essential proteins identification based on improved particle swarm optimization, named as EPPSO. Essential proteins' identification is processed by the prediction of protein essentiality based on particle swarm optimization and integrating the biological and topological information.

Kim and Moon (2017) explain a model to identify activities based on a series of learner actions over time. Among the components of activity theory, the model focuses on 35 subjects, objects, and tools to collect data. Designing a teaching–learning data model based on activity theory and application of the teaching–learning data model based on activity theory are applied.

Park et al. (2017) present a system for detecting adaptive spammers in SNSs, which formulates the detection task as one of the behavior classifications wherein SNSs users are classified into spammers and normal users by assuming only limited available information regarding their goals and prior behaviors. For behavior classification, a new class of ML-

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based classification approach derived using the concept of moving target defense (MTD) technique is utilized.

Liu (2018) solves the routing and wavelength assignment problem for realizing ECQ(s, t) communication pattern on R_n , where $n = s + t + 1$. The two problems are solved by an embedding scheme.

Liu et al. (2018) introduce a gradient descent algorithm based on stochastic conjugate gradient to accelerate the convergence of the neural network's parameters and a negative sampling algorithm based on part of speech (POS) tagging. The gradient descent algorithm is called stochastic conjugate gradient descent based on mini-batch (SCGDM). The negative sampling algorithm is processed based on POS tagging and transition probability matrix.

Appana et al. (2018) suggest a reliable fault diagnosis technique for bearings with varying rotational speeds using a CNN-based method that learns about the bearing faults from the envelope spectrums (ESs) of the raw acoustic emission (AE) signals. The reliable fault diagnosis technique performs based on preprocessing raw AE signal as envelope spectrum and CNN.

Jung and Won (2018) introduce a method to preemptively respond to ransomware and post-detection management. Entropy information is used to detect abnormal behaviors. In addition, a ransomware detection and response system is introduced, which is designed to prevent files from being damaged by attacks by moving the files targeted by ransomware to a secure zone in advance.

Lee and Lim (2018) suggest a method for improving user positioning accuracy indoors using BITON and LKF. The BITON algorithm is used to translate user movements into linear motion. The LKF algorithm uses the predicted user location and beacon coordinates to calculate the exact indoor location coordinates of a user.

Chilamkurti et al. (2018) explain new algorithms known as cost- and time-constraint task partitioning and offloading algorithm (CTTPO), multisite task scheduling algorithm (MTS) based on teaching, learning-based optimization and the energy saving on multisites (ESM) using DVS technique.

Choi and Song (2018) introduce a social control theory (SCT) to understand the effects of deterrence on public corporation employees' ISS compliance and elucidate employees' motivations of ISS violation and different perceptions of sanction threats, which helps information security institutions to consider deterrence and self-punishment and to manage compliance with information security policy effectively and securely.

Sung et al. (2018) suggest a motion estimation method to increase the accuracy of motion estimation. The orientations obtained from MYO are expressed by one quaternion and are clustered by K-means. The performance of the proposed method can be validated by analyzing the difference

between estimated motion quaternions and measured motion quaternions.

Xiao et al. (2018) explain a novel time-sensitive personalized recommendation method called TSPR for movie recommendation. A new user-context rating matrix based on the original user-movie rating matrix is defined and constructed, and then a novel time-dependent similarity measurement by mining the implicit relationship among users from the user-context rating matrix is utilized.

Gao et al. (2018) mention about an effective detection method, which has low overhead and high accuracy. The effective detection method classifies compromised potential switches using Bayesian network and deploys the anomaly detection on the vulnerable switches to detect the packet-in messages flooding attack based on fuzzy c-means.

Souza et al. (2018) present a new method to automatically generate teaching matching-to-sample tasks, adapting the difficulty by using bio-inspired optimization metaheuristics. Comparing to genetic algorithms (GA), ant colony optimization (ACO), and integer and categorical particle swarm optimization (ICPSO), the stability and capacity of the new method to generate adapted tasks show better performance.

Vu et al. (2018) show an automatic and robust method to detect and identify Alzheimer's disease (AD) using the magnetic resonance imaging (MRI) and positron emission tomography (PET) images. Using the operation of electronic computers to diagnose automatically, the incident of AD has served a vital role in supporting clinicians as well as easing significant elaboration on manual and subjectively AD diagnosing of clinicians for the patient's beneficial outcomes.

Shin et al. (2018) describe an effective method to efficiently operate cyber ISR using machine learning, especially utilizing incremental learning methods. The incremental learning method is a model that follows existing learned model when learning new incoming data and proceeds to learn only about newly collected data rather than previously learned data.

3 Conclusion

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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