Guest Editorial Preface

Special Issue on Swarm Intelligence for Ambient-Assisted Technologies

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Ambient assisted technologies to escalate upon the concept of pervasive intelligence, omnipresent computing, distributed thinking and human-assisted computation which accredit to connect human being in that domain. Interaction is enabled by embedded sensors and devices and human user interfaces, providing specialized services in reciprocation of comprehending need and taking input through sensors, gesture, voice or other intelligent extraction methods. Methods and systems used in the progression of Ambient Assisted Living Technologies are still under the state of expansion. This enables to create embedded smart systems and to handle conditions that were not controllable in different scenarios.

The special issue (Swarm Intelligence for Ambient-Assisted Technologies) targets a platform for dissemination of research and development endeavor and the presentation of such solution providing reliable and effective demand optimized swarm algorithm in perspective of human intelligent system.

Main emphasis of this issue is on the dissemination of swarm frameworks and models for amalgamating sensors and bio sensors with processing and functional potential, leading to the development of Human Intelligent systems, in which data is extract and gathered through sensors or other input device, further data is utilized for the benefit of humans for the domain like: security and safety, healthcare, social welfare, daily lifestyle, up gradation of technologies, and automated living. Developing safe, reliable and automated human systems is the foremost requirement towards the apprehension of ambient assisted living.

This special issue of the International Journal of Swarm Intelligence Research (IJSIR) contains five papers which cover a range of aspects of Swarm Intelligence in various active fields of technology like machine learning, cloud computing, wireless sensor networks. Each of these papers has undergone full double blind peer review, prior to being selected for this special issue.

The first paper, "Particle Swarm Optimization Based Data Aggregation in Wireless Sensor Network: Proposed PSO-SNAP Protocol," by Meeta Gupta, Adwitiya Sinha proposes a PSO based sensor network aggregation protocol (PSO-SNAP) with K-means to provide initial centroid. The PSO has been used to find the optimal aggregated value having minimum quantization error. The output of K-means algorithm is used as initial centroid in PSO. Apart from K-means, K-medoid and simple average have also been used to provide initial seed to the PSO algorithm and results of all three approaches are compared.

In "A Comparative Analysis of Evolutionary Algorithms for Data Classification Using KEEL Tool," Amrit Pal Singh, Chetna Gupta, Rashpal Singh and Nandini Singh, some of the evolutionary algorithms: SSMA-C, DROP3PSO-C, FURIA-C, GFS-MaxLogitBoost-Cand CPSO-C are applied on datasets: bupa, ecoli, glass, haberman, iris, monks, vehicle and wine in a model using KEEL tool to calculate the classification efficiencies of these algorithms. Moreover, results are tabulated to compare

the performance of these algorithms on the basis of classification efficiency with Friedman test, further pairwise comparison is done by Wilcoxin statistics. Furthermore, FURIA-C and DROP3PSO-C have been concluded to be the most efficient algorithms with the above mentioned datasets.

Priyanka Verma, Shashikala Tapaswi in "An Impact Analysis and Detection of HTTP Flooding Attack in Cloud using Bio-Inspired Clustering Approach" proposes an approach, which uses Teacher Learner Based Optimization (TLBO) for clustering, to identify the attack requests. In this work initially, the logs of a web server under attack are collected and pre-processed. Further, Principal Component Analysis (PCA) is used to reduce the dimensionality of the pre-processed data. Thereafter the data is clustered using TLBO clustering, which will separate the application layer HTTP flooding attack in one cluster and rest of the requests in the other cluster. The results prove that the proposed approach performs better than other traditional and bio-inspired clustering techniques. The proposed approach also attains the peak detection rate and lowermost false alarm, which proves the efficacy of the proposed approach among another state of the art approaches.

"Automatic Ear Localization using Entropy-Based Binary Jaya Algorithm and Weighted Hausdorff Distance" is a research article presented by Partha Pratim Sarangi, Abhimanyu Sahu, Madhumita Panda and Bhabani Shankar Prasad Mishra where an automatic human ear localization technique is proposed in uncontrolled scenarios such as illumination variation, poor contrast, partial occlusion, pose variation, ear ornaments, and background noise. To address these challenging issues, first segment of the skin regions from the side face image is performed and successively spurious and non-ear edges are removed. Then, entropy-based binary Jaya algorithm (EBJA) is proposed to trace dense edge locations as probable ear candidates based on an entropy map. Finally, an edge-based weight function is presented to represent the ear shape along with the Hausdorff distance measures such as weighted modified Hausdorff distance (W-MHD)and weighted doubly modified Hausdorff distance (W-M2HD)for the edge-based template matching to identify true ear from a list of probable ear candidates.

There are two regular papers on this issue. The inverted pendulum system (IPS) is considered the milestone of many robotic based industries in the paper "Hybrid Optimization Technique for Enhancing the Stability of Inverted Pendulum System." A new variant of variable structure adaptive fuzzy (VSAF) is used with a new reduced linear quadratic regulator (RLQR) and feedforward gain for enhancing the stability of IPS. The optimal determining of VSAF parameters as well as Q and R matrices of RLQR are obtained by using a modified grey wolf optimizer with adaptive constants property via particle swarm optimization technique (GWO/PSO-AC). A comparison between the hybrid GWO/PSO-AC and classical GWO/PSO based on multi-objective function is provided to justify the superiority of the proposed technique. The IPS equipped with the hybrid GWO/PSO-AC based controllers has minimum settling time, rise time, undershoot, and overshoot results for the two system outputs (cart position and pendulum angle). The system is subjected to robustness tests to ensure that the system can cope with small as well as significant disturbances.

The last paper is "Hybrid Approach for Solving the Q3AP." Metaheuristics algorithms are competitive methods for solving Assignment problems. The paper reports on a nature-inspired algorithms approach which is the Particle Swarm Optimization (PSO) method hybrid with a local search (LS) algorithm for solving the Quadratic three Dimensional Assignment Problem (Q3AP). It is an extension of the Quadratic Assignment Problem (QAP) were solving the Q3AP consists of finding an optimal symbol mapping over two vectors whereas, a single vector permutation can be solved with the QAP. Q3AP is one of the combinatorial problems proven to be NP-Hard.

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