Guest editorial

Bio-inspired computation, algorithms and its application to address real world engineering problems

The editorial notes of the special issue is titled as "Bio-Inspired computation, algorithms and its application to address real world engineering problems" of *World Journal of Engineering*. The main aim is to promote collaboration and knowledge transfer between the researchers of all over the world.

Additionally, the issue includes top 15 selected papers out of 45 papers received from academician, researchers and students from the related area, which mainly emphasis on computation and algorithms.

The first paper is titled as "Comparative Analysis of Chopper-Inverter Performances for Wind Conversion System Connected to Grid." The purpose of this paper is to propose an efficient current control technique based on model predictive control (MPC) for grid-connected wind conversion system. This nonlinear strategy is applied for the chopper circuit and grid-tied inverter and compared with other two conventional schemes: a traditional proportional-integral (PI) and sliding mode controller (SMC) using the same switching frequency. The authors introduced several simulation case studies using PSIM software package, which proves the reliability and effectiveness of the proposed MPC scheme. Therefore, the MPC performances, during dynamic and steady-state condition, were compared with those obtained by a PI regulator and SMC to highlight the improvements, specifically the transfer of smooth power to the grid.

In the second paper, the author proposed "Hybrid intelligent vehicle system for managing construction supply chain in precast concrete building construction projects." Although the adversarial nature of precast concrete (PC) building construction is frequently cited in the PC building construction press, only a few researchers have investigated construction supply chain management within the construction industry. Due to the interdisciplinary transportation environment, which inevitably results in disruption, the uses of construction supply chain and recovery from construction supply chain risk must be a subject of real interest, yet transportation management research in this area is scarce. The findings reveal the need for more sophisticated construction supply chain management solutions, which accord with the needs of PC building construction schemes.

The third paper is titled as "Digital channel for interaction with citizens in public sector entities." The use of information and communication technologies has become essential in organizations, as it is considered a key factor for modernization; however, many public or private institutions do not start with the process of digitizing their services. The purpose of this paper was to manage the digital identity through a mobile application on Android that is intuitive and simple to access information in a public entity in the Province of Cañete.

The fourth paper is entitled as "Environment-friendly FSM design on ultra-scale architecture: energy-efficient green computing approach." The purpose of this research is to make an energy efficient finite state machine (FSM) to achieve the core objective of green computing because FSM is an indispensable part of multiple computer hardware. There is up to 98.57% reduction in dynamic power when operating frequency managed as per smart job scheduling. There is up to a 21.97% reduction in static power with proper management of output load capacitance. There is up to 98.43% saving in dynamic power with the proposed management of output load capacitance. The proposed design will be environment friendly that eventually leads to the green earth. This was the main motive of the research area, i.e. green computing.

In the fifth paper, authors presented the first economic valuation of four environmental attributes of the Yanachaga–Chemillén National Park (PNYCH – Parque Nacional Yanachaga-Chemillén) in Peru. This study included households in three cities adjacent to the PNYCH and assessed the willingness to pay (WTP) for preservation efforts of these natural services to avoid the predicted loss in forest area by 2030 (currently 143,425 hectares per year). Findings: the results showed that the average WTP was US$0.695 (2.3197 soles) per household annually. Added to all households in Peru (9 million), this is equivalent to approximately $6.255m annually. From the collection of valuable economic data, the novelty lies in using the CE method, which has not yet been applied in valuations of natural ecosystem services in Peru.

The sixth paper's purpose is people who suffer from phobias try to avoid a specific object or feared situation by creating a great obstacle that causes serious consequences in their daily life; the most effective way to deal with a phobia is through exposure therapy, which according to one of the most important principles of psychology states that to overcome a fear you have to face it. The purpose of this paper is to develop a mobile application based on augmented reality for the treatment of spider phobia (Araneae). The findings of this study, in this sense, state that it was possible to overcome the phobia in an essential way by ceasing to perceive harmless things as dangerous, helping them to manage stress and keep them under control.

The seventh paper aims to characterize the sexual maturation of *M. flexuosa* plantations in Tulumayo. It was determined that at 12 years, the plots with lower density presented a greater number of mature individuals, with a predominance of female palms that produced an average of four bunches of fruit per year and males five inflorescences. In addition, 15% of adult female plants went dormant, whereas males accounted for 3.4%. Reproductive cycles began in September and culminated in October of the following year, which synchronized with rainfall.

The eighth paper is titled as "Advance control strategies using image processing, UAV and AI in agriculture: a review."

The main aim is to provide an overview of smart agriculture systems and monitor and identify the technologies that can be used for deriving traditional agriculture system to modern agriculture system. It also provides the reader a broad area to work for the advancement in the field of agriculture and also explains the use of advanced technologies such as spectral imaging, robotics and artificial intelligence (AI) in the field of agriculture.

The use of autonomous vehicles and AI techniques has been suggested through which the agriculture system becomes much more efficient. The world will switch to the smart agriculture system in the upcoming era completely. The authors conclude that autonomous vehicle in the field of science is time-saving and health efficient for both plants and workers in the fields. The suggested system increases the productivity of crops and saves the assets as well.

The ninth paper is "HSI-GCN: hyperspectral image classification Algorithm based on Gabor convolutional networks." Hyperspectral imaging (HSI) systems are becoming potent technologies for computer vision tasks due to the rich information they uncover, where each substance exhibits a distinct spectral distribution. Although the high spectral dimensionality of the data empowers feature learning, the joint spatial–spectral features have not been well explored yet. Gabor convolutional networks (GCNs) incorporate Gabor filters into a deep convolutional neural network (CNN) to extract discriminative features of different orientations and frequencies. To the best of the authors' knowledge, this paper introduces the exploitation of GCNs for hyperspectral image classification (HSI-GCN) for the first time. HSI-GCN is able to extract deep joint spatial–spectral features more rapidly and accurately despite the shortage of training samples. The authors thoroughly evaluate the effectiveness of used method on different hyperspectral data sets, where promising results and high classification accuracy have been achieved compared to the previously proposed CNN-based and Gabor-based methods.

The tenth paper is entitled as "Customized reputation generation of entities using sentiment analysis." In this study, the authors have used the customer reviews of books and movies in natural language for the purpose of sentiment analysis and reputation generation on the reviews. Most of the existing work has performed sentiment analysis and reputation generation on the reviews by using single classification models and considered other attributes for reputation generation. The authors have proposed a novel model based on combination of three classification models, which has outperformed the existing state-of-art methods. To the best of the authors' knowledge, there is no existing model, which combines three models for sentiment score calculation and reputation generation for the book review data set.

The 11th paper is titled as "Critical analysis: bat algorithm-based investigation and application on several domains." The purpose of this study is to provide the reader with a full study of the bat algorithm, including its limitations, the fields that the algorithm has been applied, versatile optimization problems in different domains and all the studies that assess its performance against other metaheuristic algorithms. Shed light on the advantages and disadvantages of this algorithm through all the research studies that dealt with the algorithm in addition to the fields and applications it has addressed in the hope that it will help scientists understand and develop it.

The 12th paper purpose is to make the implementation of a recommended Web service that allows one to formalize the search for a suitable coworking according to individual preferences as a decision-making task, as well as find a coworking area in an optimized setting for both the individual employee and those who carry out collective professional activities from a large number of alternatives in a shorter time. The development of coworking zone practices contributes to the development of a professional infrastructure of the city and minimizes the cost of equipping each enterprise with additional tools, as well as manages labor resources and tracks trends of both professional and novice workers' needs.

The 13th paper is titled as "A new K-means grey wolf algorithm for engineering problems." The research aims at studying meta-heuristic algorithms. One of the common meta-heuristic optimization algorithms is called grey wolf optimization (GWO). The key aim is to enhance the limitations of the wolves' searching process of attacking gray wolves. The development of meta-heuristic algorithms has increased by researchers to use them extensively in the field of business, science and engineering. In this paper, the K-means clustering algorithm is used to enhance the performance of the original GWO; the new algorithm is called K-means clustering gray wolf optimization.

The 14th paper is "Investigating thermal supplementation of an aquaponics system under severe climate conditions." Climate change strains scarce water resources and food production infrastructure, necessitating establishment of sound scientific basis for operation of sustainable alternative food production methodologies, such as aquaponics, which promises high yield versus small footprint. In a climate (such as in Bloemfontein, South Africa) including temperatures below freezing, real-time aquaponics monitoring and control are necessary to mitigate thermal losses and to ensure sustainability of fish stock and biofilter microorganisms. The system thermal energy also needs sustainable supplementation during wintertime. This study/paper aims to address the problem of monitoring and controlling thermal energy in a medium-sized aquaponics system to ensure biological sustainability, especially during extreme cold weather events.

The 15th paper is entitled as "Satellite magnetic/momentum wheel attitude control technology based on PIO cascade-saturation algorithm." Taking into account the factors of torque saturation and angular velocity limitation during the actual attitude maneuver of the satellite, as well as the difficulty of parameter selection in the design of attitude control algorithm, the purpose of this paper is to propose a satellite magnetic/momentum wheel attitude control technology based on pigeon-inspired optimization (PIO) cascade-saturation control law optimization. Compared with traditional attitude maneuver control with given parameters, the PIO algorithm can accurately calculate the optimal parameters needed to achieve the control objective, and this method has better stability and higher accuracy.

Zain Anwar Ali

School of Systems Science, Beijing Normal University, Beijing, China