Editor's Note

THE International Journal of Interactive Multimedia and Artificial Intelligence provides an interdisciplinary forum in which scientists and professionals share their research results and report new advances on Artificial Intelligence tools and tools that use Artificial Intelligence with interactive multimedia techniques. The research works presented in this regular issue cover different fields of application such as medicine, industry or education, proposing solutions based on various topics of interest, as for example: neural networks, neuro-fuzzy systems, case-based reasoning systems, image retrieval, classification, feature selection, meta-heuristics, constraint satisfaction, or knowledge-based systems.

Machado Fernández and Bacallao Vidal [1] propose a method based on artificial neural networks to improve the stability of radar detectors in the identification of clutter anomalies. Sea clutter, which refers to unwanted echoes in naval radars, is modelled to simulate radars performance before site implementation, with the aim of improving their proper operation in different scenarios. The neural network solution estimates the shape parameters of the Pareto distribution used to model the phenomenon of sea clutter. Authors prove that the proposed method, with low computational costs, outperforms the classic methods based on Maximum Likelihood Estimates.

Esmaeilpour and Mohammadi [2] present a method to recognize anesthesia states with high accuracy and low cost. The system estimates the depth of anesthesia using electroencephalogram signals, wavelet transform, and an Adaptive Neuro Fuzzy Inference System (ANFIS). Authors find that the use of ANFIS improves deficiencies observed in other previous methods. Since analyzing electroencephalogram signals directly is difficult, the propose method facilitates the estimation of the depth of anesthesia for anesthesiologists to administer the adequate dosage of a specific anesthetic drug.

Next article, authored by Kushwaha and Welekar [3], describes a Content-Based Image Retrieval (CBIR) system that uses a genetic algorithm for feature selection. Features refer to color, texture, shape and other characteristics of the image, and automatically extracting these features allows searching relevant images from large databases based on features similarity. The performance of a CBIR depends much on selecting a subset of relevant features from large features sets. Authors find that the use of a genetic algorithm in a CBIR system, as well as a clustering technique, reduces the time for retrieval and improves the retrieval precision.

Hbali et al. [4] present a marker-less augmented reality application, which benefits of boosting techniques. The accuracy of a trained face detector depends on the data, algorithm and training parameters used for training. The main objective of this research is to find the best training parameters that enable an accurate detector. To achieve this, authors tune a boosting based detector, varying the training parameter values, to achieve accuracy in the detection task. The optimized detector is integrated into a 3D real time augmented reality application where the position of the face is used as a marker-less object, overcoming the difficulty of using markers in augmented reality application.

Next paper, authored by Parashar et al. [5], describes a control system and push recovery controller for humanoid robot walking. Push recovery is an ability that bipedal robots must have. Firstly, authors collect push data by pushing a robot from behind and analyze the push recovery pattern. This analysis is supported by a machine learning technique, specifically, by the clustering algorithm K-means. From that, the push recovery strategy of the robot is found out. When the robot is not stable because the zero moment point is not in a safe region, the robot learns and modifies the algorithm to sustain walking.

Devi et al. [6] review the different feature sets used to differentiate non-infected and malaria infected erythrocytes. The aim is to effectively diagnose the presence of the malaria parasite host inside the erythrocyte by means of erythrocyte feature extraction and effective classification. This would allow avoiding the analysis work done by a clinical expert, which is tedious and depends on the skill of the professional.

Choudhary and Singh [7] perform the analysis of stability and temporal information processing capability of a hybrid spiking neuron model in distributed delay framework. The approach focuses on the hardware level implementation of artificial neurons. The authors study the temporal information processing capability in terms of inter-spike-interval (ISI) distribution. The research done shows that the spiking activity of the considered neuron model is invariant when a large fluctuation input is applied. Therefore, the model is capable to handle threshold variability and noisy parameters like those caused by increase of chip temperature, which is one of the common concerns in hardware level implementation of threshold based neuron models.

Next article, authored by Amar et al. [8], proposes a solution to protect the intellectual property of 3D objects. Digital watermarking is one of the best methods for data protection and authors propose a robust and blind watermarking algorithm. This uses characteristics of the mesh geometry to embed the watermark bits into the object by slightly shifting vertex positions. Moreover, thanks to the use of a blind detection scheme, the watermarked object is perceptually indistinguishable from the original one. The paper describes experiments that validate the quality of the watermarked object and its robustness under different attacks.

Kasihmuddin et al. [9] face the constraint optimization well-known problem MAX-kSAT with a method based on combining the use of a Hopfield network and a genetic algorithm. Their experimental results show that their solution outperforms conventional methods that are based only on Hopfield networks. Moreover, the proposed framework is solid promising to be valid to evaluate other satisfiability problems.

Sad Houari and Taghezout [10] describe a novel business rules management system that aims to efficiently capitalize experts' knowledge in small and medium enterprises. The solution includes a domain ontology and a multi-agent system. Several autonomous agents collaborate and interact to achieve a common goal while each one has its specific role such as supervising, interacting with the user, caring of security or detecting inconsistencies. The system presents advantages related to other described in literature as it deals with security and automatically manages the consistency of rules introduced by the experts during the capitalization of the business rules process, treating a higher number of inconsistency cases.

Continuing with multi-agent based approaches, next paper authored by Benkaddour et al. [11] proposes a system for solving industrial diagnostic problems based on agent-based modelling with case-based reasoning, as an alternative to reasoning rules. The system specifically provides a classification of the solutions given by operators in maintenance tasks, ranking them. Besides authors study similarity measures between the target case and case sources, to select the more suitable measure that improves the case-based reasoning results.

In the field of intelligent e-learning, Bhattacharya and Nath [12] discusses about motivations and limitations of some areas such as scaffolding based e-learning, personalized e-learning, confidence based e-Learning, intelligent system and technology enhanced learning. The paper includes a review on recent works in these areas.

Osaba and Díaz [13] present the work developed during PhD thesis of first author, related to multi-population meta-heuristics for solving vehicle routing problems. The main contribution of this thesis is a meta-heuristic called Golden-Ball, which is conceptually original, based on soccer concepts. Besides, different real-world transportation problems are modelled and treated with Golden-Ball, such as newspaper distribution, and therefore the thesis also includes formulation and treatment of these problems.

Last paper, authored by Kamble et al. [14], is an exhaustive literature review on fractal coding, specifically on those approaches based on block matching motion estimation and automata theory. Fractal compression is an image and video compression technique, which has the following benefits: high compression rate and good image quality with fast decoding time. However, it is a lossy compression technique, which means that some data is lost during the compression process, and encoding time is long. Therefore, improving encoding time remains a challenge. The paper includes performance comparison of the different existing methods and concludes with a description of future scope.

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