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Presentation special issue

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Many specifics of the bioinspired intelligence are not well addressed by the conventional models currently used in the field of artificial intelligence. The purpose of the work conference is to present and discuss novel ideas, work and results related to alternative techniques for bioinspired approaches, which depart from mainstream procedures.

Nowadays, the studies based on complex system is opened new doors in research field and, to improve the quality and the results of diverse applications. The bioinspired intelligence is done easy this task and in areas like, biodiversity conservation, biomedicine, security applications, etc.

For this edition, the bioinspired intelligent have been applied in different areas, as the biomedicine, the speech and audio, the microbiology and the use of machine learning for different real applications.

In the area of biomedicine, six works will be presented. The first paper presents a combined approach with EP psychological assessments and EEG functional connectivity. The next one proposes an automatic concept-level neural network method to distilling genuine sentiment in patients' notes with Parkinson's Disease as medical polar facts into true positives and true negatives. The third document shows an approach toward lung cancer histological tissue images segmentation based on colour. The fourth work describes a Mass Ventilation System (MVS) which serves as a medical ventilator system. It can be used to ventilate large number of COVID-19 patients in parallel (5 – 50+) with personalized respiratory parameters. In other study, deep learning models can be trained with multiple chest x-ray images belonging to different categories to different health conditions i.e. healthy, COVID-19 positive, pneumonia, tuberculosis, etc. and finally, the last work proposes a one-dimensional Convolutional Neural network (CNN) for the automatic detection of epilepsy seizures.

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4 International Work Conference on Bioinspired Intelligence

Another area is the speech and audio, and six documents are included. The first one, authors perform an exploratory study with two diary algorithms in children-adult interactions within a recording studio and assess the effectiveness of the algorithms in different age groups and genders. The second paper, authors assess commercial include automatic speech recognition systems for the recognition of Costa Rican children's speech, for users with ages ranging between three and fourteen years old. The next work explores the application of several classifiers for the task of discriminating speech and music in Costa Rican radio broadcast. In the fourth work, a first annotated dataset and analysis of speaker diarization for Costa Rican radio broadcasting is performed, using two approaches: a classic one based on k-means clustering, and the more recent Fischer Semi Discriminant. The following paper presents the initial results on the identification of Costa Rican children's speech, in a database created for this purpose, consisting of words pronounced by adults and children of several ages. And finally, the last study is focused in the exploration of pure audio signals of footsteps and the robustness of a person's classification under noisy conditions.

The microbiology is studied by two works. In the first document, a classical strategy to analyse the protein content of a biological sample is the two-dimensional gel electrophoresis (2D-GE). This technique separates proteins by both isoelectric point and molecular weight, and images are taken for subsequent analyses. And finally, in the last study, authors propose a bioinformatic protocol to detect tumor-specific antigens associated with single nucleotide variants (SNVs) or "mutations" in colorectal cancer and their interaction with frequent HLA alleles (complex that present antigens to immune cells) in the Costa Rican Central Valley population.

Finally, the use bioinspired intelligence is applied in real applications by five studies. The first application, authors present a pilot project for teaching an AI-based classification method that is empirically evaluated with real data of a real problem. In the second document, a comparative study on different transfer learning strategies for reducing training time and increase the effectiveness of this kind of network is presented. The following study presents a method for generating capability maps taking advantage of the parallelization that modern GPUs offer such that these maps are generated approximately 50 times faster than previous implementations. The fourth work presents a machine learning method to diagnose these disorders using the Gait monitoring system. It involves support vector machines that classify between lower back pain and normal, on the bases of 3 Gait patterns that are integrated pressure, the direction of progression, and CISP-ML. And finally, the last paper designs an implementation and evaluation of a robust obstacle detection and mapping system.

As editors of this special issue, I would like to thank the authors; their effort and dedication that they have made to achieve some works of great quality. The sum of this effort has produced this special issue, which has become an inescapable read for all those who want to know the latest advances in bioinspired intelligence.