**Special Session on**
**New Trends in Bio-Inspired Computing for Deep Learning Applications**
**at**
**The 13th International Conference on Innovations in Bio-Inspired Computing and**
**Applications**
**(IBICA 2022)**
**on**
**World Wide Web**
**December 15-17, 2022**

**http://mirlabs.org/ibica22/**

## Objectives and Scope

Deep learning is an interdisciplinary field in which neural networks and artificial intelligence approaches are combined. Deep learning with neural networks is an active solution in the current scenario, helping to tackle a variety of problems in natural language processing, computer vision, and artificial intelligence. It enables a model to function independently in order to best uncover information, extract features, and perform classification. Convolutional Neural Networks with several layers are used in the majority of deep learning models. Because bio-inspired analysis delivers self–learning, adaptable, and most efficient solutions, bio-inspired computing for deep learning has gotten a lot of attention from researchers from all over the world.

Bio-inspired algorithms, in general, give the best answers for specific situations. These algorithms use insights from naturally inspired insects and animals to address various optimization issues in computer science. The biological behaviour of objects is translated into mathematical modules and starting parameters, which are used to build and test algorithms. The algorithm's performance is assessed based on the input and output parameters. Many of these algorithms are based on biologically inspired motions including food hunting, natural collecting, group movements, and a variety of other natural activities, and they serve as a viable alternative to standard optimization approaches. On the other hand, combining these algorithms with modern techniques like deep learning can give practical real-world applications like big data analysis, Internet of Things, Cyber-Physical Systems (CPS), Cyber Security, and so on great performance and optimization measures. Solving complex issues with high dimensions and greater uncertainty, on the other hand, remains an open task for Intelligence computing researchers and academicians.

This special section is created with the goal of inspiring researchers from many domains to provide a fresh and efficient deep learning solution based on bio-inspired analysis.

**Subtopics**

The topics include, but are not limited to:

- Significance of nature-inspired computing for deep learning
- Bio-inspired computing for neural information processing using deep learning
- Bio-inspired analysis with deep learning for brain informatics
- Deep learning for neuroimaging using bio-inspired computing
- DNA computing with bio-inspired analysis
- Bio-inspired computing in deep learning: architectural elements, methodologies, and future directions
- Performance optimization in real-time deep learning algorithms with bio-inspired computing algorithms
- Novel deep learning architectures using bio-inspired computing methodologies
- Combined effect of neural networks and bio-inspired computing for deep learning applications
- Bio-inspired deep learning algorithms for IoT applications (smart homes, smart buildings, smart transportation, etc.)
- Finding optimal solutions with bio-inspired computing and deep learning for real-time cyber-physical systems
- Bio-inspired analysis with deep learning for IoT data visualization and business intelligence
- Bio-inspired computing through artificial neural networks and deep learning algorithms
- Deep neural networks and bio-inspired computing
- Bio-inspired deep model architectures
- Theoretical understanding of bio-inspired deep architectures, models and loss functions
- Novel bio-inspired training approaches for deep learning models
- Effective and scalable bio-inspired parallel algorithms to train deep models
- Bio-inspired deep learning techniques for modeling sequential (temporal) data
- Biologically relevant adaptation techniques for deep models
- End-to-end bio-inspired deep learning solutions
- Applications of bio-inspired deep approaches in various domains

**Paper Publications**
- Proceedings will be published in Lecture Notes in Networks and Systems, Springer (Indexed in SCOPUS, INSPEC, WTI Frankfurt eG, zbMATH, SCImago)
  https://www.springer.com/series/15179
- Papers maximum length is 10 pages
- Papers must be formatted according to Springer format (Latex/word) available at: https://www.springer.com/de/authors-editors/book-authors-editors/manuscript-preparation/5636#c3324

**Important Dates**
Paper submission due: September 30, 2022
Notification of paper acceptance: October 31, 2022
Registration and Final manuscript due: November 10, 2022
Conference: December 15-17, 2022

**Special Session Chairs**
- Deepika Koundal, Department of Systematic, School of Computer Science, University of Petroleum & Energy Studies, Dehradun, India
- Rashid Amin, Department of Computer Science, University of Chakwal, Chakwal, Pakistan

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