

Special Issue on **Cognitive Modeling of Multimodal Data Intensive Systems for Applications in Nature and Society (COMDICS)**

CALL FOR PAPERS

Internet technologies, in particular the availability of multimodality data from various sensors including Internet of Things and Sensor Networks, have developed rapidly. The integration and combination of these with conventional complex systems (CS), especially addressing the problems in nature and society, have dramatically expanded in acquiring more diverse observations in terms of condition monitoring, fault diagnosis, and improved accuracy and efficiency. This, along with the explosion of intelligent data analytics, especially deep learning-based artificial intelligence, has made it feasible to model the links, dynamics, and feedback loops within such systems. Typical examples can be widely found in many applications, for example, smart transportation, advanced manufacturing, logistics, natural resource and disaster management, and network traffic and load optimization.

To implement such complex systems, particularly those linked to real nature and society challenges, cognitive modeling-based intelligent computing has become a trend for advanced modeling and analysis. This is particularly the case when dealing with huge volumes of multimodality data from different nodes of the system and more effectively modeling the chaotic and nonlinear nature of such systems. Over the past two decades, various models and approaches have been proposed to address the underlying challenges within this interdisciplinary topic, and due to the nature of these rather complicated systems, how to effectively and efficiently tackle the different aspects of the associated challenges has become crucial.

This special issue aims to collate cross-disciplinary original research and review articles with a main focus on integrated concepts and technologies, adaptation to the complex nature of the application, and how to deal with these challenges under resources-tight environments. These will include not only new models, algorithms, and innovative applications, but also practical solutions that particularly focus on how to tailor generic techniques to specific applications. Of particular interest is the application of cognitive models, due to their close links to AI-enabled machine learning, and their direct applications to nature and society.

Discrete mathematical models in addressing challenges in nature and society are particularly emphasized.

Potential topics include but are not limited to the following:

- ▶ AI machine learning-based integrated concepts and solutions
- ▶ Deep learning-based fusion and mining of multimodality data
- ▶ Performance modeling and risk assessment of multimodal data intensive systems
- ▶ Genetic modeling and evolutionary computing for multimodality data
- ▶ Sparse representation and compressive sensing for smart data sampling and effective dimensionality reduction
- ▶ Integrated solutions and emerging applications in multimodality data
- ▶ Benchmark data/methods, performance assessment, and surveying in such systems

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/ddns/cmcs/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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