

Call for Papers

Complex & Intelligent Systems Special Issue on

“Interpretation of Deep Learning: Prediction, Representation, Quantification and Visualization”

Guest Editors: *Nian Zhang, Zhaojie Ju, Chenguang Yang, Dingguo Zhang, Jinguo Liu*

Aim and Scope:

While Big Data offers the great potential for revolutionizing all aspects of our society, harvesting of valuable knowledge from Big Data is an extremely challenging task. The large scale and rapidly growing information hidden in the unprecedented volumes of non-traditional data requires the development of decision-making algorithms. Deep learning is currently an extremely active research area in machine learning and pattern recognition society. In contrast to the conventional classification methods, deep learning models can learn a hierarchy of features by building high-level features from low-level ones, thereby automating the process of feature construction for the problem. The deep learning approach exploits many nonlinear processing layers to develop representations of data at increasing levels of abstraction. It has demonstrated best-in-class performance in a range of applications, including image classification, and been successfully applied in industry products that take advantage of the large volume of digital data. Companies like Google, Apple, and Facebook, who collect and analyze massive amounts of data on a daily basis, have been aggressively pushing forward deep learning techniques.

While deep learning has achieved unprecedented prediction capabilities, it is often criticized as a black box because of lacking interpretability, which is very important in real-world applications such as healthcare and cybersecurity. For example, healthcare professionals would appropriately trust and effectively manage prediction results only if they can understand why and how a patient is diagnosed with prediabetes. There has been an explosion of interest recently in the related research directions, such as a) analyzing the information bottleneck for efficient learning, b) inferring and regularizing the network structure for stable and robust prediction, and c) interpreting the learned representations and generated decisions.

This special issue will focus on the interpretability of deep learning from representation, modeling and prediction, as well as the deployment of interpretability in various applications. Potential topics include but are not limited to the following:

- Interpretability of deep learning models
- Quantifying or visualizing the interpretability of deep neural networks
- Neural networks, fuzzy logic, and evolutionary based interpretable control systems
- Dimensionality expansion and sparse modeling
- Optimization of big data in complex systems
- Applications in:
 - Image/video processing
 - Audio/speech
 - Robotics, navigation, control
 - Games

- Cognitive architectures
- Natural language processing

Important Dates:

- Paper submission deadline: August 30, 2020
- Author notification: October 30, 2020
- Revised paper submission: December 30, 2020
- Final acceptance: February 28, 2021

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