



## Guest editorial: special issue on data science in cyberspace 2019

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We are delighted to present this special issue of World Wide Web on Data Science in Cyberspace 2019. As we know, the world is increasingly becoming a digital space. Especially in recent years, there is a huge growth of data in the field of cyberspace, including e-commerce, Internet of Things, online social media, and many other Internet services. People and organizations are facing zettabytes of structured and unstructured digital big data every day. This growth poses great challenges to traditional data management, data mining, and machine learning paradigms. Data Science, as a highly interdisciplinary field, is playing a more and more critical and central role in the development of cyberspace and various applications. It involves obtaining meaningful insights from big data which is processed through analytical, machine learning, and other state-of-the-art intelligent skills.

The special issue was preceded by the 5th IEEE International Conference on Data Science in Cyberspace (IEEE DSC), held at Hangzhou White Horse Lake Jianguo Hotel (June 23–25, 2019 in Hangzhou, China). The articles have undergone rigorous peer-review according to the conference's high standards. Selected high quality papers were invited to submit an extended version to this special issue by adding at least 40% new materials for journal publication. The

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revised papers again have undergone rigorous peer-review according to the journal's high standards.

This issue consists of 7 extended papers covering a variety of topics, including various deep/machine learning framework or algorithms in different domains, data privacy protection algorithms, knowledge graph fusion, underlying cloud infrastructure et al. In "Rebalancing the Car-Sharing System with Reinforcement Learning," the authors propose a novel method called DPB (Double P Bonus), and introduce reinforcement learning framework DDPG (Deep Deterministic Policy Gradient) and hierarchical reinforcement learning to rebalancing the car-sharing system. Pholsena et al., in "Mode Decomposition Based Deep Learning Model for Multi-section Traffic Prediction," propose a hybrid deep learning model for traffic prediction based on empirical mode decomposition and convolutional neural network, which can decompose original road traffic information into periodic and random sequences to achieve the prediction on multi-section road traffic. Liao et al., in "DP-FL: a novel differentially private federated learning framework for the unbalanced data," propose a novel differentially private federated learning framework to protect the data privacy for unbalanced data. This framework provides a two-level protections in cloud server and user client, simultaneously. Ye et al., in "Processing Capability and QoE driven Optimized Computation Offloading Scheme in Vehicular Fog based F-RAN," propose a hybrid fog architecture which composed by fog computing radio access network and Vehicular Fog Computing, as well as a heuristic algorithm enhanced by deep learning to optimize the computation offloading in the hybrid architecture. In "Multi-source Knowledge Fusion: A Survey," Zhao et al. introduces the latest research progress of open-source knowledge fusion, multi-knowledge graphs fusion, information fusion within Knowledge Graphs, multi-modal knowledge fusion and multi-source knowledge collaborative reasoning. In "High-performance Docker Integration Scheme Based on OpenStack," the authors introduce an OpenStack-based Docker container management service named Yun, which has advantages in terms of deployment efficiency, container throughput and container system performance in the case of resource competition, while also balancing resource load. In "Scene Text Reading Based Cloud Compliance Access User Behavior Analyze of Graphical System and Images Data Sanitization," the authors propose a Cloud Compliance Access system based on improved scene text reading model. This system realizes timely auditing on cloud graphical resources related and transparent data sanitization for user.

In summary, these 7 papers illustrate a diverse range of issues currently being investigated in the field of Data science in Cyberspace. We would like to acknowledge the excellent work done by all authors and their contribution to this special issue. We are also thankful for all reviewers dedicating their efforts in reviewing these papers, and for their valuable comments and suggestions that significantly improve the quality of the articles. Finally, we would like to thank Prof. Yanchun Zhang, the Editor-in-Chief of World Wide Web and Katherine Moretti, Assistant Editor of Computer Science, for their guidance and support in the completion of this special issue.