

Editorial Preface

Special Issue on Enabling Data Driven Methods and Technologies for Future Computer Networks

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Big Data is a new research field that comprises multiple disciplinary applications and has significant impact on a wide range of sectors of information and communication systems. The rapid development of big data processing in recent years has already been contributing to several emerging applications, e.g., understanding and targeting customers, improving healthcare and public health, improving security, promoting science and research. In future Internet, advanced technologies and services will facilitate the massive exchange of data. Enabling data-driven methods and technologies has potential to improve the quality-of-service and demand the innovative tools for analyzing, learning, modeling, visualization and understanding the big data in the network.

This Special Issue is devoted to recent advances in addressing challenges on emerging areas, and covers four papers that apply data-driven technologies into different use cases.

The paper “Telecom Big Data based User Offloading Self-Optimisation in Heterogeneous Relay Cellular Systems” by Xu et al. studies the traffic offloading in telecommunication through big data driven self-optimization. In the cell-level offloaded traffic analysis stage, the optimal offloaded traffic is calculated to minimise the total blocking probability. In the user-level offloading stage, the user portrait is drawn and the K-MEANS algorithm is employed to cluster users in the heavily loaded cell, and finally shifting users to assistant cells. The joint optimization from these two-levels data improves the economy of telecommunication companies as well as users’ quality of experience.

The paper “Aras: A Method with Uniform Distributed Dataset to Solve Data Warehouse Problems for Big Data” by Barkhordari and Niamanesh studies the data warehouse problem, due to the increasingly explored network data. Particularly, the queries involved for data exchange among hardware nodes results in problems, such as the joins between data segments that exist on different nodes, network congestion, and delay for data reception. The proposed method enables nodes to execute their queries independently and without need to exchange data with other nodes.

The paper “Application of HY-2 satellite SST data in 4D variational assimilation ocean forecast model” by Zhang et al proposes a real-time operational ocean forecast model for Taiwan Strait and adjacent area. The forecast model with 25 vertical sigma layers is integrated in conjunction with a 4D variational data assimilation algorithm to produce the reanalysis ocean state.

The paper “An Integrated Fuzzy-Based System for Cluster-Head Selection and Sensor Speed Control in Wireless Sensor Networks” by Cuka et al. studies the cluster formation and cluster head selection in Wireless Sensor Networks (WSNs). Four types of input linguistic data parameters are

gathered for selection of the cluster-head and the control of sensor speed. An integrated fuzzy logic system is further implemented to control the sensor speed based on these knowledge, to predict the association of sensor nodes within the clusters.

In conclusion, the papers presented in this Special Issue demonstrate the fruitful research in the field of data driven technologies in dedicated use cases. We wish to thank both the authors and the reviewers for their hard work in helping us assemble this Special Issue, and also would also like to express our sincere gratitude to the Editor-in-Chief, Prof. Nik Bessis, for providing this opportunity and lots of guidance throughout the process.

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