Guest Editorial: Data-Centric Big Services

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As an overwhelming amount of data is generated at a faster rate every day from all sources, and applications such as cloud services, the Internet of Things (IoT), social network services and intelligent terminals, it has become more urgent than ever to design, deploy and provision services more wisely so that the provisioned services could support effective acquisition, storage, transformation, process, management and utilization of such data [1], [2], [3]. Manipulating and getting the most out of the Big Data can bring unprecedented value and new opportunities that are critical to business success. Services should be ideally provisioned in a way that speeds up data processing, scales up with data volume, and improves the adaptability and extensibility over data diversity and uncertainties, and finally turns low-level data into actionable knowledge towards better understanding and manipulation of the Big Data. Data-centric big service is an inevitable evolution of services with the emergence of big data in the last decade [4].

Big Data requires services across various domains, heterogeneous networks and cyber-physical worlds to be aggregated, interoperated, and linked together into a massive and complicated collaborative service ecosystem which could in turn handles the challenging issues of Big Data. On the other hand, Big Service is a massive, complicated series of services dealing with Big Data, which can be considered as a correlative and complicated business in the networked virtual and real worlds. It is formed by complicated business services and Web services across multi-domains and multi-networks through convergence or composition of services [4].

This special section aims at presenting the latest developments, trends, and research solutions of service provisioning in the Big Data era. There were 24 submissions and five papers were selected to be included in this special section after several rounds of rigorous review by the guest editors and invited reviewers.

The first paper by Lee, Liu, Ganti, Srivatsa, Zhang, Zhou, and Wang, "Lightweight Indexing and Querying Services for Big Spatial Data", considers the challenging issues of effective management of big spatial data. The authors propose lightweight and scalable indexing and querying services for big spatial data that are typically stored in distributed storage systems or graph-based systems. The proposed solutions have several advantages including easy application to existing storage systems, high pruning power, customizable control of index data size, and efficient updates of spatial data. Targeting the similar challenges, the second paper by Song, Schilder, Hertz, Saltini, Smiley, Nivarthi, Hazai, Landau, Zaharkin, Zielund, Molina-Salgado, Brew, and Bennett, "Building and Querying an Enterprise Knolwedge Graph", report a real-world effort from Thomson Reuters on the development of a family of services in building and querying an enterprise knowledge graph. The authors describe their approach on data acquisition, transformation and interlinking. Their approach also features TR Discover, a natural language interface from which users can ask questions using their own words and the questions are then translated into executable queries for answer retrieval.

The paper by Li, Zhang, Wu, Liu, Zhu, Yi, Wang, Zhang, and Yang, "A Novel Workflow-Level Data Placement Strategy for Data-Sharing Scientific Cloud Workflows", considers the important topic of data placement in scientific workflow systems and proposes a novel workflow-level data placement model and a two-stage data placement strategy. The paper by Liang, Chen, Wu, Xu, and Wu, "SMS: A Framework for Service Discovery by Incorporating Social Media Information", focuses on service discovery and presents a framework called SMS for effective discovery of services by incorporating social media information. Finally, the paper by Wang, Wang, Yu, and Zheng, "Learning the Evolution Regularities for BigService-Oriented Online Reliability Prediction", considers the challenging issues on service reliability and proposes a motifs-based Dynamic Bayesian Networks that can achieve one-step-ahead online reliability time series prediction. The authors also propose a Convolutional Neural Networks (CNN)-based prediction approach to deal with big data challenges.

These selected papers cover important topics and present some of the key directions in this vibrant and rapidly expanding area of research and development. We hope that the set of selected papers provides the community with a better understanding of the current directions and areas to focus in future, and inspires your own work.

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