

Special Issue on  
**Big IoT Data Analytics in Fog Computing**

# CALL FOR PAPERS

The number of devices within Internet of Things (IoT) that are connected and available via Internet will be between 50 and 100 billion by 2020. The IoT devices are typically the sensors embedded in environments, buildings, vehicles, manufacturing processes, and products or attached to the people. The amount of the data generated by IoT devices grows exponentially as these devices operate nonstop, 24/7, creating an avalanche of data that is out of the control of existing and foreseeable data processing and analytics techniques. On the other hand, we can create numerous opportunities to extract unprecedented insightful information. Unlocking the value of big data through analytics and mining has been regarded as the key enabler of many innovation and marketing strategies which, in turn, has pushed more efforts and supports to the IoT and big data related R&D. While data processing is typically envisaged to be conducted in clouds, it alone is suffering from growing limitations in meeting demands of numerous applications where the local computation nearby data sources is required for low-latency response, contextual information integration, or networking load reduction. Meanwhile, moving all the data generated from IoT devices into cloud server farms for further processing or storage poses overwhelming challenges on the Internet infrastructure and is often prohibitively expensive, technically impractical, and mostly unnecessary.

Fog computing is an emerging paradigm based on creation of micro clouds (called fog nodes) near the sources of data. It is a promising approach to processing data before they even attempt to reach cloud, shortening the communication times and cost, as well as reducing the need for huge data storage. It seamlessly bridges IoT devices and the remote cloud data centers by pushing cloud computing, storage, and networking services down closer to end IoT devices. Fog computing has seen a rapidly increasing number of applications in many industries such as manufacturing, e-health, oil and gas, smart cities, smart homes, and smart grids. However, it is still in its early stages and presents a set of new challenges with the increasing adoption of this computing paradigm, such as fog architecture, frameworks and standards, computing, storage and networking resource provisioning and scheduling, programming abstracts and models, and security and privacy issues. In particular, big IoT data analytics with fog computing infrastructure is in its nascent stage but of paramount importance and requires extensive research in order to conduct more efficient knowledge discovery and smart decision support.

Many relevant theoretical and technical issues have not been answered well yet, for example, how to abstract programming interfaces of fog infrastructure and platforms for data analytics, how to design scalable data mining algorithms with the use of fog infrastructure, how to achieve secure and privacy-preserving data analytics in fog computing. As such, it is high time that the related issues in big IoT data analytics with fog infrastructure are investigate by examining fog architecture, platforms, and applications in detail, hence the call for this special issue.

Potential topics include but are not limited to the following:

- ▶ Fog architectures, frameworks, standards, and platforms for IoT data analytics
- ▶ Fog programming abstracts, models, and toolkits for data analytics
- ▶ Wireless communication supports for fog computing
- ▶ Mobile computing with the support of fog computing
- ▶ Load balancing and resource scheduling and management in fog computing
- ▶ Middleware for distributed data management in fog computing
- ▶ Data mining and machine learning algorithm design in fog computing
- ▶ Theory and modelling of distributed intelligence in fog computing for IoT data analytics
- ▶ Multisource and heterogeneous IoT data analytics with fog
- ▶ Time-critical and low-latency data analytics with fog
- ▶ Spatial and temporal data processing and analytics in fog computing
- ▶ Fog data analytics applications, for example, smart cities, e-health, and smart homes
- ▶ Information retrieval design and knowledge assistance for fog computing data analytics
- ▶ Context-aware IoT applications in the fog
- ▶ Disaster and emergency management in IoT with fog
- ▶ Recovery schemes in case of fog down
- ▶ Pricing models for IoT data analytics in fog computing
- ▶ Privacy and security issues related to fog data analytics

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**Lead Guest Editor**

Xuyun Zhang, University of Auckland, Auckland, New Zealand  
[xuyun.zhang@auckland.ac.nz](mailto:xuyun.zhang@auckland.ac.nz)

**Guest Editors**

Yongrui Qin, University of Huddersfield, West Yorkshire, UK  
[y.qin2@hud.ac.uk](mailto:y.qin2@hud.ac.uk)

Deepak Puthal, University of Technology Sydney, Ultimo, Australia  
[deepak.puthal@uts.edu.au](mailto:deepak.puthal@uts.edu.au)

Xiaobing Wu, University of Canterbury, Christchurch, New Zealand  
[barry.wu@canterbury.ac.nz](mailto:barry.wu@canterbury.ac.nz)

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