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Introduction to Special Issue on Multimedia Big Data

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Introduction to: Special Issue on Multimedia Big Data: Networking

Multimedia, the biggest big data, including game media, social images, voices and videos, medical images, to name just a few, continue to outstrip the capacity of the traditional multimedia processing and analysis systems. For handling this issue, researchers developed and presented many technologies and applications to connect big data to multimedia processing, which plays an important field in existing multimedia computing. Further, in real-time required scenarios, such as cloud game systems, have strict delay limitation in interaction, multimedia data processing needs much higher performance networking support. However, networking for multimedia big data processing, communications and applications have attached less attention so far. Even though the size of multimedia big data increased rapidly in recent years, the fundamental networking technologies are hard to afford the requirements of more and more complex processing and analysis. Further, in real-time required scenarios, such as cloud game systems, have strict delay limitation in interaction, multimedia data processing needs much higher performance networking support. New networking technology, also brings a new possibility of the multimedia systems, e.g. processing and analyzing more and more multimedia data brought by smartphones in developing mobile networks have become a very important field in multimedia big data computing. Therefore, since networking plays an essential role in multimedia big data computing, there is a critical need for research into a new concept, designs and implementation that can support more reliable, efficient and real time multimedia big data computing, communications and applications.

This special issue of *ACM Transactions on Multimedia Computing Communications and Applications* TOMM provides an opportunity to attract and bring together network architecture, video game system, multimedia streaming, distributed systems, and multimedia computing researchers along with big data and networking with diverse backgrounds to contribute articles on theoretical, practical, and methodological issues for next-generation networks for multimedia big data computing and communications. There are twenty-six papers submissions for this special issue of ACM TOMM. Seven high-quality, creative, and interesting articles were selected and accepted, which discuss various challenges and emerging directions of networking for multimedia big data.

This special issue starts off with 4 articles concerning the managements and optimizations for better performance and efficiency of multimedia big data computing in cloud data center networks. The first article by Amiri et al. is titled "Towards Delay-Efficient Game-Aware Data Centers for Cloud Gaming" and it presents a novel method for improving the Quality of Experience (QoE) within a cloud gaming data center. A novel optimization-based method for near-optimally assigning game servers to gaming sessions and selecting the best communication path with a cloud gaming datacenter.

Video-on-Demand (VoD) cloud services have dominated the Internet traffic nowadays. Cloud providers have to rescale resources in a timely and adaptive manner to

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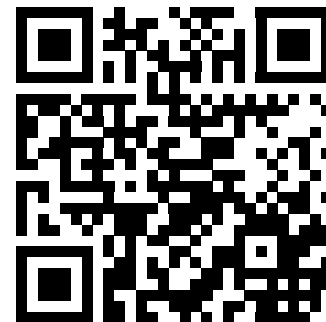
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satisfy fluctuating user demands while meeting user requirement. By studying video management and resource allocation for a large-scale VoD cloud with distributed collaborative servers, the next article by Change et al., "Video Management and Resource Allocation for a Large-scale VoD Cloud", proposed a novel algorithm based on linear programming and a video clustering algorithm to minimize the deployment cost and resource allocation in a VoD cloud data center.

Rather than managing video or allocate resource in a cloud data center, the article, "A Deployment Optimization Scheme over Multimedia Big Data for LargeScale Media Streaming Application", by Wu et al., addresses the issues in the migrating media streaming applications from private server cluster onto cloud.

The next article by Kuang et al., "A Tensor-based Framework for Software-defined Cloud Data Center", developed a novel tensor-based software-defined networking model on cloud data center for multimedia big data computation and communication. A framework is proposed to tackle the problems created by the tremendous amount of unstructured multimedia data in a cloud data center network.

Overall, the collection of articles in this special issue provide a panoramic and inspiring view that spans a variety of issues and directions being researched by communities related to multimedia. We hope that researchers who are active in the field of multimedia, big data, social computing, sensing, and systems and networking will benefit from studying these articles in this special issue on smartphone-based interactive technologies, systems, and applications. We thank all of the authors who submitted their articles to our special issue, and we especially thank the editorial members of ACM TOMM, , and for their help and trust to realize this special issue. Most importantly, our appreciation also goes to the reviewers whose comments and observations led to the high quality of the accepted articles, and we sincerely thank them. To align with the topic of this special issue and save some paper, we would like to highlight our special acknowledgment to a long list of reviewers and some interesting statistics of this special issue through your smartphone and the following QR code.



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