Multimedia Big Data

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The First IEEE International Conference on Multimedia Big Data (BigMM 2015) took place at the Chinese National Convention Center in Beijing, China, from 20–22 April 2015. This conference was jointly sponsored by the IEEE Technical Committee on Multimedia Computing (TCMC) and IEEE Technical Committee on Semantic Computing (TCSEM) and was hosted by Peking University. The motivation for organizing the BigMM conference is the proliferation of multimedia data and ever-growing requests for multimedia applications—including video-on-demand, interactive video systems, surveillance, social media, medicine, and healthcare—making multimedia the "biggest big data" and an important source of insights and information.

In a broader sense, multimedia big data is emerging as the next "must have" competency in our society. As an active and interdisciplinary research field, multimedia big data also presents challenges and opportunities for multimedia computing in the big data era. The BigMM conference thus aims to foster the growth of a new research community, acting as an international forum for researchers and practitioners in academia and industry to present research that advances the state of the art and practice of multimedia big data, identifies emerging research topics, and defines the future of the field.

The theme of BigMM 2015 was "Multimedia: The Biggest Big Data." The technical program consisted of invited talks, oral and poster presentations, panels, a summit, a grand challenge, and several featured workshops. More than 120 participants attended this conference.

Keynote Speeches

Three keynotes were presented in the morning of each day's session.

On the first day, Wen Gao of Peking University presented, "Video Big Data Compression and Analysis." Gao discussed his vision of the three grand challenges in video big data: ultra-efficient compression, object tracking and search in a large-scale surveillance network, and event recognition from real-world surveillance videos. He also demonstrated recent developments to tackle these challenges.

On the second day, Ramesh Jain of the University of California, Irvine, presented "Multimedia and Big Data." Jain introduced his vision of multimedia big data, combining personal and environmental situations. Toward this end, he proposed a situation-recognition framework using heterogeneous data streams to solve real-world challenges for multimedia big data.

Finally, Dick Bulterman of FXPAL presented, "Finding the Needle in the Haystack: Personalizing the Search Through Big Data." His talk focused on a more personalized view of big data: what if we want to search a large collection of data (the haystack) for a single set of important, person-bound items (the needle)? He also shared their experiences from various large-scale international projects in trying to address this problem, both in theory and in practice.

Main Conference Sessions

The conference received paper submissions from 23 countries. Due to the large amount of top-quality submissions, the regular paper acceptance was very competitive (with an acceptance rate of 22.47 percent). In addition to regular papers, 18 short papers and seven posters were accepted, all of which provided novel ideas, new results, and state-of-the-art techniques in the field. In the technical program, the papers were compiled into six oral sessions and one poster session, covering different aspects of multimedia big data such as content analysis, processing, retrieval, systems, and applications, as well as social big media analysis.

The success of BigMM 2015 is evidence that multimedia big data is becoming an active and inter-disciplinary research field in its own right. One major driving force is the amount of multimedia data, which has grown to the extent that the traditional multimedia processing and

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Figure 1. Shu-ching Chen introduces the four panel experts: from left, Jitao Sang, Yong Rui, Wenwu Zhu, and Fei Wu.

analysis systems cannot handle the data effectively. As a consequence, several new problems were presented in BigMM 2015 papers, including multimedia big data harvesting, analysis, and retrieval; rare actions/event detection in surveillance big data; cloud-based image enhancements; and mobile crowd sensing. Some novel methods and techniques were also proposed to address the multimedia big data challenges, such as semisupervised multimodal clustering, temporal multiple correspondence analysis, cascaded filtering retrieval, and geometric consistent tree partitioning MinHash (the min-wise independent permutations locality sensitive hashing scheme).

The best paper prize, sponsored by China Security & Fire Technology, was awarded to Yafei Song, Xiaowu Chen, Xiaogang Wang, Yu Zhang, and Jia Li, of Beihang University, for their paper, "Fast Estimation of Relative Poses for 6-DOF Image Localization."

BigMM Summit and Panel

The BigMM Summit was a featured program at the conference, providing a premier forum for leading scholars to present their insightful opinions on the scientific and technological challenges of multimedia big data and a common vision on how to address them. The summit was jointly supported by IEEE-TCMC, IEEE-TCSEM, and ACM SIGMM China Chapter, and was sponsored by Cooperative Medianet Innovation Center at Peking University. Ten experts presented their vision talks in this summit, including Yong Rui from Microsoft Research Asia, Yonggang Wen from Nanyang Technological University, and Changsheng Xu from the Chinese Academy of Sciences.

The summit ended with a panel discussing "When Multimedia Computing Meets Big Data." Four experts, including Rui, Wenwu Zhu from Tsinghua University, Fei Wu from Zhejiang University, and Jitao Sang from the Chinese Academy of Sciences, were invited to discuss and debate their views and experience on this topic with each other and the audience (see Figure 1).

The BigMM Challenge

Each year, the BigMM organizing committee plans to organize an algorithmic competition to address one grand challenge in the field of multimedia big data, which is open to all tool vendors, academics, and corporations. The major aim is not to rank the participants but to recognize the most innovative, efficient, and methodologically advanced tools in the field.

This first BigMM 2015 Challenge was to address the problem of large-scale object tracking over a network of multiple cameras. In such a network, the observations of the same object should be visually different and widely separated in time and space. Moreover, the tracking system shouldn't require calibrated cameras or complete site models, which are not available in most situations. These requirements made the task very challenging but of practical importance.

Six teams participated in BigMM Challenge 2015. The winning team was from Wuhan University; the runner-up and third place teams were from Ningbo University and Nanjing University of Science and Technology, respectively. All these teams, together with other participant teams, presented their solutions in a separate session.

Workshops

Four workshops were held in conjunction with BigMM 2015. They covered several topics that were related to multimedia big data, including hyperspectral imaging, geometry and graphics, multimedia big data compression, and the emerging techniques on big surveillance data analysis. They were scheduled in the afternoon sessions of the first and third days. Overall, these workshops obtained a huge success in terms of the attendance and participation.

Related Special Issues

To further promote the research in multimedia big data, the BigMM 2015 organizing team is also organizing two special issues in *IEEE*

Transactions on Multimedia (T-MM) and the *International Journal of Multimedia Data Engineering and Management* (IJMDEM), with the same theme as the conference. The authors of regular papers were invited to submit the extended versions to these special issues, which are also open for submissions from the general public.

IEEE BigMM 2016 will be held in Taipei, Taiwan, ROC, in 20–22 April 2016. Visit www.bigmm.org for more conference information and the call for papers. **MM**

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