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## **Special Section on Ultrawide Context- and Content-Aware Imaging**

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## Special Section on Ultrawide Context- and Content-Aware Imaging

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Breakthrough technologies are needed to make emerging imaging applications—such as three-dimensional (3-D) and four-dimensional imaging in health care, high-definition TV, broadcasting, and multicamera systems in surveillance—handle increasingly demanding requirements concerning reliability and speed of automated image analysis (e.g., person identification in a surveillance system). In addition, advancements are needed to improve the success rate and comfort for humans using images for a particular task (e.g., performing a laparoscopic surgery). Future imaging systems will have to be much more intelligent about what data to acquire (e.g. automatic region of interest detection) and how to optimally image it based on the image content. Moreover, the systems need to become more context-aware (e.g. account for the presence of other cameras in the systems) and contribute to the joint optimization of the imaging system given the environment in which they are used. This special section focuses on new developments, which may speed up the transition towards intelligent imaging, ranging from intelligent sensors to control systems in various domains including but not limited to health care, broadcasting, and surveillance.

The special section was made possible by the enthusiastic collaboration of the PANORAMA consortium. PANORAMA (<http://www.panorama-project.eu/>) is an ENIAC European Project which started on April 2012 and ended in December 2015. This project has addressed advanced image-video processing algorithms that are typically acquired with multiple cameras and processed on high-performance computing hardware. PANORAMA has studied generic breakthrough technologies and hardware architectures for a broad range of imaging applications. For example, object segmentation is a basic building block of many intermediate and low level image analysis methods. In broadcast applications, segmentation can find people faces and optimize exposure, noise reduction, and color processing for those faces. Even more importantly, in a multicamera setup these imaging parameters can then be optimized to provide a consistent display of faces (e.g., matching colors) or other regions of interest. PANORAMA has then delivered solutions for applications in medical imaging, broadcasting systems and security and surveillance,

all of which face similar challenging issues in the real-time handling and processing of large volumes of image data. These solutions are characterized by imaging sensors with higher resolutions and new pixel architectures. Furthermore, integrated high performance computing hardware has been proposed to allow for the real-time image processing and system control. This special section has drawn on papers presented at the PANORAMA special session in conjunction with the Image Processing: Algorithms and Systems XIII conference of the SPIE EI presented 8–12 Feb 2015.

The published research contributions are addressing the following topics:

- Object detection and classification: multiresolution saliency map, context sensitive x-ray imaging, contrast detection
- Multicamera content identification and tracking: person re-identification
- 3-D model reconstruction: markerless motion capture, real-time segmentation of depth images
- Image and video understanding: high-resolution imaging, multiview human activity recognition, traffic sign analysis
- Real-time video processing algorithms: multiresolution saliency map, dynamic background modeling,
- Subjective and objective image and video quality assessment: automatic color correction, image enhancement, noise removal.

Taking advantage of new developments in data storage, high-performance computing, imaging and 3-D sensors, the imaging systems presented in this issue are opening new horizons in many multicamera application domains. As researchers continue to address the fundamental challenges in multicamera imaging systems and applications, we are very close for these systems to be an everyday experience in many domains of our lives. Special thanks are due to the JEI editorial staff who patiently helped us bring this special section together while we were also working to finalize the PANORAMA project. Thanks also to all of the reviewers who worked hard to ensure the submissions were of the highest quality and, of course, most importantly to the authors who submitted their work and who responded quickly to the reviewers' comments.