Guest Editorial Special Section on Video Analytics: Challenges, Algorithms, and Applications

VIDEO analytics, also known as video content analysis, refers to the capability of automatically analyzing video to extract knowledge/information and detect and determine temporal and spatial events. The algorithms designed for these analytics can be implemented as software on general-purpose machines, or as hardware in specialized video processing units. Video analytics is still an emerging technology with techniques that are continuously being developed to help make widespread implementation feasible in the years ahead. Such analytics has been typically used in semantic categorization and retrieval of video databases. A goal of this special issue is to focus on video analytics beyond categorization and retrieval.

With increasing hardware capability and advances in algorithms used, real-time video analytics is now being used in a wide range of domains including entertainment, health-care, retail, automotive, transport, home automation, emotion analysis, aesthetics, inappropriate content detection, safety and security. For instance, video analytics are increasingly being deployed for real-time alerts in situation monitoring systems such as traffic surveillance (vehicle counting), counting people in lines (some hospitals are using this to get more nurses from a less busy department to serve the waiting patients) and in manufacturing (for monitoring and counting). From the sensing aspect, 3-D cameras such as RGB-D and LiDAR (Light Detection and Ranging) cameras are becoming more and more affordable, enabling additional areas of research and applications, such as self-driving cars employing video analytics on LiDAR captured data for path planning as well as obstacle detection.

Research advances in hardware have facilitated miniaturization of components needed for image sensing, processing, communication and rendering. This miniaturization has also led to Internet of Things (IoT) devices and solutions with visual information processing at the core. Since video analytics on wearable/IoT/mobile devices need to work with small computational resources on-board, distributed algorithms are being developed to have these devices work in tandem with servers in cloud and high performance computing clusters. As an example, in the health-care domain, researchers have been working on to provide real-time cues to patients with Alzheimer's disease, using egocentric video data feed from wearable camera.

This special section provides the much needed research forum for sharing the challenges and recent advances in video analytics algorithms and applications. We received 18 submissions in response to our call. After 2 rounds of rigorous review, we have 3 high quality research papers as part of this special section:

- Another work on "EgoGesture: A New Dataset and Benchmark for Egocentric Hand Gesture Recognition" presents a dataset with more than 24,000 gesture samples and 3,000,000 frames for both color and depth modalities from 50 distinct subjects giving 80+ different gestures in 6 diverse indoor and outdoor scenes. The authors also provide an exhaustive analysis on input modality selection and domain adaptation between different scenes.
- In the paper on "Depth Pooling Based Large-scale 3-D Action Recognition with Convolutional Neural Networks", the authors have outlined three effective representations of depth sequences that use Convolutional Neural Networks (CNNs) for human action recognition from 3-D camera data.
- The authors of the paper on "Anomaly Detection Based on Stacked Sparse Coding with Intra-frame Classification Strategy" have outlined a novel method based Stacked Sparse Coding that uses Foreground Interest Points for intra-frame classification to facilitate anomaly or outliers of normal distribution.

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Digital Object Identifier 10.1109/TMM.2018.2821959