

Call for Papers IEEE Transactions on Pattern Analysis and Machine Intelligence

Special Issue on Multimodal Human Pose Recovery and Behavior Analysis – M²HuPBA

Topic

Analyzing human poses and behaviors from visual and non-visual sensor data is one of the most challenging topics in Computer Vision, Pattern Analysis and Machine Learning. Recently driven by the need of user friendly interfaces, the next challenge is to integrate and analyze sensor data coming from different modalities, including RGB cameras, 3D range sensors, infrared cameras, audio signals, or Inertial Measurement Unit data, among others.

Human Pose Recovery and Behavior Analysis (HuPBA) has been used for posterior analysis of gestures and context in both still images and image sequences. However, HuPBA requires dealing with the articulated nature of the human body, changes in appearance because of clothes, and the inherent difficulties of clutter scenes, such as background artifacts, occlusions and illumination changes. Given the inherent difficulties of human pose estimation and the requirement for accurate estimations in order to perform posterior human behavior analysis, alternative visual modalities from different input sensors have drawn a lot of attention. This includes Time-of-Flight (ToF) cameras, other active or passive 3D range images (e.g. Infrared-based Kinect© Microsoft device), camera networks, light field cameras, multispectral sensors, underwater vision, and other non-conventional visual sensors as the new generation of low cost Thermal wavelengths cameras. These and other visual modalities have shown to offer complementary information, so data fusion increases the accuracy of computer vision approaches.

In addition to the use of different visual modalities for HuPBA, behavior analysis can be potentially benefited from the use of other complementary sources of sensor data, such as audio signals, Inertial Measurement Unit data, Electrothermal activity responses, and Electroglottograph signals, among others. In this sense, some challenges that arise from the use of different modalities for behavior analysis essentially includes feature extraction, synchronization of data coming from different sensors, data fusion, and temporal series analysis.

Several areas have emerged that require accurate multi-modal HuPBA technologies, such as Affective Computing or Social Signal Processing. Moreover, the efforts involved in these fields of research will be compensated by its potential applications, including leisure (gaming, intelligent retrieval of video data, augmented reality, Human Computer Interaction, etc.), security (security surveillance and ambient intelligence), health care (greater autonomy for those suffering diseases, advanced assisted living, inpatient monitoring, supported diagnosis, etc.) and energy (smart rooms, buildings and cities), to name just a few. In addition to this broad range applications, some novel approaches are being explicitly designed to be implemented in graphical processor units, smart phones, and game consoles.

Scope

The scope of this special issue includes, but is not limited to, the following topics applied to HuPBA:

- Multi-modal data fusion and learning strategies.
- Combination techniques of visual and non-visual descriptors (RGB+D, multispectral, thermal, IR, audio, IMU, EDA, EGG, etc.).
- Calibration and synchronization of multi-modal data.
- Multi-modal datasets and evaluation metrics.
- Leisure, security, health and energy applications based on multi-modal data.
- Multi-modal Affective Computing and Social Signal processing systems.
- Multi-modal algorithms designed for GPU, smart phones and game consoles.

Authors who are unsure whether their planned submission is in scope may contact the guest editors prior to the submission deadline with an abstract, in order to receive feedback.

Important Dates

Submission Deadline: December 1, 2014
First round of Reviews: March 15, 2015
First revisions of Submissions: April 2015
Final Decisions/Manuscript: August 2015
Estimated Online Publication: End of 2015

Guest Editors

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