

Editorial for the Special Issue of IMAVIS on Automatic Face Analytics for Human Behavior Understanding

With advances in visual computing, human behavior understanding has become possible via multimodal sensors at different time-scales and at different levels of interaction and interpretation. During the last two decades, several famous companies / R&D centers have begun designing emotion-aware robots that serve people in different fields, especially in health and autism assistance, etc. Therefore, it is interesting to see what kinds of changes the currently newest techniques bring to us. This special issue aims at inspecting developments in areas where smarter robots that can sense human behavior have great potential to revolutionize the application domain. This special issue also aims to attract researchers to propose the novel way to deal with the problem of modeling human behavior. We believe face analytics over image/visual computing will be greatly in human behavior understanding.

With this Special Issue of IMAVIS dedicated to automatic face analytics, we have received six submissions and lastly accepted three papers. Here, we are pleased to present three state-of-the-art papers, from the field researchers in academia, pushing the visual computing technology forward:

- In their paper “Visual Tracking based on Robust Appearance Model”, authors Bobin Zhang (China University of Mining and Technology), Xiuyan Shao (University of Oulu), Wei Chen (China University of Mining and Technology), Fangming Bi (China University of Mining and Technology), Weidong Fang (Chinese Academy of Sciences), Tongfeng Sun (China University of Mining and Technology), Chaogang Tang (China University of Mining and Technology) aim at alleviating the problem of target drifting and losing to object tracking. In this paper, they propose to use the global and local Fisher vectors to obtain discriminative appearance description and to use the pollution degree of patches of each candidate to obtain the similarity between sub-patches of the target template set and all the candidates. In their detailed evaluation they achieve both an increase in visual tracking overlap rate and a center location error reduction at the same time.
- In the paper “Expression Recognition with Deep Features Extracted from Holistic and Part-based Models”, authors S L Happy (INRIA, France), Antitza Dantcheva (INRIA, France), Francois Bremond (INRIA, France) aim at a performance comparison of holistic and part-based deep learning models for facial expression recognition. In addition to the performance comparison, the two main contributions are multi-face multi-part (MFMP) model and an effective data augmentation strategy for facial expression recognition. The paper also provides an overview over recognizing facial expression, both from emerging deep learning methods, transfer-learning, part-based classification and face representation. In their detailed evaluations, they extensively evaluate the effectiveness of skip connection and novel data augmentation in five challenging facial expression databases. Finally, the paper summarizes (1) holistic models outperform

part-based model, (2) skip connection can improve the accuracy of part-based models, (3) data augmentation scheme improves the performance part-based models.

- In the paper “A survey of micro-expression recognition”, authors Ling Zhou (Jiangsu University), Xiuyan Shao (Southeast University), Qirong Mao (Jiangsu University) give a literature review over the state-of-the-art works on the emerging field in human behavior understanding. Due to the subtle and rapid motion changes, micro-expression provides a unique challenge for expression recognition systems and even for humans. During the last ten years, besides macro-expression, micro-expression has attracted the researchers to use or design the new methodology over handcrafted or the latest deep learning architectures. The main contribution of this paper is to insight the development of micro-expression analyze from the widely used micro-expression databases, the normally used pre-processing pipeline, the various tasks and evaluation protocol hosted in the recently challenging competition including performance metric, the hand-crafted feature methods and the recently designed deep learning network. This paper firstly provide a general pipeline of existing micro-expression recognition systems, which gives recruits in human behavior understanding easily and quickly startup their system in micro-expression recognition. Secondly, this paper goes through the new databases and emerging technologies in micro-expression recognition. It is believed that the survey over micro-expression recognition will provide detailed and boarder overview to the researchers in both industry and academia. This paper summarizes the challenging and opportunities in database, end-to-end architecture and multimodal method, which brings the new direction to the topic on micro-expression recognition.

We hope this special issue helps shed light on contributions that visual computing has on what is likely to be the greatest advance in human behavior understanding.

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