

Understanding of Human Motion, Actions and Interactions

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Abstract

The efforts to develop computer systems able to detect humans and recognize their activities form an important area of research in computer vision today. The recognition of human activities will lead to a number of applications, including personal assistants, virtual reality, *smart* monitoring and surveillance systems, as well as motion analysis in sports, medicine and choreography. Motion is an important cue for the human visual system and for understanding human actions. It has been the subject of intense study in a number of fields including philosophy, psychology and neurobiology and, of course, computer vision, robotics and computer graphics. In computer vision research, motion has played an important role for the past thirty years.

Prof. Aggarwal's interest in motion started with the study of motion of rigid planar objects and gradually progressed to the study of human motion. The current research includes the study of interactions at the gross (blob) level and at the detailed (head, torso, arms and legs) level. The two levels present different problems in terms of observation and analysis. For blob level analysis, we use a modified Hough transform called the Temporal Spatio-Velocity transform to isolate pixels with similar velocity profiles. For the detailed-level analysis, we employ a multi-target, multi-assignment strategy to track blobs in consecutive frames. An event hierarchy consisting of pose, gesture, action and interaction is used to describe human-human interaction. A methodology is developed to describe the interaction at the semantic level.

Professor Aggarwal's presentation will focus on the contributions from other fields leading to the study of motion in computer vision. Further, it will address the issues of interactions at the blob level and at the detailed level. In addition, it will address the directions of future research in motion and human activity recognition.