Probability Distribution of Arm Trajectory for Motion Estimation and Gesture Recognition

Abstract:

In the human motion measurement, motion capture system is used to record the movement of the human body by using different types of sensors such as a magnetic position sensor, a mechanical motion detector and a vision sensor. The most challenging task in human motion measurement is to achieve the ability and reliability of a motion capture system for tracking and recognizing dynamic gestures, because human body structure has many degrees of freedom. This paper introduces a 3D motion measurement of the human upper body by using an optical motion capture system for the purpose of the estimation of human upper body motions, which is based on the probability distribution of arm trajectories. In this study, by examining the characteristic of the arm trajectory, motion features are selected and classified by using the fuzzy technique. The posture of the occluded body part is probabilistically estimated by using the aggregation of the fuzzy information of arm trajectories and the constructed human upper body model. Experimental results show that the use of the system effectively works for classifying various motion patterns and estimating the occluded posture in the motion.