A multi-view vision-based hand motion capturing system

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Abstract

Vision-based hand motion capturing approaches play a critical role in human computer interface owing to its non-invasiveness, cost effectiveness, and user friendliness. This work presents a multi-view vision-based method to capture hand motion. A 3-D hand model with structural and kinematical constraints is developed to ensure that the proposed hand model behaves similar to an ordinary human hand. Human hand motion in a high degree of freedom space is estimated by developing a separable
state based particle filtering (SSBPF) method to track the finger motion. By integrating different features, including silhouette, Chamfer distance, and depth map in different view angles, the proposed motion tracking system can capture the hand motion parameter effectively and solve the self-occlusion problem of the finger motion. Experimental results indicate that the hand joint angle estimation generates an average error of 11o.

Keyword：Hand motion capturing, Separable state based particle filtering