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Hybrid model of human hand motion for cybernetics application

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Abstract

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One of the major unsolved problems in the field of image processing is to recognize human hand motion robustly in many real circumstances and unpredictable scenarios. Understandingly, this problem is not a trivial task. In this paper, a hybrid methodology for motion analysis and hand tracking based on adaptive probabilistic models is presented in this paper. This hybrid model is composed of a deterministic clustering framework and a standard particle filter. We search for regions of interest before distributing particles into each region to determine the fingertips. This is definitely different from any previous particle filter system. It is not only performed in real-time, but also adaptively based on skin color probabilities. This means that the amount of lighting may change, the tracker still performs accurately. Finally, experimental work demonstrates that the proposed method of human hand motion is able to track and recognize successfully and robustly. This presented hybrid model is able to further and potentially implement the systems and applications of cybernetics. © 2014 IEEE.

Author keywords

Cybernetics; Human motion; Image processing; Man hand; Motion tracking; Probabilities; Region of interest

Indexed keywords

Engineering controlled terms: Cybernetics; Image processing; Image segmentation; Monte Carlo methods; Motion analysis; Probability

Human hand motions; Human motions; Hybrid methodologies; Man hand; Motion tracking; Probabilistic models; Region of interest; Regions of interest

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