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A methodology for hand and finger motion analysis using adaptive probabilistic models (Article)

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Abstract

 View references

A methodology for motion analysis and hand tracking based on adaptive probabilistic models is presented. This is done by integrating a deterministic clustering framework and a particle filter together in real time. The skin color of a human hand is firstly segmented. A Bayesian classifier and an adaptive process are utilized for determining skin color probabilities. The methodology enables us to deal with luminance changes. After that, we determine the probabilities of the fingertips by using semicircle models for fitting curves to fingertips. Following this, the deterministic clustering algorithm is utilized to search for regions of interest, and then the Sequential Monte Carlo is also performed to track the fingertips efficiently. Representative experimental results are also included to ensure workability of the proposed framework. Several issues about using the presented method in embedded systems are discussed. The method presented can be used to further develop the associated applications of embedded robotic and virtual reality. © 2014, Kerdvibulvech; licensee Springer.

Author keywords

Adaptive learning; Bayesian classifier; Clustering algorithm; Color segmentation; Embedded system; Extended sequential Monte Carlo; Finger tracking; Hand tracking; Motion analysis

Indexed keywords

Engineering controlled terms: Color; Curve fitting; Embedded systems; Monte Carlo methods; Virtual reality

Adaptive learning; Bayesian classifier; Color segmentation; Hand tracking; Motion analysis; Sequential Monte Carlo

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