A Hierarchical Temporal Memory Based Hand Posture Recognition Method

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Abstract

In various pattern recognition applications, angle variation is always a main challenging factor for producing reliable recognition. To increase the endurance ability on angle variation, this paper adopts a Hierarchical Temporal Memory
(HTM) algorithm which applies temporal information to organize time-sequence change of image features, and constructs invariant features so that the influence of angle variation can be effectively learnt and overcome. The proposed multi-angle HTM-based posture recognition method consists of two main modules of Hand Posture Image Pre-processing(HPIP) and Hand Posture Recognition (HPR). In HPIP, each input image is first processed individually by skin color detection, foreground segmentation and edge detection. Then, the three processed results are further combined linearly to locate a hand posture region. If a forearm exists in the located hand posture region, a forearm segmentation process will be executed to keep only the part of palm. In HPR, the normalized image is forwarded to a HTM model for learning and recognizing of different kinds of hand postures. Experiment results show that when using the same continuous unconstrained hand posture database, the proposed method can achieve an 89.1% high recognition rate for discriminating three kinds of hand postures, which are scissors, stone and paper, and outperforms both Adaboost (78.1%) and SVM (79.9%).

Keyword：Hierarchical Temporal Memory, Multi-Angle Hand Posture Recognition