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标题: Accurate Hierarchical Human Actions Recognition From Kinect Skeleton Data

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摘要: Human action recognition has become one of the most active research topics in natural human interaction and artificial intelligence, and has attracted much attention. Human movement ranges from simple to complex, from low-level to advanced, with an increasing degree of complexity and data noise. In other words, there is a complicated hierarchy in movement actions. Hierarchy theory can efficiently describe these complicated hierarchical relationships of human actions. Accordingly, a hierarchical framework for human-action recognition is designed in this paper. Different features are selected according to the level of action, and specific classifiers are selected for different features. In particular, a two-level hierarchical recognition framework is constructed and tested on Kinect skeleton data. At the first level, we use support vector machine for a coarse-grained classification, while at the second level we use a combination of support vector machine and a hidden Markov model for a fine-grained classification. Ten-fold cross-validations are used in our performance evaluation on public and self-built datasets, achieving average recognition rates of 95.69% and 97.64%, respectively. These outstanding results imply that the hierarchical step-wise precise classification can well reflect the inherent process of human action.

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