

Accelerometer based Gesture Recognition for Mobile Phone User interface

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Abstract: Recently, several smart phones are equipped with a triaxial-accelerometer that can be used for 3D gesture interface. Dynamic time warping (DTW), which is a time series pattern-matching algorithm, has shown good performance on the gesture recognition. Since DTW is based on template matching, its processing time and recognizing accuracy depend on the number and quality of its templates. In this paper, we proposed an optimized gesture recognition method for mobile user interface based on the DTW and modified k -means clustering algorithm. It estimates a set of generalized templates by using the clustering algorithm that preserves the time varying attribute while represents generic features of the time series data. In order to validate the proposed method, we designed 20 types of gestures based on the scenarios of mobile contents browsing, and implemented the gesture recognition application on a Samsung Omnia smartphone. Experimental results showed that the proposed method was more stable than DTW with randomly chosen templates, while they were five times faster than the DTW using all training samples as templates.

Keywords: Accelerometers, Dynamic Time Warping, k -Means Clustering, Pattern Recognition, Classification, Machine learning, Models, Sensors.
