Abstract

Today, in the era of modern technology, gesture recognition influences the world diversely, from physically challenged people to robot control to virtual reality environments. Dance gesture recognition is an application of general gesture recognition task. Dance gestures are the most natural and intuitive non-verbal communication medium and research efforts have recently boosted interest. Sattriya dance is a 500-year-old living dance heritage of Assam. The basic requirement of Sattriya dance is a set of ground exercises and it is vital to preserve and archive digitally these which lead to the overall conservation of Indian cultural heritage. However, recognition of dynamic dance gestures is a challenging problem in the field of pattern recognition. The prime focus of this work aims to develop a method for classification of dynamic gestures of Sattriya dance.

First, we propose a framework for classification of ground exercises of Sattriya dance. Additionally, we create the Sattriya Dance Ground Exercise video dataset containing 560 sequences of 28 ground exercises of Sattriya dance. We have also created a feature dataset containing three features. Then we have developed a two-level classification system using machine learning approach. An empirical analysis has been conducted to evaluate the performance of our own developed dataset with three features- HW ratio of MBRs, inter-frame entropy difference and inter-frame energy difference. Second, we use ensemble classifiers to improve the classification accuracy of 2 level classification systems. To combine the output of simple classifiers and make final decision, the well-known ensemble learning methods- Random Forest, AdaBoost, Gradient Boost and XGBoost have been chosen. To improve the classification accuracy, deep learning approach is introduced. We employ a transfer learning strategy to learn the features for classification of the ground exercises. Experiments on our dataset demonstrate that the proposed approach is capable to classify an occurring gesture and to recognize its type far before its end.