Abstract

The recognition of hand gestures in dance is an emerging area of research in computer science. Dance gesture recognition refers to the linguistic treatment of human motion where gestures are used to communicate drama artistically. One primary aim of these research works is to create universal communication environement for a dance drama which is independent of the language of the associated songs. It also has applications in self-assessment and e-learning of dances. Among the reseach works reported in the literature on recognition of gestures of Indian classical dance forms, there is no significant research works on Sattriya dance. Sattriya dance is a 15^{th} century dance recognized as a major Indian classical dance in the year 2000. This thesis reports a study carried out for recognition of Sattriya dance single-hand gestures. Single-hand gestures are the basic gestures of Sattriya dance which are used to represent all other gestures. As part of this research a dataset of single-hand gestures of Sattriya dance is created which will be useful for the research community working in this area. An empirical study using statistical moments and a set of geometric features and five state-of-the-art benchmark classifiers on this dataset is also reported in this thesis. A two-level classification method for single-hand gestures of Sattriya dance is also proposed in this thesis. Also, a hierarchical classification algorithm with more than two-levels, which results higher classification accuracy than the two-level method, is proposed. A set of vision-based invariant features are used in this proposed hierarchical classification algorithm. Finally, an entropy based scheme is proposed to measure the correctness of an input hand-gesture with a set of expert hand-gestures which will be useful in self-assessment and e-learning of dances.

Keywords: Sattriya dance, dance gestures recognition, Asamyukta hastas, vision-based invariant features, classifiers.