Articulate Similarity: A Visual Search Framework For Embodied Knowledge In A Confucian Rites Video Archive

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Introduction

Like many intangible and indigenous cultures, Confucian *li* is a cosmological philosophy featuring "practicality", hereby the transmission of which is through enacting, performing rather than preserving. By computing the videos of re-performing li-rites in a machine-readable way, we instantiate a search engine that performs query-by-example in less annotated videos, also underscore motion as meaning to explore the embodied aspects of such "living etiquettes".

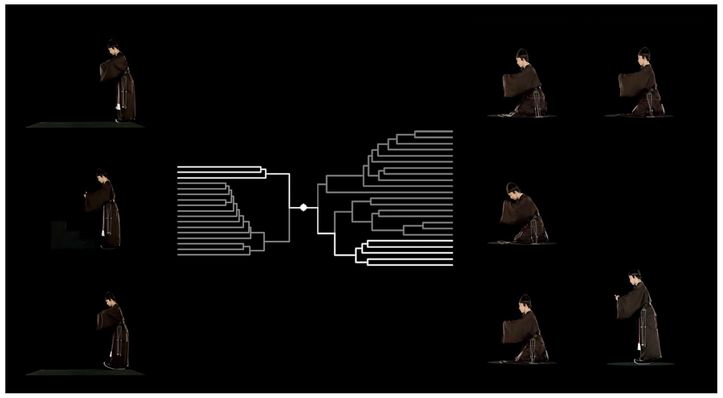
Methodology

This work proposes a visual search framework for embodied knowledge that leverages semi-supervised learning to compute motion similarity among the less well-annotated videos. First, a high-dimensional feature model is constructed to encode body movements combining aspects of physical postures, kinematic parameters and spatial-temporal transitions into motion time series. It then models similarity distance between vary-in-length videos using respective methods of dynamic time warping (DTW), radial basis function (RBF) and finally a model averaging approach on top. As validation, we implement a query-by-example search engine in Python and conduct top-k search tasks to evaluate its retrieval effectiveness measured by F1-score and run-time efficiency measured by computational time.

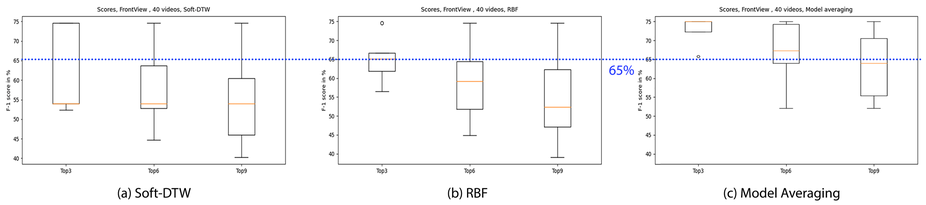
Conclusion

This work proposes a motion similarity search framework that performs query-by-example for the videos from the *Re-making of Confucian Rites*. Experimental results conclude an effective retrieval performance, especially the model averaging approach with a confidence at ~75% for top-3 search tasks. A distance tree of video clusters with associated video contents illustrates its robust clustering quality via obvious inner-cluster similarity and inter-cluster difference with regard to human movements. Furthermore, by prototyping an interactive evaluation and annotation tool, we unveil the potential of applying such approach to searching, annotating and representing embodied knowledge in many other cultural datasets lacking established metadata schema or notation systems.

A Distance Tree of Video Clusters



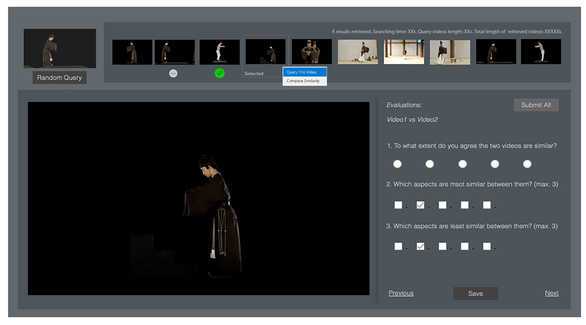
Experimental Evaluations of Retrieval Effectiveness with Different Methods



(a) Soft-DTW (b) RBF (c) Model Averaging

The Similarity-Based Embodied Search Framework

A Clustering Evaluation Tool Integrating the Framework



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