Paper title: Towards Universal Representation for Unseen Action Recognition

Unseen action recognition(UAR) is a new hot field covering two main aspect of computer science:artificial intelligence and pattern recognition, which aims to recognized novel action categories without example.

There are sufficient researches on UAR, including attribute-based method, semantic representation, etc. But all of them encountered some tough problems, especially domain shift problem. So authors adopt a new way that address UAR as a Generalised Multiple-Instance Learning(GMIL) instead of specifying. Paper describes a novel algorithm named as Universal Representation learning(URL), which composed of Non-Negative Matrix Factorisation(NMF) with a Jensen-Shannon Divergence(JSD) constraint. Pipeline is a good analogy for this algorithm. Authors called it as CD-UAR pipeline(cross-dataset UAR) consisting of there step. This algorithm does not need considerable trained model from the target domain. Firstly it uses a large-scale training sources to extract deep features and summaries, which can be considered as essential “building-blocks” via deep network. Second, preserve shared components with the label embedding to achieve universal representation (UR) using NMF with JSD. This step is the part improvement. Third, when inputted new concept( unseen action), algorithm can use UR and domain adaption to represent.

This paper focus on the new algorithm to address the UAR. It extends conventional UAR tasks to more realistic CD-UAR scenarios. The new URL algorithm incorporate lots of different methods to avoid the former problems faced by conventional algorithm.