

Abstract

With the explosion of online media and media-based services, a key challenge in the area of media management is automation of content annotation, indexing, retrieval, summarization, search, and browsing applications. One of the major limitations of current annotation systems is the semantic gap between the simplicity of features that can be computed automatically and the richness of semantics in user queries posed for media search and retrieval.

In this thesis, we have proposed a hierarchical classification tree to extract the events from the sports video sequences using low-level audio-visual features. The high-level semantic concept will be mined by finding the sequential association between these events. Since, it is difficult to provide the generic solution to all types of the videos, our research is mainly concentrated on sports video sequences.

We propose a novel, integrated approach to video-shot detection and classification using Finite State Machine Model. It is observed that the short duration shots are often not detected and hence misclassified. We analytically establish the necessary and sufficient conditions for correct classification of shots and derive a bound on the minimum shot duration.

Automatic extraction of important clips from sports video for highlight generation is a challenging and important problem. We have proposed a novel multi-layered hierarchical framework in which the first level uses audio features to extract exciting parts of the sports video, and next levels use video features such as color histogram, fractal dimension, motion vector for segmenting the clips into events.

The sequential association among the extracted events are derived to mine semantic concept for the clip. Although we used the standard *a priori* data mining algorithm to find the sequential association among the items, our work has a nov-

elty in finding the sequential association distance between two associations. We have successfully implemented our ideas on cricket video.

A recorded sports video is divided into megaslots, slots, concepts, and events. The extracted concepts and events within the concepts are selected according to their degree of importance to include those in the highlights. We have also proposed the parameter degree of abstraction, which gives a choice to the user about how concisely the extracted concepts should be produced for a given highlight duration. Using our approach, we have successfully extracted highlights from recorded video of cricket match and compared our results with the highlights generated by the television channels.