

摘要

体育视频摘要技术是近年来多媒体领域内的一个研究热点，它有着巨大的应用前景，是许多新型视频应用技术的关键和基础。体育视频摘要技术具有广泛的应用前景，如视频检索，视频点播，视频管理，视频浏览等。体育视频摘要技术的目的是从时间连续的视频中提取出其中一些有意义的键事件，并利用这些键事件进行重新排序组合进而生成该视频的完备的语义描述。这种技术为方便有效地管理、浏览、检索视频提供了有效的支持。本文重点研究体育视频中层特征的提取技术，它是体育视频摘要的提取和生成的基础。本文所做的研究工作主要集中在以下几个方面：

a) 镜头边界检测技术。

镜头，是指摄像机不间断拍摄的一组视频图像序列，它常被看成一部视频的最小结构单元。镜头边界检测技术是一种自动定位视频中镜头边界的技术。镜头检测的难点是：如何有效去除物体和摄像机的运动，以及光照的变化带来的噪声。本文提出了一种基于颜色直方图特征和滑动窗口机制的镜头边界检测方法。这种方法可以在很大程度上抑制噪声的影响。实验证明这种方法的查全率和准确率的总体情况是较好的。

b) 慢镜头检测技术。

慢镜头通常突出强调了一些关键的、重要的语义事件。慢镜头检测是自动定位视频中慢镜头片段的技术。所以慢镜头检测对提取语义事件的提取有很大的帮助作用。本文提出了一种有效的慢镜头检测算法。该算法有两部分组成：1) 有效地半自动 logo 模板序列提取，2) 基于 logo 模板序列匹配的慢镜头检测。算法的第一步先从手工标定的两段含有视频段中提取两个 logo 模板序列。算法的第二步利用已提取的模板序列，利用模板序列匹配的方法检测视频中的慢镜头。实验证明该算法能够精确的提取 logo 模板序列，并能有效地检测慢镜头。并且该算法适用范围广泛且易于应用。

c) 摘要生成技术。

基于检测到的镜头和慢镜头，在慢镜头的前面几个镜头中标定出该慢镜头所突出强调的语义事件。通过这种方式，从体育视频中，提取出视频的语义事件。当这些语义事件被提取以后，我们对这些事件按照它们的重要性进行打分。按照分数的高低，将这些事件重新组合、排序，进而形成一个体育视频的完备的、可扩展的摘要。该视频摘要是整个视频内容的语义压缩。它可以方便地进行浏览和传输，并有利于视频的管理和检索。

关键词： 镜头检测，慢镜头检测，视频摘要，logo 提取

Sports Video Summary Technique Research and Implementation Based on Replay Dang zhong hua (computer application)

Directed by Gao Wen

Sports video summary technique has being a hot research topic for its broad and enormous application potential in recent years. The video summary technique is the basis of many newly video applications. The classic examples of these applications are: video retrieval, video browsing, video management, video semantic event detection, video service customization, video on-demand, etc. This thesis consists of three primary parts:

- a) **Shot Boundary Detection:** Video shot is a video frame sequence that is captured by a camera with uninterrupted manner. Video shot is usually considered to be the smallest structure unit. Video shot boundary detection is a technique that can detect the video shot boundary automatically. The primary difficulty in shot boundary detection is: camera/object motion and illumination change. In this thesis, we propose a color histogram and slide window based video shot boundary detection algorithm. This algorithm can reduce the effect of noise effectively. Experimental results prove that the recall and precision performances of the algorithm is overall better.
- b) **Replay Segment Detection:** This paper proposes a novel approach to replay detection in sports video. The proposed method consists of efficient semi-automatic logo template sequence extraction and logo template sequence based replay detection. In the beginning, two video segments are marked manually. Then a logo template sequence extraction algorithm is adopted to extract logo template sequence automatically. Once the logo sequence is extracted, the sequence is used to locate the replay segments accurately by the template sequence matching algorithm. The experiments are carried out on various types of sports videos. The experimental results show that our algorithm can extract logo template sequence accurately and detect replays effectively. Moreover, our algorithm is generic and easy to use.
- c) **Video Summary Generation:** Once the video shots and replay segments are extracted, these semantic events preceding replay segments are marked. In this way, most of semantic events can be extracted. After semantic events extraction, these events are sorted according to their importance. We compound these semantic events renewedly to form a integrity, scalable video summary. The video summary compresses the video content effectively. The video summary can be browse, transform effectively and it is quite helpful to manage and retrieve video.

Key Words: Shot boundary detection, replay detection, video summary, logo extraction.