

摘要

随着视频数据的海量增长，视频数据的内容分析工作，得到了广泛的研究。这些工作利用了数据挖掘、机器学习、模式识别以及人工智能的技术，研究如何自动的得到视频中所包含的有用信息，进而对视频进行处理。目前对于视频分析的研究主要集中于两个方面，即对视频客观属性的研究和对视频主观属性的研究。前者着眼于对视频结构、事件、对象等客观语义信息进行提取和分析，比如镜头检测、场景聚类、对象跟踪等技术。后者更关心视频通过声音、画面、事件等信息传达给观众的感受，也即观众在观赏某段视频时会产生什么样的心理体验，它包括视频的情感属性研究和关注度研究等方面。

本文提出了视频主观属性的概念以及其包含内容，并对其进行了研究，研究内容涵盖了视频主观属性的几个主要议题，包括情感属性研究和视频的关注度属性研究。在视频的情感属性研究方面，本文利用视频中的视觉和听觉特征，建立了视频的情感模型，然后利用统计学习的方法对得到的情感模型进行降维，这样就得到了一段视频的情感特征。然后使用有监督的学习方法，对视频进行识别和分类等任务。

在视频的关注度研究方面，本文将其分为时间关注度和空间关注度两个子领域。时间关注度指的是视频片断引起观众感兴趣的程度，或称为精彩程度；空间关注度研究图像或视频中某个空间区域的关注程度。在视频时间关注度研究中，本文以体育视频为代表，提出了通用的体育视频精彩程度检测方法以及针对特殊比赛的精彩摘要方法。而对于视频的空间关注度，本文融合了自底向上和自顶向下的方法，提出了一个关注区域检测的方案。

Abstract

Since the amount of the multimedia data grows rapidly, the video analysis technology has been widely investigated. It focuses on how to mine specific information from the video and process with, combining with datamining, machine learning, pattern recognition and artificial intelligence. Present works concentrate on two topics, which are the video's objective as well as the subjective characteristics analysis. The former work intends to extract external, objective informations from the video such as objects, structures, figures and investigate the video's objective characteristics, including shot boundary, scene, object trajectory, etc. The latter investigates the psychological experiences which the video bring to the audience, including the affective video analysis and attention analysis.

The paper describes what called subjective characteristics. Also, its main content has been studied in the work of affective video analysis and attention analysis.

In affective video analysis, we establish the affective model of a video using the audio and visual features. Then a statistical learning model is employed to generate affective features of the videos, which can be used for video classification and recognition tasks.

In video attention analysis, we first categorize the field into two subfields, temporal attention analysis and spatial attention analysis. The topic of temporal attention investigates the audience's attention level stimulated by the video clips. It is also called video highlight detection. Spatial attention analysis investigates the attentive area in the images or videos. In our work, we

studied highlight detection in the sports video. We propose two highlight detection system, one for generalized sports game and the other for a specific sports game. In the topic of visual attention analysis, we implement an approach to detect attention area in the image, fusing both the top-down and bottom-up models.