VCenter: A Digital Video Management System with Mobile Search Service

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ABSTRACT

Digital video data have proliferated in recent years due to the rapid development of multimedia computing and computer technologies. Management of video data is thus becoming an indispensable part in digital library. However, currently most digital video library systems are lack of the support of content-based video search and an easy-to-use query interface. In this work, we develop a digital video management system called VCenter, which provides lightweight mobile search functionality based on image taken from camera phone. By the proposed framework, both end user and content owner are easier to enjoy the multimedia contents in digital video libraries.

Categories and Subject Descriptors

H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval

General Terms: Algorithms, Design, Management

Keywords: Content-based Video Search, Mobile Search

1. INTRODUCTION

We are seeing the increasing popularity of digital video in recent years. As multimedia data become one key component of digital libraries, it is essential to design a system that can help to manage such large collections and retrieve information efficiently form them. In this work, we have developed a digital video management system called VCenter, which provide a platform for effectively managing video archives. In addition to various tools that can help to manage video collections, a content-based multimedia search engine has also been provided. By uploading photos taken by image sensors (e.g., camera phone) to VCenter through Internet or MMS (Multimedia Message Service), a page contains all relevant videos in database will be quickly returned to user.

2. ALGORITHM AND DESIGN

Nowadays, digital imaging sensors in mobile phones and consumer-level cameras have already millions of users. The popularity of camera phones has attracted attentions on developing mobile-based applications and services. Motivated by this, VCenter has provided mobile video search functionality for quickly extracting information from video collections. For example, user may wonder if there exists associated information in digital video libraries when he or she has watched advertisement posters or an interesting video clips. In our framework, all you need to do is simply take several photos by using camera phone directly, and upload them to VCenter through Internet or MMS. The mobile query module will then process the query and return top *k* similar candidates of video in database by using our proposed retrieval

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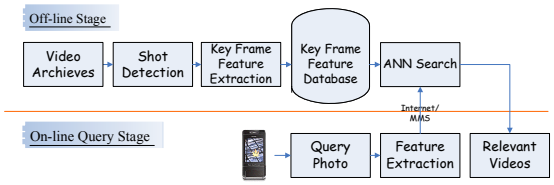

Figure 1. Block diagram of the mobile video query.

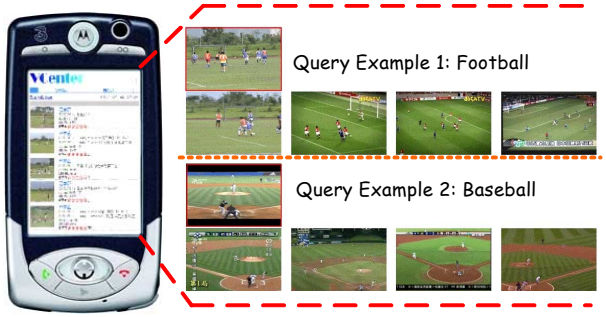

Figure 2. Example search results.

algorithm. Figure 2 has shown the block diagram of the proposed mobile search, which includs an off-line stage and an on-line query stage. In the off-line stage, each video in archives is initially segmented into video shots by using Reynolds Transport Theorem proposed by 0. For each shot, only several representative frames (i.e., key frames) are employed for indexing. Our framework use SIFT [2] algorithm to generate image signature for key frame. In contrast to global image feature, local descriptor techniques like SIFT have higher resistibility against image distortion. During on-line query stage, each query descriptor extracted from query photo vote to their closest video in the database. Approximate-Nearest-Neighbor (ANN) [1] search technique is employed to reduce the system response time. Finally, the relevant videos in database will be returned according to the voting information. Figure 3 has shown two examples of query and their corresponding search results.

3. ACKNOWLEDGMENT

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