비디오 브라우징 서비스

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Video Browsing Service

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ABSTRACT

This paper proposes a Video Browsing Service that provides both the video content retrieval and the video browsing by the real-time user interface on Web. For the scene segmentation and key frame extraction of video sequence, we proposes an efficient scene change detection method that combine the RGB color histogram with the χ2 histogram.

키워드

Video Brwosing Service, Scene Change Detection

Ⅰ. Introduction

Wolf has proposed the key frame extraction method based on motion analysis [1]. This method analyzes the optic flow and the motion metric function. The motion metric is used as a function of time to select key frames at the local minima of motion. Audio and image are used for key frame selection [2]. Key frames are selected using the keywords of audio, the image information and the camera motion. However, this technique is difficult to implement automatically, since processing area is widely spread. Other key frame extraction methods are following. There are frame difference[3,4], color histogram method[5,6], video object segmentation and tracking[7,8], edge distance[9] and wavelet measurement [10].

Ⅱ. Proposed Histogram

This paper proposes a new scene change detection method that combines the RGB color histogram with the χ2 histogram. Histogram difference will be computed by converting the RGB color space into the YIQ space. This can be de-scribed as following:

$$d(I_i, I_j) = \sum_{k=1}^{n} \left(\frac{(H_i^r(k) - H_j^r(k))^2}{H_i^r(k)} \times 0.299 + \frac{(H_i^g(k) - H_j^g(k))^2}{H_i^g(k)} \times 0.587 + \frac{(H_i^b(k) - H_j^b(k))^2}{H_i^b(k)} \times 0.114 \right) \Big/ 3$$

This method is more efficient and flexible than other methods, since it is tolerant to the motion of camera and objects, and good for detection of abrupt and gradual scene change. scene change.

Ⅲ. Structure

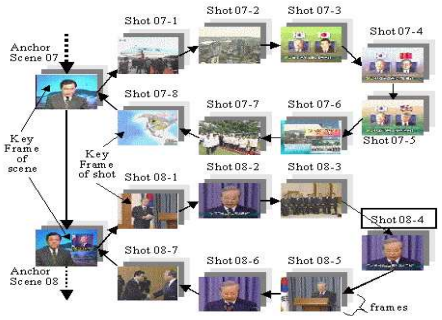

Fig. 1 Scene and shot structure

Scene change detection extracts key frames and separates shots from video streams. That

is. These key frames are key frames of shots, and shot is consisting of subsequent frames. In news video, an anchor frame is representative of an item of news. Therefore, each anchor frame is the key frame of each news scene that consists of several shots. Fig. 1 shows this scene and shot structure.

Ⅳ. Browsing

Most users may want to use fast forward and rewind function as in the VCR's. When users will play and watch a video, they may just want to skip over some uninteresting sequence of frames. Therefore, video editing system involves the function of a VCR and provides the video editing services, such as the frame segmentation and merge, the concatenation of frames and scenes, and the deletion of frames and scenes.

Ⅳ. Experiment

Table 1 shows the results of key frame extraction using three scene change detec-tion methods, where TKF is a total number of extracted key frames and EKF is the number of error key frames. As showing in the results, a proposed method that com-bined the RGB color histogram with the χ^2 histogram is more efficient and optimal, since both the total number of key frames and the number of error key frames are less than other methods.

Table 1. The results of key frame extraction

TV	Scene Detection Method	TKF	EKF
KBS	Color Histogram	46	15
	χ^2 Histogram	44	13
	A Proposed Method	38	7
MBC	Color Histogram	46	17
	χ^2Histogram	42	13
	A Proposed Method	34	5
SBS	Color Histogram	58	25
	χ^2Histogram	53	20
	A Proposed Method	40	7

Ⅴ. Conclusion

This paper proposed a Video Browsing Service(VBS) that provided both the video content retrieval and the video browsing by the real-time user interface on Web. We proposed a new scene change detection method that combined the RGB color histo-gram with the χ^2 histogram. This new method gave better result than the result from individually using of the color histogram or the χ2 histogram.

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