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DISSOLVE DETECTION BASED ON TWIN-COMPARISON WITH CURVE FITTING

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Abstract. *Video shot boundary detection is a fundamental step in video indexing and retrieval. There are a number of different types of transitions or boundaries between shots. Most shot change detection algorithms can detect abrupt transitions without difficulty. However, gradual transitions usually consist of wipes, fades, dissolves and computer-generated effects, so it is much more difficult for us to detect them than to detect abrupt transitions. In most available dissolve detection algorithms, the false/missed hit rate caused by motion is relatively high. In this paper, we propose a novel method customized for dissolve detection. The twin-comparison approach is first utilized to roughly detect dissolve candidates. Then a special curve is fitted according to the inherent characteristic of dissolves indicated by two novel parameters, i.e., the percentage of dissolve-supporters in a frame and the variance of coefficients in the dissolve model. At last, we utilize this curve function to remove non-dissolve transitions. Experiments performed on various types of video clips validate the proposed approach. Compared with the twin-comparison scheme and the linear algorithm, our scheme can greatly improve the precision performance for all kinds of video clips with a bit reduction in the recall performance.*
Keywords: Shot boundary detection, Gradual transitions, Dissolves, Video retrieval, Video analysis

1. **Introduction.** In recent years, the advances in computer and network technologies have resulted in the development of digital video, and millions of video clips have been distributed over the Internet and/or via CD-ROM. Thus, on the one hand, it has become a great challenge to video data compression and transmission [1-6]. On the other hand, it has also become a challenge to video copyright protection [7,8]. Furthermore, it is difficult for us to manage and query video data with the structured query language. As a result, Content Based Video Retrieval (CBVR) techniques have been proposed and widely researched. Shot boundary detection [9] and key-frame extraction are two core techniques in CBVR [10], and shot boundary detection is a preprocessing step which is required for many tasks in video content analysis.

A shot is the basic unit of video analysis and refers to a sequence of frames shot uninterruptedly by one camera. There are a number of different types of transitions or boundaries between shots. Generally, shot transitions can be classified into following categories: cuts, dissolves, fades, wipes and computer-generated special effects [11,12]. A cut is an abrupt change that comes from editing two different shots together. Fades