Abstract

Human beings prefer to watch videos of news, movies, sports, dramas, medical, teaching, meetings and so on. However because of time constraints it is not possible to watch longer video documents and also these videos are significantly viewed globally by large crowd on the internet and mobile devices. Consequently it needs to generate concise video summary that provide important and necessary information within short span of time at anytime and anywhere. Video abstraction is a technique that abstracts video content and represents it in a compact manner. There are basically two types of video abstraction: Video summarization and video skimming. Video summarization is a process that selects a set of salient images called key frames to represent the video content. Video skimming represents the original video in the form of a short video clip. Video abstraction forms a key ingredient in a practical video content management system, as generated key frames and skims provide users an efficient way to browse or search video content. With the increase in demand of digital video, this process has become indispensible component to any practical content management system. A video summary can be displayed without the worry of timing issues. Moreover, extracted key frames could be used for content indexing and retrieval. A summary sequence provides a small taste of entire video, while a highlight contains only the content that may appear interesting to viewers such as the movie trailer. Watching a live video is interesting, especially live sports video is exciting, but when it comes to browsing the action that had already taken place, it is a time consuming effort. The most challenging problem is to efficiently manage the sports video contents of important events. This has inspired us to compress long sequence into a more compact representation through a summarization process. Recently, this area has gained much attention of the researchers and hence considered as the potential problem in this research work.
This research work proposes a novel video summarization scheme for sports video. Initially for every frame in the shot we have computed color histograms in the HSV color space. Color histogram characteristics have been used to compute the dominant color in the shot. Based on the measure of dominant color of each shot, the video shots have been classified into play field color shots (PFCS) and non-play field color shots (NPFCS). Play field color shots are the segments of interest and non-play field color shots are trivial shots. Sports video generally contains short and long play field color shots. Every short as well as long play field color shots are very important. Accordingly, only play field color shots can be analyzed and further classified into grass color play field shot (GCPFS) and clay color play field shot (CCPFS) for any sports video. In this thesis the play field color shots have been successfully used for discrimination of lawn tennis tournaments. A dominant colored frame from every play field color shots have been extracted as a salient frames. In the proposed approach we have used dominant values of volume and energy for key frame extraction from play field color shots. For the each play field color shots dominant audio energy value is computed and corresponding key frame is extracted. On-screen text presented in play field color shots provides important semantic information so the last frame of the shot is extracted as key caption. Three key frames based on audio, visual and text information conveyed in every play field color shots have been extracted and summary of various sports video has been successfully created. These key frames of every play field color shots serve as accurate localization of the events like a faulty service, dead a ball and fall a ball for the lawn tennis field. Key frames are vital and attractive key components in providing internet users a way to swiftly browse a video clip in different levels of detail, without the need to view entire video clip. Past study reveals that several schemes have been developed for representative frame extraction however all schemes are not decorating the key frames. Our scheme proposes a new concept called Representative Frame Decoration (RFD), in which the essential
operation is to enhance the key frame of a video summary. The efficiency, effectiveness, and robustness of the proposed algorithms have been demonstrated over a dataset of various lawn tennis tournaments and other sports video like cricket, soccer, golf etc.

*Key words:* Shot Classification, Color histogram, key frame, play field color shots, non-play field color shots, Representative frame decoration, Video Summarization.

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