Chapter 15
Scalable Video Watermarking: A Survey

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ABSTRACT

In recent times, enormous advancement in communication as well as hardware technologies makes the video communication very popular. With the increasing diversity among the end using media players and its associated network bandwidth, the requirement of video streams with respect to quality, resolution, frame rate becomes more heterogeneous. This increasing heterogeneity make the scalable adaptation of the video stream in the receiver end, a real problem. Scalable video coding (SVC) has been introduced as a countermeasure of this practical problem where the main video stream is designed in such a hierarchical fashion that a set of independent bit streams can be produced as per requirement of different end using devices. SVC becomes very popular in recent time and consequently, efficient and secure transmission of scalable video stream becomes a requirement. Watermarking is being considered as an efficient DRM tool for almost a decade. Although video watermarking is regarded as a well focused research domain, a very less attention has been paid on the scalable watermarking in recent times. In this book chapter, a comprehensive survey on the scalable video watermarking has been done. The main objective of this survey work is to analyse the robustness of the different existing video watermarking scheme against scalable video adaptation and try to define the research problems for the same. Firstly, few existing scalable image watermarking schemes are discussed to understand the advantages and limitations of the direct extension of such scheme for frame by frame video watermarking. Similarly few video watermarking and some recent scalable video watermarking are also narrated by specifying their pros and cons. Finally, a summary of this survey is presented by pointing out the possible countermeasure of the existing problems.

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INTRODUCTION

The rapid growth in Internet technology and media communication started a new era of video broadcasting and transmission. In this new era, the heterogeneity among end using display devises increased considerably with respect to the display resolution, processing power, network bandwidth etc. Depending on their computation power, display size or storage capacity, these devices have varying requirements in terms of video quality, frame rate, resolution etc. It has been observed that achieving these scalable adaptation at the receiving side for a variety of end user devices is a bit complicated process. Scalable video transmission provides a viable solution to this problem by doing these scalable adaptation at the multimedia servers rather than in the receiving ends. A hypothetical scalable video transmission scenario is depicted in Figure 1.

The widespread and easy accesses to digital contents and possibility to make unlimited copy without loss of considerable fidelity/quality make the multimedia content distribution more prone to the digital piracy and hacking. Thus the ownership as well as video content authentication become an important part of the efficient and secure multimedia communication and pose challenging research problems especially when scalable media is concern. Encryption and cryptographic hashes are proposed to meet the solutions. But it is observed that the scalability property of the bit stream is lost (Stutz & Uhl, 2012)

Figure 1. Use of scalable video