

Chapter 7

Conclusions and Suggestions for Future Works

7.1 Conclusions

In this study, we have proposed several methods for a variety of information hiding application purposes, such as copyright protection, authentication, and data association using MPEG-4 videos as cover data.

For copyright protection, an active copyright protection method for MPEG-4 videos using an active visible watermarking technique has been proposed. Multimedia providers can protect with our method their MPEG-4 videos downloaded to the client site by limiting the video play count. When the play count runs out, a visible watermark will appear actively to claim the ownership of this video by the video provider. Furthermore, a malicious user cannot duplicate the downloaded video into several copies for acquiring more play counts because the video play count of each downloaded video is controlled by a remote server using the proposed method.

For authentication, an MPEG-4 video authentication method has been proposed to verify the integrity and the fidelity of surveillance videos. Not only temporal but also spatial tampering can be detected by the proposed system. Temporal tampering can be detected by checking whether the video sequence order has been changed or not. And spatial tampering can be detected by checking whether the embedded authentication signals have been modified or not.

For data association, two methods for two different video searching applications using an information hiding technique have been proposed. The first method is

proposed to search surveillance videos for motions and classify the types of motions using a human detection technique. The second method is proposed to search for targeted persons in recorded videos by hiding special information acquired from smart cards. The principle of both methods is to embed some specific data into the quantized DCT-domain for indexing the frames of a given video during a real-time video encoding process.

7.2 Suggestions for Future Works

Several suggestions for future research works are listed in the following.

1. The proposed ideas in this study may be extended to handle digital videos of other formats, such as the H.264.
2. The video search methods proposed in this study may be integrated with a video authentication method to provide the ability of verifying the integrity and fidelity of the resulting video.
3. The proposed method of searching videos for motions may be extended to be capable of searching more types of moving objects.
4. It is interesting to add a criminal-scene retrieval capability to the proposed authentication system for surveillance videos. This idea is based on the principle that people only care about the frames with special events, such as criminal events. Hence, if a video is considered unauthentic by the proposed authentication system, we can try to restore these significant frames further.