ABSTRACT

Recent advancement in digital technology for broadband communication and multimedia data distribution in digital format opened many challenges and opportunities for researchers. Simple-to-use software and decreasing prices of digital devices have made it possible for consumers from all around the world to create and exchange multimedia data. Broadband Internet connections and error-free transmission of data facilitate people to distribute large multimedia files and make identical digital copies of them. A perfect reproduction in digital domain has promoted the protection of intellectual ownership and the prevention of unauthorized tampering of multimedia data to become an important technological and research issue.

Digital watermarking has been proposed as a new, alternative method to enforce intellectual property rights and protect digital media from tampering. Digital watermarking is defined as technique which directly embeds and extracts the data from the host signal. The main challenge in digital audio watermarking is that if the perceptual transparency parameter is fixed, the design of a watermark system cannot obtain high robustness and a high watermark data rate at the same time.

In this thesis, we address the research problem on audio watermarking. First, what is the imperceptibility of the watermarked data and how to measure it? Second, how can the detection performances of a watermarking system are improved for blind detection? Third, whether the system is robust to different signal processing attacks? Is it possible to increase the robustness trough attack characterization? An approach that combined theoretical consideration and experimental validation, including digital signal processing, is used in developing algorithms for audio watermarking.

The results of this study are the development and implementation of audio watermarking algorithms. The algorithms performance is validated in the presence of the standard watermarking attacks. The thesis also includes a thorough review of the literature in the digital audio watermarking.