Evaluating the Feasibility of Digital Watermarking To Enforce Music Copyright

CS 588: Final Project

Rob Farraher
Ken Pickering
Lim Vu

Date Due: 12/04/01

Introduction

With the tremendous increase in the usage and creation of digital media today, there is an ever-growing need for new methods of protecting intellectual property rights. This need results from the ease with which any person can make identical copies of a digital file to share and distribute. In particular, people abuse copyright protections everyday by participating in music and file sharing networks such as Gnutella and Morpheus. As most are aware, MP3 technology began this file-sharing phenomenon by providing a means for copyrighted music to be freely available in an easily downloadable, compressed media. Major American companies realize the potential in downloadable music but run into the problem of copy-protecting digital music after a user has downloaded it. If one user licenses and downloads a song, companies must somehow prohibit others from copying that music. As a result, researchers have developed several watermarking schemes to protect the integrity of digital music and thwart anyone from illegally copying and distributing that music.

Digital watermarking technology is scalable to the value of the contents it protects. Artists and corporations can choose from merely authenticating their work to digitally tracking it using varying watermarking technologies [1]. Watermarking also provides the possibility of fully utilizing digital media while continuing to uphold copyright regulations. However, all current digital watermarking schemes today have inherent weaknesses that make them vulnerable to attacks. Also, another innate obstacle must be overcome before digital watermarking is a viable form of copyright protection: the universal acceptance of a particular working watermark protection scheme. Software companies must agree to provide digital music extractors that use an agreed upon

watermarking scheme. Hardware companies also must agree to provide digital music players that implement the agreed upon watermark scheme. Lastly, there must also be a general consumer acceptance. Thus, due to lack of a successful watermarking scheme as well as difficulty in gaining universal acceptance of a single watermark, we believe digital watermarking is currently infeasible.

For this project, we will provide a general overview of digital watermarking technology. One particular digital watermarking initiative we plan to study will be SDMI (Secure Digital Music Initiative). In addition, we will examine the conditions that must occur in the general market for a watermarking scheme to be successfully implemented. Overall, we believe this project will provide a complete analysis of the state of digital watermarking today as well as explain the difficulties that exist in bringing it to fruition.

Overview

Digital watermarking is an active field of research that covers not just protection of audio but all digitally created content. It involves embedding a digital signal into any content that can later be detected and extracted. Digital watermarks can be placed with two general categories; robust and fragile. Robust watermarks can withstand manipulation of the content it is embedded within. Thus, compression, copying, distortion, or any kind of general manipulation of the digital content leaves the watermark intact. Fragile watermarks are the opposite in that any modification of the data will leave the watermark undetectable [2]. Watermarks can also be classified into another two major categories: Perceptible and Imperceptible. Perceptible watermarks are visible on the media. Imperceptible are invisible to the viewer of the document, and instead are