

Chapter 7.19

IPR Protection for Digital Media Distribution: Trends and Solutions in the E-Business Domain

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ABSTRACT

Copyright protection is becoming an important issue for organizations that create, use, and distribute digital content through e-commerce channels. As online corruption increases, new technical and business requirements are posed for protecting intellectual property rights such as watermarking, use of metadata, self-protection, and self-authentication. This work is a review of the most important of these methods and analyzes their potential use in digital rights management systems. We focus especially on watermarking and argue that it has a true potential in e-business because it is possible to embed and detect multiple watermarks to a single digital artifact without decreasing its quality. In conjunction with parallel linking of content to metadata, there is

true potential for real life copyright-protection systems.

INTRODUCTION

The wealth of information provided by digitization devices and sensors has grown dramatically while the available communication channels for faithfully transmitting that data face serious security threats. Digital media in the form of still images, video, sound, and multimedia (digital artifacts) offer many advantages in their use since they enhance human-machine interaction in numerous areas. E-commerce (B2C and B2B) channels are becoming a primary distribution channel for the digital media market, which in turn has seen a dramatic growth in the last few years (Eskicioglu,

2003). However, where there is profit there is also a big chance for corruption. The ease with which perfect digital copies are produced by virtually any user creates great concern to content providers and online resellers.

The discussion behind copyright violation in e-commerce (especially B2C) is of course justified by the considerable financial losses of content providers and legal distributors. The international intellectual property alliance estimated the annual loss of revenue in the U.S. motion picture industry due to piracy at US\$1.5 billion, and in the record and music industries at US\$2.3 billion for the financial year of 2003 (IPR, 2005). It is also worth noting that a large portion of Internet bandwidth (approximately 30%) is consumed by users exchanging illegal copies of digital media (mainly video). The recent legal battle between U.S. filmmakers and companies that support free distribution technologies such as peer to peer, has resulted in a crisis for the software industry: software developers are directly deemed responsible for the use of their products (McCalman, 2005). The recent ruling of the U.S. supreme court in favor of content developers in the case of *MGM vs. Grokster* somewhat shook the so-called “Sony Safe Harbor” (a 1984 court ruling in the case of *Sony vs. Universal* according to which h/w and s/w developers are immune from liability for the infringing acts of their users) (Samuelson, 2005). It is certain that there will always be people with enough motivation to illegally use copyright material by bypassing protection mechanisms.

Although IPR protection was and is still considered a strategic goal for many organizations, vendors are not yet convinced to invest the needed, and in many cases substantial resources to achieve it (Schneider, 2005). Cost effectiveness is emerging as a major requirement for protecting IPR (Cohen, 2003). Many solutions have been proposed for addressing the problem of copyright protection and in the recent years, the community has witnessed some huge security failures and partial successes. The initial movement for

the development of advanced and cost-effective techniques for IPR (intellectual property rights) management and protection of digital media was accompanied by great enthusiasm. Soon, as efforts were advancing, several technological, economic, and cultural shortcomings were identified. Some efforts for producing security standards failed, others merged (Felten, 2005). A perfect IPR protection solution still eludes us, partly because the industry cannot or will not agree in common standards. This does not mean, however, that copyright protection is impossible, it just emphasizes the need for coordinated actions.

From a technological point of view, two major categories of IPR protection techniques can be identified: a-priori (copy prevention) and a-posteriori protection (copy detection). Copy prevention methods include software techniques such as cryptography, password authentication, and physical media protection techniques such as CD/DVD copy prevention systems. Software techniques are more successful but experience has shown that these methods alone are still not as effective as predicted. Copy detection methods, such as digital watermarking are becoming extremely popular (Memon & Wong, 1998). They do not directly avert theft but rather discourage it by supporting detection of stolen copyrighted material. New methods also enable tracking of the source that provided the media and, in many cases identification of the distribution path. Copy detection provides proof that stands as evidence in legal courts. The popular anti-piracy motto of the U.S. film industry “steel it and we will catch you” is based on this concept. Other methods include futuristic ideas such as self-protecting content (Rosenblatt, 2004) or utopic proposals such as a small-scale Internet for hackers to tangle with; they have only demonstrated the urgency to find efficient solutions.

Complete solutions to IPR protection and management in e-business such as digital rights management (DRM) systems have been proposed for the persistent protection of digital content and

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