

ABSTRACT

Sion, Radu. Ph.D., Purdue University, August, 2004. Rights Assessment for Discrete Digital Data. Major Professors: Mikhail Atallah and Sunil Prabhakar.

Zero-cost verbatim digital copies, possibly one of the main features of the Information Age threatens to become one if its significant road-blocks, as more and more information is processed in fast, distributed environments. The ability to produce duplicates of digital Works at almost no cost can now be misused for illicit profit. This mandates mechanisms for effective rights assessment and protection.

One such mechanism is based on *Information Hiding*. By concealing a resilient rights holder identity “signature” (watermark) within the digital Work(s) to be protected, Information Hiding for Rights Assessment (Watermarking) enables ulterior court-time proofs associating particular Works with their respective rights holders.

One main challenge is the fact that altering the Work in the process of hiding information could possibly destroy its value. Additionally, one has to be concerned with a malicious adversary (“Mallory”), with major incentives to remove or alter the watermark beyond detection (thus disabling the ability for court-time proofs) without destroying the value of the Work (potential for illicit profit).

In this work we show that Information Hiding can be deployed as an effective tool for Rights Assessment for discrete digital data. We explore a wide range of discrete data domains, including numeric and categorical relational data, discrete sensor streams and semi-structured aggregates. We then prove that there are inherent limits to applying it effectively in hostile environments, limits illustrated best by a trade-off between the ability to “convince” in court and at the same time survive malicious adversaries.