Optical Fingerprinting to Protect Data: A Proposal

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To counter the increasing problem with optical media piracy, the author proposes Thor, a copy protection mechanism that incorporates both optical fingerprinting and cryptographic techniques to secure disc data.

A recent IDC survey (http://www.idcresearch.com) projected that the world software market will grow to $220 billion in 2002. Unfortunately, unauthorized software duplication and reselling have increased also. According to the Software and Information Industry Association (http://www.spa.org), in 1998 worldwide sales of business-related software generated $17.2 billion, while the global losses in the same market segment due to software piracy totaled $11.4 billion.

Developing software usually involves a considerable investment of money, time, and intellectual skill. The huge financial losses that companies incur because of piracy might have the sinister effect of discouraging developers from investing resources in newer and better software. This trend in piracy not only harms the prospects for companies in the present-day competitive market but also denies consumers access to improved software products.

Optical discs are the preferred media for storing and distributing digital information, especially software. The pervasive use of these discs is motivated by their low cost coupled with their versatility and durability. But advances in circuit technology have also boosted software piracy by making it easy to create high-fidelity copies of optical discs. Today, users can install a high-quality recorder in a home PC for a few hundred dollars. This trend toward progressive ease of disc copying has spawned a burgeoning parallel economy based on illegal software copying and merchandising.

For example, in Thailand, a pirated copy of Oracle's database software costs roughly $25, whereas a legitimate copy costs around $20,000. Apart from trying to enforce deterrent controls through trade sanctions, such as the special 301 provision of the Omnibus Trade and Competitiveness Act, or through the legal punitive actions included in the Digital Millennium Copyright Act, the software industry hasn't done much on the technological front to prevent this pernicious activity.[1]

A few companies, such as SunnComm (http://www.sunncomm.com) and MidTech (http://www.midtech.com), have developed technology for protecting CDs. These technologies prevent duplication by making minor changes to the data the CD stores. While these approaches could work for audio or video CDs, where imperceptible changes to the data don't make much difference, they are not easily applicable to software, which requires perfect data fidelity.

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