



TECHNOLOGY

Intersymbol Interference (ISI) Removal in Data Recovery

OVERVIEW

This invention discloses a novel approach for recovering mission-critical hard disk data that are unreadable due to hardware failures of the drive systems (such as a head crash or a faulty spindle). Under these circumstances, read channel techniques like PRML (partial response maximum likelihood) often cannot correctly detect the data because prior knowledge of the write channel (such as bit cell period) may not be available at the time of recovery. As such, this invention disclosure describes a new approach of data recovery using a read channel technique that is insensitive to the specifications of the write channel. This technique is based on the "response function" characterization of giant-magnetoresistive heads of hard drives. It effectively removes intersymbol interference (ISI) that in turn (after the appropriate decoding) will lead to the recovery of the otherwise unreadable drive data. The result is a new data recovery technique and related software that remove ISI without prior knowledge of how the data were written. In addition, this technique may also lead to new designs of hard disk read channels that will significantly increase the data storage density of future hard disk drives.

This invention originates from a government-sponsored collaborative research between the University of Maryland and the Laboratory for Physical Sciences. It fills an existing void of recovering hard disk data that are unreadable by current state-of-the-art data retrieval techniques.

The commercial benefits of this invention are promising due to the growing need for computer data recovery. From databases in educational and research institutions to large mission-critical servers in corporate enterprises and federal agencies, this new recovery technique potentially could save America hundreds of millions of dollars per year in data-loss-related costs. This invention also has a broader societal impact in the intelligence, security, and law enforcement communities where, in the field of computer forensics, for example, the retrieved data may serve as digital evidence for criminal and terrorist prosecution, thus promoting homeland security. Furthermore, the successful implementation of the ISI-removal technique may substantially increase the capacity and reliability of future hard drives. In addition, this technique also consumes less power and assumes a lower cost of implementation, making it suitable for mobile applications and a viable contender for read channel products in the multi-billion dollar hard disk market.

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Additional Information

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PATENT STATUS

Issued

LICENSE STATUS

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CATEGORIES

- Software + Algorithm
- Microelectronics

EXTERNAL RESOURCES

- [US Patent 7,002,762](#)

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