Implicit-Storing and Redundant-Encoding-of-Attribute Information in Error-Correction-Codes

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MICRO 46, Davis, California, December 9th 2013
Implicit Storing (IS)

Leverage error correction codes used for cache and memory data protection

- encode extra information
- without storing the information
- infer the information on reads

Based on error and erasure coding

Needs shortened codes: the number of protected data bits to be smaller than what can be protected by an error correction code

😊: reduce area and energy with low performance overhead
😊: Hurts error correction code strength
Redundant Encoding of Attribute Information (REA)

Exploit fine granularity of protection in caches and memory

- **encode** the same extra information in **multiple codewords**
- **decode** the extra information from **multiple codewords**

Needs the **multiple codewords** to be **correlated**

😊: improve **strength of the code** that implicitly stores or tags extra info

😢: not full strength recovery

😄: **minimal area, energy, and timing overheads**

Several **IS & REA** uses: **reliability, performance, security, energy**
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