File Compression Through Successive Bit Shifted XOR Functions

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Abstract   Compression is undoubtedly an exceptionally important part of data storage. Throughout this paper I will be exploring a new compression method that utilises XOR functions and bit shifting to compress data.

Preface

To preface this paper, I would like to first explain the notation used throughout this paper. The method being discussed throught this paper is refered to as SBX, for successive bit shifted XOR compression. SBX uses bit shifting to compress correction keys into shorter keys and bit shift lists, or BSLs, which are simply lists of integers. Since there are multiple BSLs, the BSL related to file n will be refered to as s_n, where the ith value, starting from 1, is refered to as $s_{n,i}$. One of the measures used is in relation to the length of all of the BSLs for a given set of files. In this instance, s refers to all BSLs for the given set of files. Within the scope of this paper, SBX was tested on small amounts of data, and not actual files. For this reason, the term *binary string* is used throughout the paper. This can be seen as equivalent to the term *file*, but in reality it's generation is purely random, unlike a genuine file. The term *pair* is used extensively throughout and refers to a BSL calculation class and key class, and not the actual values contained ithin the classes. For mamematical notation, see table 1.

Overview

SBX uses a paralell iterative process

Symbol	Description	Type
s_n	Bit shift list for file n	List of integers
k_n	The associated key for file n	Bit string
$D(k_n, s_n)$	Decoding function. See **??**	Function
	Bitwise XOR shorthand. See **??**	Operation
$<<$	Bit shift left	Operation
I_n	Correction key. See **??**	Bit string
F_n	File n, where n$\neq$ 0	Bit string
F_{0C}	Calculated F_0 for a given key and BSL pairing.	Bit string
	This may be an incorrect F_0	
F_0	Compressed file	Bit string
$L(s)$	Number of items in all bit shift strings	Integer

TABLE 1. *Notation used throughout this paper, in order of occurrence*

Compression

Expansion

Results

Future Work

Author

Rosie Bartlett is a currently a student and is still developing SBX. She can be reached at abc@xyz.edu. GitHub is also a good way to keep up with the current version of SBX.

Acknowledgements

Key Words