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IS THE PIED PIPER ALGORITHM FROM THE SHOW “SILICON VALLEY” POSSIBLE IN REAL LIFE?

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Анотація

Алгоритм Pied Piper із шоу Силіконова долина — це програма для стиснення відео, написана на C, яка досягає п’яти балів Вайсмана. Вважається, що цей тип технології стиснення відео здатний фактично скоротити Інтернет на цілих 10 відсотків із широким поширенням.

Ключові слова: алгоритм компресії, оцінка компресії, оцінка Вайсмана.

Abstract

The Pied Piper algorithm is a video compression software application developed in C that reaches a Weissman score in the fives, as seen on the show Silicon Valley. This form of video compression technology is estimated to be capable of decreasing the internet by up to 10% if widely adopted.

Keywords: compression algorithm, compression score, Weissman score.

Introduction

The "Pied Piper" algorithm, or "Middle Out" algorithm, is a fictional algorithm from the TV show "Silicon Valley." The show is about a genius programmer named Richard, who has created an amazing way to compress files almost without any loss. Most people were curious whether this could be done in real life while watching the show. Why is this algorithm so special in the first place? It has a magical 5.2 Weissman compression score. Compression algorithm metrics that rate not only the amount of compression but also the processing speed are difficult to come by. As a result, it asked the consultants it hired to help build the original algorithm—Stanford Professor Tsachy Weissman and then-PhD student Vinith Misra—to come up with a criterion that could be used to score various algorithms and determine a winner [1].

$$W = \alpha \frac{r \log \bar{T}}{\bar{r} \log T}$$

r and T refer to the compression ratio and time-to-compress for the target algorithm, $\bar{r}$ and $\bar{T}$ refer to the same quantities for a standard universal compressor (e.g. gzip or FLAC), and α is: scaling constant. By normalizing the performance of a standard compressor, we take away variation in compressive performance between types of data.

Materials and methods

First of all, we have to remember that the "Middle Out" algorithm is fictional. And even though everyone knows that implementing such a kind of compression algorithm is almost impossible, some programmers are still trying to recreate it or make something alike.

The most common way to compress files is with Shannon, Huffman, or Lempel–Ziv–Welch coding. Shannon's coding is based on going down, Huffman's on going up, and Lempel-Ziv-Welch on going left and right. But in the show, the main difference is that the Piped Piper algorithm is going from the middle to the outside. See Fig. 1. That's why the second name of it is "Middle Out."

In Ethan Crow's article [2] he has created his own algorithm using DCT filter banks as we saw in the show. See Fig.2. Efficiency is visible using a filter bank construction based on the discrete cosine transform

to encode and the inverse discrete cosine transforms to decode. According to DCT theory, the number of multipliers in the synthesis bank must be at least N-1. This is the smallest number of multiplies required to conduct the IDCT reconstruction function, lowering the amount of memory required for compression. Naturally, there is a high speed-to-memory ratio.

Another attempt at creating a compression algorithm inspired by the "Silicon Valley" is shown in Alexander Gould's article [3]. In the test provided by the author, we may see that his algorithm works better with complex video files. Illustrated in Fig. 3.

Results and discussion

The results of testing different algorithms inspired by Piped Piper are not impressive now. They have problems, so they can't be used now. But there are tons of companies and developers trying to create a better way to compress different files.

Compression Algorithm A team of engineers at Dropbox's Hack Week re-created the fictional compression schema from HBO's Silicon Valley. Horn's project is a file compression scheme for media files that allows you to compress and decompress files without losing quality. Horn and his colleagues were able to achieve a 22 per cent reduction in file size for JPEG photographs in less than a week, with no discernible loss in image quality [4].

Conclusions

Today, the same compression algorithm as was presented in the show seems impossible. Almost every engineer says that it's not realistic. But in my opinion, never say never. Maybe in the future, we will see a great project that will create an even better algorithm that will change our picture of the modern internet.

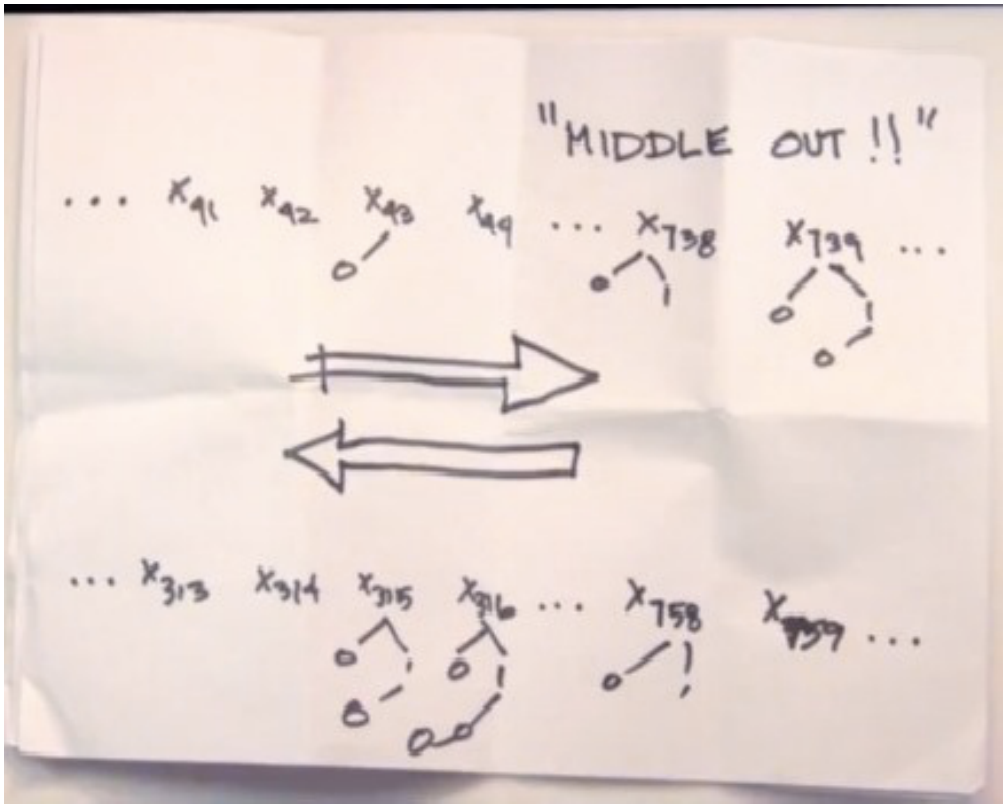

Fig. 1 Middle Out algorithm

Fig. 2 Usage DCT filter bank

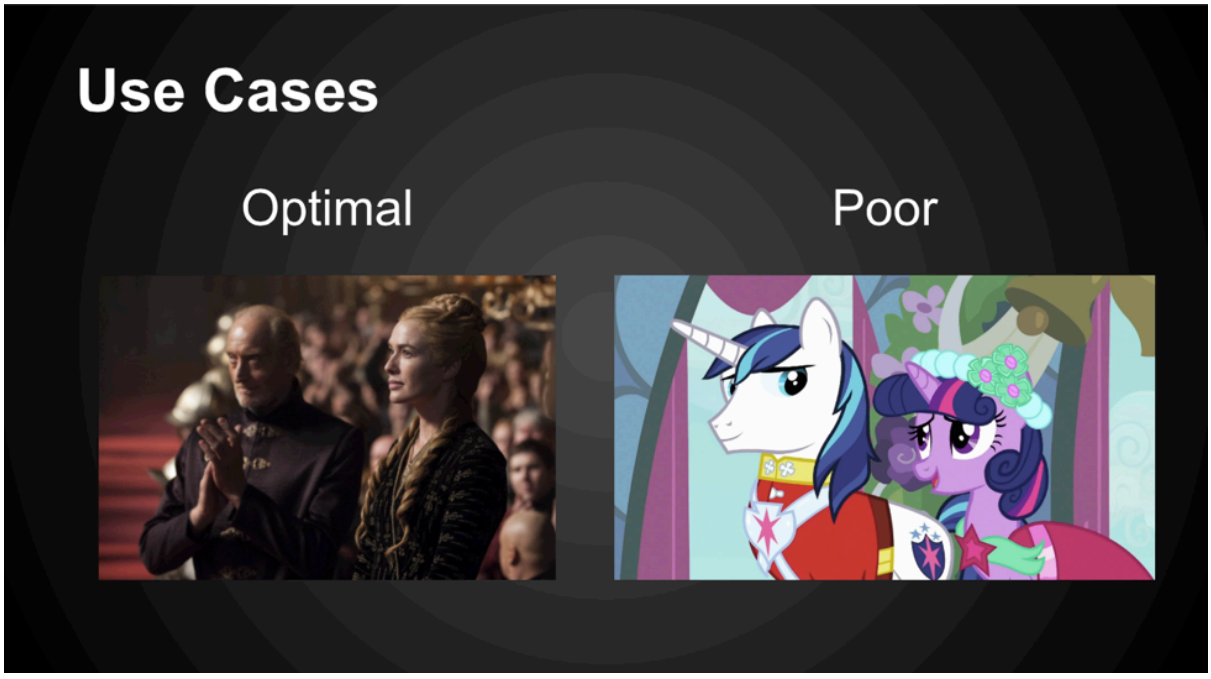

Fig. 3 Test of the compression algorithm

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