Improvement of the Method of Transformation of Numerical Matrices by Algorithm of their Balancing

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INTRODUCTION

The most common methods of encoding data in their transmission are divided into:

- Linear
- Combined
- Matrix
- Cascading

Such classes of methods guarantee full reproduction of information after its encoding and transmission. The algorithms for balancing numeric matrices for encrypting and encoding data also provide the restoration of the information matrix to its original form. Accordingly, this encoding method relates to lossless encoding methods.

BASIC CONCEPTS OF BALANCING MATRICES

The balancing of the numeric matrix is the process of determining or accommodating the central part of the matrix and depending on the result of executing a clearly defined set of operations in order to transform the matrix. The central part may be a string, a column, or a diagonal matrix. The center of the numerical matrix is determined by its size, namely, the ratio of the number of gaps and columns. The next step of balancing is the analysis of numerical values contained in different parts of the matrix centered center. After comparing the decimal values of the two opposite parts, the smaller and larger parts are determined, which in process increase and decrease by "1" due to a certain number of iterations.
The main types of balancing:

- Vertical Balance
- Horizontal balance
- Diagonal balance
- Cross Balancing

These types of this technique of matrix transformation may include the possibility of using virtual strings, columns, and diagonals.
Representation of horizontal and vertical balances:

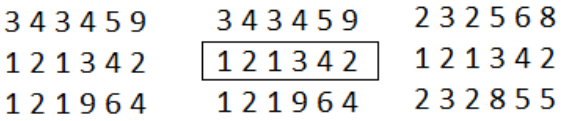

Fig. 1 One iteration of vertical balancing.

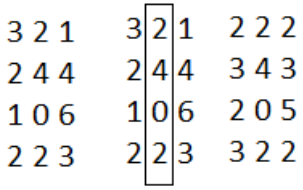

Fig. 2 One iteration of horizontal balancing.

In these algorithms, the center determines or sets a row or column that does not change, but compares and changes only the values of the opposing parts.

Diagonal and cross-balance are very similar at first glance, but they are intended for different types of motherhood:

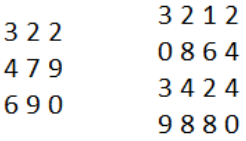

Fig. 3 The matrices are intended for diagonal and cross-correction.

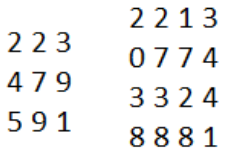

Fig. 4 Perform one iteration of diagonal balancing.

These types of balancing are valid for matrices with the same number of rows and columns, then the operation takes place diagonally.

COMBINED MATRIX BALANCING METHOD

This is one of the algorithms for balancing matrices, which performs operations simultaneously with several of the main algorithms described in the article. The effectiveness of using a particular balancing algorithm depends on the particular type of numeric matrix.

This type of balancing operation combines the previous algorithms, that is, in one matrix there will be balances on the vertical, horizontal and two diagonals. Accordingly, this algorithm is intended for matrices with an odd number of rows and columns.

1 2 2 4 2 5 6	1 2 2 4 2 5 6	2 2 2 3 2 5 7
3 4 3 5 2 6 6	3 4 3 5 2 6 6	3 5 3 4 2 7 6
9 0 0 5 1 2 0	9 0 0 5 1 2 0	9 0 1 4 2 2 0
3 4 2 7 7 7 7	3 4 2 **7** 7 7 7	4 5 3 7 6 6 6
4 8 9 0 5 4 3	4 8 9 0 5 4 3	4 8 8 1 4 4 3
8 5 1 1 2 1 6	8 5 1 1 2 1 6	8 4 1 2 2 0 6
1 2 3 4 5 0 0	1 2 3 4 5 0 0	0 2 3 5 5 0 9

Fig. 5 One iteration of the combined balancing.

The first matrix is the start point, in the next matrix its center is determined, namely the central number "7", after which all opposite parts of the matrix are compared and their balancing is performed once.

CONCLUSIONS

The article presents the results of the study of methods for balancing numerical matrices, depending on their size. The combination of these methods was also presented for the effectiveness of these methods. The combined type of balancing allows you to encrypt or encode a large number of matrix numbers.

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