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ABOUT ONE FORMAL SCHEMS OF INFIRMATION COMPRESSION

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In this given article the peculiarity of information compressing is based on principle of unity and intercommunication of different informational systems. This method of approach secures regulation of initial information, and regulation is one of main conditions of information compressing.

Formal scheme, which secures such regulation, stipulates Puttingin order of information (by regulation purpose) and possibility of its following pressing.

The essence of this formulary scheme is in following: Let's permit that we have casual sequence of vectors:

$$A_1,\ A_4,\ \ldots\ A_i,\ \ldots\ A_m$$

where A_i is binari vector of n+1 length.

$$A_i = (a_0^i, a_1^i \ldots a_n^i) \qquad a^i{}_k \in \{0,1\}$$

$$k = 0..n; \quad i = 1..m$$

To write this system of vectors we need m(n+1) bit

A_i (i=1..m) vectors must be discussed as whole numbers written in binari system:

$$A_i = 2^n \cdot a_n^i + 2^{n-1} \cdot a_{n-1}^i + \cdots + a_0^i$$

Let's place these vectors by the following regulated sequence:

$$A_1 \le A_2 \le \ldots \le A_m \tag{1}$$

Such sequence represents regulated sequence [1,2,3]. We can name sequence of vectors monotonic if (1) regulation exists. In this case formal scheme depends on the mathematic model:

$$f(A_1\ A_2 \cdots A_m) = C^m_{A_m+m-1} + C^{m-1}_{A_{m-1}+m-2} \cdots + C^1_{A_1} \tag{2}$$

$$C^j_{i+j-1} = \frac{(i+j-1)(i+j-2)\cdots i}{j!}$$

$f(A_1 A_2 \ldots A_m)$ number represents similar "pattern" of $A_1 A_2 \ldots A_m$ vectors and we need l bit to write it:

$$l < \begin{cases} m(n+1) - \alpha(m+1) + 2^{\alpha} & \text{if } \alpha < n+1 \\ d(\alpha - n+1) - n & \text{if } \alpha > n+1 \end{cases}$$

where $d=2^{n+1}-1$, and a is the marker of the highest degree of (disintegrating) parting m in degrees. .

If system of $A_1\ A_2\ ...\ A_m$ is given as $f(A_1\ A_2\ ...\ A_m)$, then it is possible to restore is partly, as $f(A_1\ A_2\ ...\ A_m)$ function is inaction or for any natural k number exists only one numeral sequence $A_1\ A_2\ ...\ A_m$, which satisfies the condition:

$$A_1 \le A_2 \le ... \le A_m$$

Let's discuss the difference:

$$K - \frac{m(m-1)(m-2)\cdots 1}{m!}$$

if

$$K - \frac{m(m-1)(m-2)\cdots 1}{m!} \geq 0$$

discuss

$$K - \frac{(m+1)m(m-1)(m-2)\cdots 1}{m!} < 0$$

Using such scheme we can find A_m, which satisfies the conditional:

$$K - \frac{(A_m+m-1)(A_m+m-2)\cdots A_m}{m!} \geq 0$$

$$K - \frac{(A_m+m)(A_m+m-1)(A_m+m-2)\cdots A_m}{m!} < 0$$

Let's permit

$$K - \frac{(A_m+m-1)(A_m+m-2)\cdots A_m}{m!} = K'$$

Let's carry out analogical process for K':

$$K' - \frac{(A_{m-1}+m-2)(A_{m-1}+m-3)\cdots A_{m-1}}{(m-1)!} \geq 0$$

$$K' - \frac{(A_{m-1}+m-1)(A_{m-1}+m-2)(A_{m-1}+m-3)\cdots A_{m-1}}{(m-1)!} < 0$$

$$K' - \frac{(A_{m-1}+m-2)(A_{m-1}+m-3)\cdots A_{m-1}}{(m-1)!} = K''$$

We can carry out the same process for K'' to restore A $_{m-2}$ and atc. By these iteration we'll get $A_1, A_2, \ldots A_m$ sequence of numbers.

For restoring compressed information partly it is enough to know the number of compressed vectors m and numberal (scalar) significance of vectors of such kind:

$$K = f(A_1\ A_2\ \ldots\ A_m) = C^{m}_{A_m+m-1} + C^{m-1}_{A_m+m-2} + \cdots + C^{1}_{A_1}$$

Let's discuss the examples:

ex.1

$A_1 = 3(011)$; $A_2 = 4(100)$; $A_3 = 5(101)$; $A_4 = 6(110)$

To write sequence of these vectors we need12 bit .

$K = f(3,4,5,6) = 174(10101110)$

For writing in pressed form we need 8 bit

Restoration:

$C^4_{6+3} = 126$ $\quad K - C^4_{6+3} > 0$

$C^4_{7+3} = 210$ $\quad K - C^4_{7+3} < 0$

fixes $A_4 = 6$

$K^1 = K - C^4_{6+3} = 48$

$C^3_{5+2} = 35$ $\quad K^1 - C^3_{5+2} > 0$

$C^3_{6+2} = 56$ $\quad K^1 - C^3_{6+2} < 0$

fixes A_3=5

$K^{11} = K^1 - C^3_{5+2} = 13$

$C^2_{4+1} = 10$ $\quad K^{11} - C^2_{4+1} > 0$

$C^2_{5+1} = 15$ $\quad K^{11} - C^2_{5+1} < 0$

fixes A_2=4

$K^{111} = K^{11} - C^2_{4+1} = 3$

$C^1_3 = 3$

fixes A_1=3

Sequence is restored partle.

Example:

$A_1 = A_2 = A_3 = A_4 = 4(100)$

$K = f(4,4,4,4) = 69(1000101)$

7 bits write initial sequence of numbers.

As we can see from these examples in cases when sequence of numbers are strictly monotone (regulated) or all the members of sequence are scalar equal (partly regulated), sequence is carried out by regulation rule and it needs no different artificial rule for reduction informational.

R E F R E N E C E

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