

Modeling of Movement and Correlation Data Processing in Computer Systems

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Abstract. The paper presents the methodology of the model and example of the movement of data in computer systems using correlation processing of these data in jurisprudence.

Keywords: matrix models of motion data, correlation functions

relevant in the field of jurisprudence and the creation of databases and knowledge in a wide range of modern information systems

I. INTRODUCTION

Theory of traffic data in computer systems (CS) is fundamentally developed by American scientist J. Martin [1]. Creation of information technology design CS in the class "colored" Petri nets is an important direction of development of this theory. The theoretical basis of such networks is traffic data matrix models [2]. Opportunities for development of technology for constructing such models is the correlative processing of information in documents and data in order to protect them from unauthorized access. This problem is

II. THEORETICAL PRINCIPLES AND METHODOLOGY OF THE MATRIX MODELS OF MOTION DATA

Consider the processes of property rights [2] as an example, patterns of movement data. If the process of law is implemented on the basis of operation "sale" property, then it is legal movement of property, finance and related documents (fig. 1). This formed the documents that have universal identifiers - numbers and registered in accordance with the rules of law.

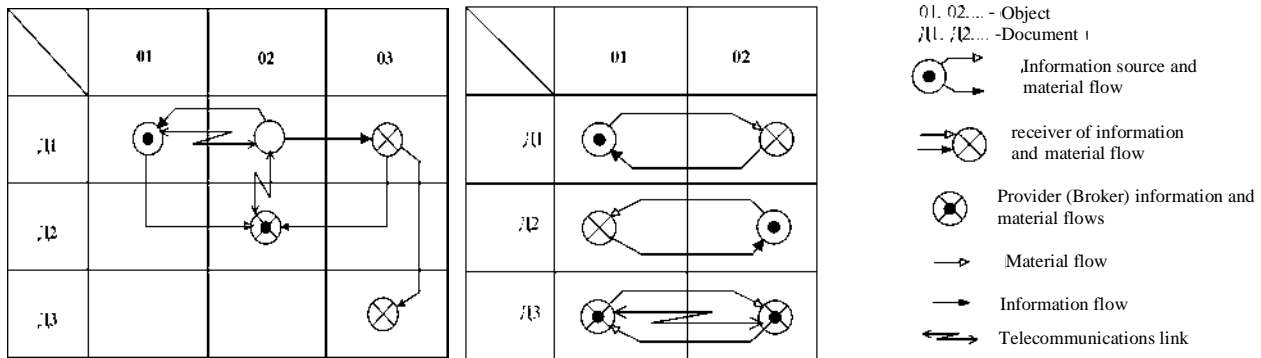


Fig.1. Matrix model of property rights on the basis of operations "sales".

The use of computer systems for automation of such processes requires on the one hand structuring data, and on the other hand methods of automatic generation of identifiers and registration documents.

III. METHODOLOGY FOR THE FORMATION OF STRUCTURED DATA IN COMPUTER SYSTEMS

Struktyrizovani data, including alphanumeric, telemetry and data model, usually formed at the grassroots levels and CS describes the following frame:

$$F_{OY} = f(x_i, TED, M_i), \quad (1)$$

where x_i – telemetry data on the status of management object,

TED – technical and economic data, including tabular data and alpha-numeric documents,

M_i – set of information models that identify the state of management object.

An important class of models which represent the integrated characteristics of management object is a correlation model that include statistical and spectral characteristics.

IV. SYSTEMATICS AND THE USE OF CORRELATION MODELS FOR DATA PROCESSING, CARRIED OUT AT NODES OF PATTERNS OF MOVEMENT DATA

In many cases, effective method of data processing in the nodes of the matrix model is the correlation analysis. In consideration of fig.1 an example, the correlation functions can be used to generate a unique identifier of the document. If the correlation model built so that all the characters taking

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part in the formation of its number - an identifier, in addition to the uniqueness of this number, it does provide additional protection against falsification of the document, since a change in him at least one character will lead to a change in the whole identifier.

Correlation model for generating sixteen symbol number will have the following form:

$$W_{xx}(j) = \frac{1}{M} \sum_{i=0}^M r(x_i, x_{i+j}), \quad j = \overline{0, 15}, \quad (2)$$

where N – number of symbols in the document;
 $M = N - 15$ – length of the sample for correlation
 $r(x_i, x_{i+j})$ – one of the correlation functions (3)

$W_{xx}(j)$ – selected value of the correlation function corresponding to the expression $r(x_i, x_{i+j})$, that both are symbols of identity document.

Classical correlation function requires a balance of values and requires long calculations, especially for large documents. Therefore, to generate an ID document easier to use a structured, modular or function of equivalence [3].

For example, the identifier for the text of this article, calculated on the basis of function equivalence,

$$F_{xx}(j) = \frac{1}{M} \sum_{i=1}^M z[x_i, x_{i+j}], \quad (3)$$

where $z[x_i, x_{i+j}] = \begin{cases} x_i, & x_i \geq x_{i+j} \\ x_{i+j}, & x_i < x_{i+j} \end{cases}$ — function "lesser"

will look like: "**Modelingnofmove**"

Thus characters are encoded in ASCII coding system.

V. CONCLUSION

Thus, the paper presents the methodology for the formalization of data traffic based on matrix models, which allow to build computer systems to Automatic Processing of structured information. A method as registration documents using the document identifier, obtained by the correlation model, which provides additional protection against falsification of documents.

[1]. Martin J. Digital Networks and Distributed Data Processing. – M.: Finance and Statistics, 1985. – 256 p.

[2]. L.Shandrovskya, N.Vozna Computer technologies and models of conducting the agreements, concerning occurrence of the property right. – Матеріали VII Міжнародної науково-технічної конференції CADSM 2003, - Львів, - 2003, – с.244-245.

[3]. Nykolaychuk Y., Segin A. Information source models and methods of there building. // Methods and equipment of quality valuation. Ivano-Frankivsk: IFSTUOG, 1998, № 2. – P. 80 – 84.