MATHEMATICAL METHODS, MODELS AND MODERN PHYSICAL PROCESSES

COMPARATIVE REVIEW OF METHODS FOR IDENTIFICATION OF OBJECTS OF AUTONOMOUS INFORMATION PROCESSING SYSTEMS

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The relevance of the development of identification methods is growing in close relationship with the complication of information processing systems. Our goal is to compare and analyze existing methods to further improve the mechanisms and algorithms for identifying objects of autonomous information processing systems.

Material and methods. In solving modeling problems, scientific activity is faced with the need to formalize processes, phenomena and objects. Building a model based on identification uses information obtained about the object in the course of its operation according to its input and output data [1].

It is convenient to classify identification methods according to some criteria. According to the testing method, we single out active and passive identification methods. The active provide for a deliberate impact on the object, it can be deterministic or random. In the case of choosing passive methods, the object is in natural conditions of exposure to the environment.

By the nature of the signals used deterministic methods are possible only with active identification, as they imply a clearly defined effect on the object, excluding any interference; statistical methods work with the results of processing observations.

On the basis of time costs, during operational identification, data about the object are collected in real time, and the evaluation of the parameters of the model is supplemented immediately. With retrospective identification, all estimates are made after collecting and analyzing the entire array of data about the object [2].

Let us analyze the strengths and weaknesses of specific methods.

The naming method is based on assigning a name (term) to an object, which has a corresponding definition. The name identifying the object answers the question what it is and reflects its essence, it can be supplemented with a characteristic feature, as well as a proper name.

The method of digital numbers involves assigning an object a serial or serial-serial number.

The classification method is designed to detect a certain number of similar objects according to a selected feature.

The convention method combines several methods of identification, seeking to combine their advantages and minimize the amount of use of the number of characters, while uniquely identifying the object. Elements of serial numbers, as well as classification designations, can also be used here.

The reference method usually complements the method of names and conventions, providing additional information pointing to a specific database about the object.

The descriptive method does not name the object directly, but most fully lists a number of its characteristics. Like all speech methods, it is easy to use, but very time consuming.

The descriptive-reference method seeks to unload the descriptive method by transferring some of the secondary information about the object to a separate document or database.

The automatic identification method became possible with the development of technology and electronics, as it processes a large amount of information. It is used to identify objects by reading a set of minimally necessary data about the object in a form understandable for this device (bar codes, smart cards, sounds and signals, optically recognized characters).

In the context of the development of autonomous information processing systems, the biometrics method is the most relevant in our time and is of the greatest interest. The biometric method is aimed at identifying a person by his key characteristics using an electronic recognition device. Fingerprints, voice, retinal pattern, hand vein pattern, thermal images, face image are used.

Findings and their discussion. The naming method is the most understandable and intuitive to understand due to its proximity to the spoken language, but the disadvantage is a large number of characters used to identify the object. The classification number method is good in combination with methods that give information about the essence of the observed object. The advantages of the classification method are flexibility, the ability to apply according to various criteria, as well as the provision of information with a given accuracy about a large number of objects. However, the classification method is not designed to solve the problem of unique identification. The convention method combines several identification methods, presenting information in a short and convenient form. Reference, descriptive and descriptive-reference methods demonstrate the advantage of the completeness of the information provided and convenient access to it. The automatic identification method works quickly and on a technical basis, with little or no human intervention, processing a large amount of information. However, it requires a well-defined form of input data. The accuracy of identification by biometrics is a problematic area, since a person is a dynamic object, constantly changing in time and space, but the high demand for autonomous biometric identification systems makes it necessary to constantly increase the accuracy of the method with the help of scientific developments.

Conclusion. Based on the foregoing, we can conclude that the choice of the identification method is closely related to the form of representation of the mathematical model, almost never being universal. Together with the rapid development of technology, the existing identification methods are increasingly being changed, divided and supplemented, several of them are combined at once. There is a need for new approaches to identification, especially in the operation of autonomous data processing systems, which will be the focus of further scientific activity.

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2. Diligenskaya, A. N. Identification of control objects / A.N. Diligenskaya – Samara: Samar. state tech. university, 2009. – P. 136.