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Issues of Optimal Processing of Visual Information

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It is clear that processed signals in the direction of radio engineering such as radiolocation, radio navigation, space communication, artificial satellite communication, and recently developing holography are mainly visual information. The signal being processed must give a complete picture of the object. Theoretical and practical experiments show that these signals, during processing due to numerous noise and noise, can give incorrect representations, i.e. processing of the visual signal is carried out under conditions of uncertainty.

Now in many countries of the world, scientists and radio engineers are carrying out scientific research to increase the quantity and quality of visual information in conditions of uncertainty.

A number of circumstances cause the recent rapid development of methods and means for processing visual information, among which the most important can be considered the following. The intensive development of scientific research and the growing complexity of the scientific and technical problems to be solved now require analysis not so much of one-dimensional signals as of various types of scalar and vector fields that can be represented in the form of two-dimensional images. An analogous process is currently being observed in various spheres of production, where automatic visual control and analysis of three-dimensional and two-dimensional production scenes by their two-dimensional images are very widely used.

In addition, much attention to the problems of processing visual information is due to the variety of practical problems arising in various fields of technology and associated with the management, guidance and self-guidance of stand-alone devices. It should be noted here that the person on the visual channel receives the main part of information about the external world and at the same time, he uses the apparatus of analysis and interpretation of visual information elaborated in the process of evolution quite effectively. Apparently, such an approach to the analysis of visual information is the most rational for robotic devices, and it must be optimally realized within their visual systems within the limits of existing technical capabilities.

In the above applications, processing of visual information is performed in virtually all ranges of electromagnetic waves: optical, radio, X-ray, ultrasound,

As is known, the processing and analysis of visual information is understood as the application of transformation systems that ensure the extraction of useful information about the properties of the imaged objective or processes from it. Over the past twenty years, a significant part of the applied tasks of information processing and data analysis in a number of areas of technology is associated with visual information and, in particular, with two-dimensional images. This also applies to applications of methods of artificial intelligence and pattern recognition [1].

For the analysis of visual information, a rich arsenal of passive methods is used, based on the perception of the own radiations of objects and scenes, and active methods based on various schemes of structured scene illumination. In addition, various variants of the stereoscopic and light-analysis analysis are effectively used for the three-dimensional scenes.

The rational construction of a system for the removal of visual information, which amounts to identifying useful information and significantly reducing the flow of redundant information at the input of the system, is a very important task. Its successful solution allows the creation of technical vision systems operating in real time and having simple computing devices.

Automatic processing and analysis of visual information is currently being paid much attention, which is caused by the intensive use of such systems in various fields of science and technology. Principles of optical-electronic processing of visual information are used in performing survey-search operations, solving problems of analysis and recognition of images of objects and scenes, solving problems of tracking complex objects on various backgrounds, and so on. Such systems are called MVS (Machine Vision Systems). The main functions implemented by the MVS are the detection of objects, their identification, as well as the determination of orientation, coordinates and other parameters.

One of the important issues that should be optimally solved when creating a specific MVS is the acquisition (in the form of a video signal) of the primary information about the controlled scene with the required space-time resolution. To remove visual information, the scene image must be subjected to sequential (or parallel - sequential) viewing, implemented in the passive or active versions. Common in the work of all MVS is the scanning process when reviewing the analyzed scene. Currently, the following scanning methods have been developed: continuous frame-by-line, frame-by-frame and autonomously-frame-by-frame. In those cases when the scanning system moves at a certain speed relative to the object

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under investigation, located for example on a conveyor belt, a method of continuous scanning in the direction perpendicular to the movement of the object is usually used.

The process of automatic analysis of visual information, as a rule, is a complex multi-stage procedure. After the decomposition operation of the image in the video sensor, the information in analog or digital form is fed to the following processing steps. Analysis of visual information is a process based on the use of an analysis structure that is sensitive to various levels of detail in the image. At the same time, various methods of processing, identification and recognition of 2D and 3D images are used, including stereoscopic methods, active probing illumination methods, light grid grating methods, etc.

In connection with the significant progress in the field of computing.

Now in automatic recognition of images, certain successes have been achieved. The work is carried out mainly in two directions. The first direction is the creation of a system of image processing and analysis for various automatic production complexes. These systems are designed to solve such tasks as identification, classification and sorting of parts, quality control of their surfaces, etc. The second direction is related to the creation of automatic devices for reading labels, markings, checks, etc. Intensive work is conducted to create technical means for systems of analogue of two-dimensional and three-dimensional scenes (sensitive elements, monocular and binocular cameras, systems of structured illumination, etc.). However, the main part of the research is concentrated on the problems of processing, analysis and use of visual information (development of programs, algorithms and means of their hardware implementation). The urgency and complexity of these tasks are closely related to the prospects for the further development of computer technology.

The algorithm for processing two-dimensional visual information with the help of MVS usually includes the following procedures: obtaining image data, image linearization, segmentation, identifying characteristic features, identifying or classifying objects, locating objects and transmitting data to executive bodies. Thus, the MVS can divided the functions performed into three groups: the identification of the form, determination of spatial position, isolation of the control signal or control [2].

Proceeding from the foregoing, the development of optimal algorithms and the structure of the process of processing signals carrying visual information in conditions of uncertainty is one of the theoretical and scientific-practical topical problems.

References:

1. Катыс Г.П. Обработки визуальной информации. — М.: Машиностроение, 1983. 320с
2. Лопухин В.А, Гурылев А.С. Автоматизация визуального технологического контроля в электронного приборостроением. // Л.1987г. 287с