BASICS OF PROGRAMMING FOR GEOINFORMATION SYSTEMS

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Introduction. Modern intensive development of information technologies, models and methods of data processing finds its logical implementation and effective implementation in geoinformation systems.

Aim. Work includes a modern understanding of geographic information systems, their functionality and general structure, classification of geographic information systems and organization of data in geographic information systems.

Materials and methods. In the modern sense, a geoinformation system is an information system designed to collect, store, process, display and distribute data, as well as to obtain new information and knowledge about spatially coordinated objects and phenomena based on them [1-3].

The key difference between a geographic information system and other information systems is that all information in geographic information systems is visually represented as an electronic map, which, unlike paper maps, is not a static image. At the same time, each symbol corresponds to a specific object that can be analyzed, and the basic function is to obtain information about the object selected on the map.

The functionality of a geographic information system is described by the classical scheme of function scheme according to R. Tomlinson [3] and includes, on the one hand, data collection, data processing, data analysis and decision making, and, on the other hand, observation, measurement, description, explanation, prediction and decision.

The modern market of software solutions for geoinformation systems is quite diverse and is developing intensively. At the same time, there is a unification and

standardization of software solutions, at least in terms of interface implementation.

The main window of a typical geographic information system implemented as a desktop application contains the following main parts [3] – menu, toolbar, layer legend, status bar and map window.

Also, modern geographic information systems support such basic modes of working with a map [3] -obtaining information about objects on the map, zooming in, zooming out, panning, measuring distances, measuring areas, editing objects, creating new objects. The basis of any successful and effective activity is a compact, complete and rational classification.

In work [3] proposes to use such classification features as spatial coverage, management level, area of activity, functionality, models used and the corresponding platform. In line with spatial coverage distinguishes between global (planetary), subcontinental, interethnic, national (state), regional (regional), subregional (district), local (local, city, UTC), ultra-local (enterprises, limited territories) geoinformation systems.

According to the level of management, geoinformation systems are divided into national, regional, municipal and corporate.

Depending on the field of activity, geoinformation systems are used to solve the problems of management, land use, real estate management, urban planning, architecture, business, engineering networks, engineering and geodetic search, defense, emergency situations, ecology, meteorology, subsoil use, oil and gas industry, demography, statistics, education and domestic use.

By functionality, geoinformation systems are divided into full-featured (instrumental), systems for viewing data, systems for entering and processing data, as well as specialized systems. Geoinformation systems use vector, raster and hybrid models using desktop, client-server and Internet platforms. The organization of data in geographic information systems is based on the main concept - the concept of layered organization of spatial data, according to which, the same type of data on the earth's surface are grouped into layers (themes), and the combination of layers forms a map.

The implementation and use of geographic information systems is possible in accordance with one of two possible scenarios.

The first option involves the use of geoinformation systems of third-party developers, as a rule, of fairly large companies. The basis of the second implementation option is the use of our own developments. An essential basis for the viability of this approach is the development and availability of effective software development tools and the availability of a huge variety of libraries for working with geo-referenced data.

Results and discussion. The current state of the issue of implementing systems for working with geo-referenced data is described.

Conclusions. The paper presents a modern understanding of the geographic information system and its main functionality. The typical interface elements of the desktop version of geoinformation systems and the main modes of operation in them are described. The signs and the corresponding classification of geoinformation systems are presented. As the main option for the implementation of geographic information systems, it is proposed to develop our own software using existing libraries.

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