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Structure of legal support for the of development of ecologically balanced environment in the conditions of formation of the agrarian policy

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Abstract

Information management system is a set of information, economic and mathematical methods and models, technical, software, other technological tools and specialists, as well as intended for information processing and management decisions. Classification of information management systems depends on the types of management processes, the level of management, the scope of the economic object and its organization, the degree of automation of management. The author notes that geographic information systems are database management systems (DBMS). However, there is one important difference: in geographic information system together with attribute data spatial (geographical) information is processed. Therefore, when designing GIS specialists use the same techniques and techniques as in the development of conventional DBMS. Any database contains information about a certain subject area. A subject area is a specific area of the real world that is of interest to study. The first stage of designing any information system is the formalization of the problem, i.e. at this stage, an infological model of the subject area is built. The next step is creation of a physical database model that links the datological model to a specific storage environment. Working on the creation of GIS, we must not forget about the issues of project financing. GIS projects are usually very long, so problems in funding can lead to the closure of works. It is recommended to have several sources of funding and to provide an option of self-financing the project.

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Keywords

Remote sensing, formation, system, agricultural sector, law, regulation.

Introduction

Information systems are the level in the system of public administration; area of functioning of economic object; types of management processes; the degree of automation of information processes; - the level of structuring of tasks; the nature of the use of information.

In accordance with the classification feature at the level of public administration, automated information systems are divided into federal, territorial (regional) and municipal, which are information systems of a high level of hierarchy in management [Chumakova, 2017]. Federal information systems solve the problems of information service of the administrative administration and operate in all regions of the country. Territorial (regional) information systems are intended for the decision of information problems of management of the administrative and territorial objects located in the concrete territory [Verenich, Chelysheva, 2008]. Municipal information systems in local governments are for information service of experts and providing processing of economic, social and economic forecasts, local budgets, control and regulation of activity of all links of social and economic areas of the city, the administrative area, etc.

Classification by the field of functioning of the economic object is focused on the production and economic activities of enterprises and organizations of various types. These include automated information systems of industry and agriculture, transport, communications, banking systems, etc. [Chelysheva, Verenich, 2009].

Management processes are divided into the following groups by types of IP:

1. Process control ICS are designed for automation of various technological processes (flexible technological processes, energy, etc.) [Obermeyer, 1993].

2. The management of organizational and technological processes is multilevel, hierarchical systems which combine is of management of technological processes and is of management of the enterprises [Rostokinskii, Tolpekin, 2014].

The most widespread is organizational management, which are designed to automate the functions of management personnel [Ashton, Simmons, 1993]. Given the most widespread use and diversity of this class of systems, different information systems are understood in this interpretation [Rostokinskii, 2011]. This class of IP includes information management systems for both industrial firms and non-industrial economic objects-enterprises of the service sector [Chelysheva, 2010]. The main functions of such systems are operational control and regulation, operational accounting and analysis, long-term and operational planning, accounting, sales and supply management and other economic and organizational tasks.

Integrated ICS are designed to automate all functions of management of the company and cover the entire cycle of operation of the economic object: from research, design, manufacture, production and marketing of products to the analysis of the operation of the product [Verenich, 2008].

Computer-aided design (CAD) is designed to automate the functions of design engineers, designers, architects, designers when creating new equipment or technology. The main functions of such systems are engineering calculations, creation of graphic documentation (drawings, schemes, and plans), creation of project documentation, modeling of designed objects.

Corporate ICS are used to automate all management functions of a firm or Corporation that has a territorial separation between divisions, branches, branches, offices, etc. [Rostokinskii, 2011].

Research ICS provide the solution of research problems on the basis of economic and mathematical methods and models.

Training materials are used for training specialists in the education system, retraining and advanced training of workers in various sectors of the economy.

Main part

According to the degree of automation of information processes is divided into following groups:

1. Manual information systems, which are characterized by the lack of modern technical means of information processing and execution of all operations by a person according to pre-developed techniques [Antonyan at al., 2011].

2. Automated information systems-human-machine systems that provide automated collection, processing and transmission of information necessary for management decisions in organizations of various types [Rogers, Craigб 1996].

3. Automatic information systems are characterized by the implementation of all information processing operations automatically, without human intervention, but leave the control functions for the person [Rostokinskii, 2014].

The more accurate the mathematical description of the problem, the higher the possibilities of computer data processing and the less the degree of human participation in the process of its solution. This determines the degree of automation of the task.

There are three types of tasks for which information systems are created: structured (formalized), unstructured (non-formalized) and partially structured [Pocock, 1993].

A structured (formalizable) problem is a problem where all its elements and relationships between them are known.

Unstructured (unformalizable) task is a task in which it is impossible to select elements and establish links between them [Kostyuk, Rostokinskii, 2012].

In a structured problem, it is possible to express its content in the form of a mathematical model with an exact algorithm for solving. Such tasks usually have to be solved many times, and they are routine. The purpose of using the information system to solve structured problems is the complete automation of their solution, i.e. reducing the role of a person to zero. An example of a structured task is, for example, payroll.

The solution of unstructured problems due to the impossibility of creating a mathematical description and algorithm development is associated with great difficulties. The possibilities of using the information system here are small. The decision in such cases is made by the person from heuristic considerations on the basis of his experience and, possibly, indirect information from different sources.

According to the nature of the use of information, there are information retrieval and information-solving systems.

Information retrieval systems produce input, systematization, storage, delivery of information at the request of the user without complex data transformations. For example, the information retrieval system in the library, in the railway and air ticket offices.

Information-solving systems carry out all operations of information processing according to a certain algorithm. Among them, it is possible to classify the degree of impact of the developed result information on the decision-making process and to distinguish two classes: managers and advisers.

IP managers generate information on the basis of which a person makes a decision. These systems are characterized by the type of computational tasks and processing of large amounts of data. An example is the system of operational planning of production, accounting system [Verenich, 2015].

Advisory (expert) is develop information that is taken into account by the person and does not immediately turn into a series of specific actions. These systems have a higher degree of intelligence, as they are characterized by the processing of knowledge, not data.

Territorial information system (TIS) is a geographic information system designed to ensure the processes of developing optimal spatial solutions based on the use of relevant, reliable and comprehensive geoinformation and methods of geoinformation data processing.

The generalized purpose of creation of TIS consists in formation of the mechanism of geoinformation support of systems of life support and socio-economic development of the region.

In the temporal aspect, it is divided into three main objectives:

1) The short-term goal is the integration and comprehensive presentation of heterogeneous thematic orientation of geoinformation in a single geographic information space.
2) The medium-term goal is to provide the main groups of consumers with relevant, reliable and comprehensive geo-information to assess the state of the territory, the current situation and decision-making spatial solution.
3) The long-term goal is the introduction of geoinformation methods of modeling, analysis and forecasting directly into the processes of spatial decision-making in order to optimize them, improve efficiency and validity, more rational use of available resources.

The information content of TIS is justified by the need of information presentation areas from the standpoint of its development needs, economic performance, livelihoods.

The consolidated list of the main directions of GIS use in the implementation of activities related to the management of territories includes the study of socio-economic status of the subject of the Russian Federation; economics and finance; ecology, resources and nature management; transport and communication; utilities and construction; agriculture; health, education and culture; public order, defense and security; socio-political status.

Geoinformation analysis-analysis of the location, structure, relationships of objects and phenomena using methods of spatial analysis and geomodelling [Dansby, Onsrud, Milrad,1992].

Spatial analysis-a group of functions that provide analysis of placement, relationships and other spatial relationships of spatial objects, including analysis of visibility zones, neighborhood analysis, network analysis, creation and processing of digital elevation models, spatial analysis of objects within buffer zones, etc.

Geomodeling (geoinformation modeling) – the creative process of creating a computer simulation model of spatial objects, processes or phenomena, as well as the study of relationships between them using geoinformation systems.

In accordance with the functional classification of GIS allocate specialized software for geoinformation analysis and modeling, as well as basic software, which have the majority of modern GIS.

Despite the apparent, at first glance, the complexity of spatial analysis and modeling, absolutely any consumer of geoinformation performs these operations using both built-in GIS functions, and using their own, specific commands, operations, queries or software applications. The simplest examples of spatial analysis are the determination of the location or the optimal route to the object of interest to the user. When searching for a product or service, users of reference and mapping systems often perform spatial analysis to identify nearby suppliers or those suppliers that are in the most attractive transport accessibility.

The main types of geoinformation analysis are:

functions of work with databases of spatial and attribute data, geocoding, cartometric functions, creation of models of surfaces, construction of buffer zones, overlay operations, network analysis, data aggregation, zoning, specialized analysis [Pearson, Wheaton, 1993].

A. functions of work with databases of spatial and attribute data:

– editing database structure;

– data entry, updating, editing, generation of derived information based on the performed spatial analysis, modeling, spatial and attribute queries;

– search (selection) of objects by a certain condition (criterion);

– data generation and editing;

– analysis and automatic correction of topological correctness of spatial data (determination of self-intersections, overlays of areal objects, voids between objects, subducts, objects, redundant nodes, etc.);

B. Geocoding – a method and process of positioning of spatial objects relative to a coordinate system and their attributes, carried out by establishing links between non-spatial databases and the positional part of the GIS database.

Thus, geocoding consists in binding objects to the map, the location of which in space is specified by information from database tables.

The simplest geocoding is to display on an electronic map one symbol of objects that meet the request that the user has specified for their attribute database. An example is the address binding of objects to the map by certain attributes from the database. More complex geocoding can be performed using large databases, information from which is tied to an electronic map and displayed on it in certain symbols.

As one example, we can give a model of the territorial distribution of applicants to the SSCA of Novosibirsk.

The addresses of the actual residence of the students enrolled in the Academy were used as the initial information for the model. In the geoinformation system on the territory of the city of Novosibirsk, geocoding of address information was performed and, according to the obtained data, schemes of distribution of the density of students in the city were made.

From the analysis of the distribution of residence in the city of students enrolled in the Academy, it follows that the vast majority are residents of Leninsky and Kirovsky districts. Most often, students living in the immediate vicinity of metro stations come from the right bank districts. Thus, one of the factors influencing the choice of higher education institutions by applicants is transport accessibility;

C. Cartometric functions are to calculate areas, lengths, perimeters, surfaces, volumes, angles of inclination, exposure slopes, visibility zones. Cartometric functions are implemented using algorithmic and mathematical apparatus implemented in GIS.

D. creation of models of surfaces. Surface models can be constructed from regular and irregular points.

The most common types of surface analysis are surface interpolation and contour plotting; calculation of angles of inclination, illumination, visibility zones, direction of water flow, etc.

E. Construction of buffer zones. The buffering function in GIS is one of the functions of neighborhood analysis and consists in creating polygons whose boundaries are spaced a certain distance from the boundaries of the original objects. For example, as a buffer zone can act as a water protection zone, sanitary protection zone, etc.

F. Overlay operations. They consist in the imposition of dissimilar layers on each other with the generation of derived objects arising from their geometric layering with inheritance of their semantics (attributes). A classic example of overlay operations is the subtraction of the layer" cadastral quarter "layer" land" and getting a new layer-land not put on the cadastral register.

G. Network analysis consists in solving various problems on spatial networks of connected linear objects (rivers, roads, pipelines, power lines, etc.). Of the most common tasks can be distinguished: search for the nearest object that meets the attribute request of the user; the opening of the shortest route; definition of service areas (availability), etc.

H. data Aggregation consists in the transition to collective, generalized characteristics of objects grouped by different criteria. For example, it could be merging objects of the same themes in accordance with their placement inside the polygon features of another theme (the object is created «collection»); combining objects by equality of values of a certain attribute, etc.

I. Zoning consists in the construction of zones-areas that are homogeneous according to the selected criterion or group of criteria;

J. Specialized analysis – carrying out specialized geoinformation analysis, in particular, geological, geophysical, hydrogeological, environmental, etc., carried out on the basis of specialized software modules.

Modern approaches to the creation of a GIS

Modern geographic information systems (GIS) are a new type of integrated information systems, which, on the one hand, include data processing methods of many pre - existing automated systems (as), on the other-have specifics in the organization and processing of data. In practice, this defines GIS as multi-purpose, multi-aspect systems.

In particular, the control system GIS is the backbone of the new automated control systems (management information system). This causes the increased importance of GIS – a modern means of organizing many types of production [Cheng et al., 2001]. It is no coincidence that in December 1996 the Russian government adopted a resolution" GIS as public authorities (OGV)".

Development of GIS software consists of six stages:

1) Analysis of the requirements for the GIS
2) Definition of specifications
3) System design
4) Coding
5) Testing
6) Operation and maintenance

The first step is to analyze the requirements for the system being developed, which are concentrated in the interface between this system and the users who will operate it [Worley, Rupert, Risse, 2001]. The analysis includes such issues as information processing time, processing cost, error probability, etc. requirements Analysis can contribute to a better understanding of the actual problem being solved and compromise situations, which helps to choose the best solution. It is necessary to identify the space-time constraints imposed on the system, which may change in the future, as well as the means used in its different versions for different applications.

When creating a GIS, a team of developers immediately faces many problems, both technological and conceptual. It is necessary to define the basic concepts, objects and information processing procedures that will underlie the GIS. It is necessary to approach this task very responsibly, because it is the concept of the future system and the perfection of the data model that determines its success and survivability in the market [Capolongo, Refice, Mankelow, 2002]. At the same time, developers have to take into account many factors-the advantages and disadvantages of the concepts of existing systems, constantly changing requirements from the side of applications, changes in information technology and much more.

At the stage of defining specifications is an accurate description of the system functions, you specify the structure of input and output data, addressed the complex issues relating to the structure of file organization data access, update, and delete last [Levine, 2003]. Specifications perform only the functions that the system is supposed to perform, without specifying how this is achieved. Detailed algorithms for the implementation of system functions are not developed at this stage.

At the design stage, the algorithms specified by the specifications are developed and the overall structure of the information system is formed. The developed system is divided into small parts so that the responsibility for the implementation of each such part can be assigned either to one developer or to a group of performers. At the same time, for each module of the system defined in this way, the requirements imposed on it must be formulated: the functions implemented, the size of the modules, the execution time, and others [Sui, Goodchild, 2003].

The next step is coding. This stage is the easiest. Its implementation uses high-level algorithmic languages, methods of structural and object-oriented programming. Coding is mastered better than any other software development phase.

The testing phase is one of the most expensive stages. Testing costs account for half of all system development costs. Poorly planned testing often leads to increased deadlines and disruption of the work schedule. The testing process uses data specific to the system in operation. The test plan should be prepared in advance, and most of the test data should be determined on the design phase of the system.

Testing is divided into three stages: autonomous, complex, systemic.

In stand-alone testing, each module is validated using data prepared by programmers. In this case, the software environment of the module is simulated with the help of a test management program containing dummy programs instead of real subroutines (so-called "stubs"), which are accessed from this module.

In the process of complex testing, groups of software components are checked together.

System or evaluation testing is the final stage of system verification, that is, testing the system as a whole through independent tests.

The characteristics of a modern GIS

The main principles of construction of modern GIS:

Storing graphical and attribute data in a relational database.

Use of three-level architecture of GIS construction: the first level – a database, the second-a user application, the third-a specialized "data server" responsible for the export and import of data.

Integration of data from different sources in a single logical geographic information environment without format conversion.

Create your own geographic workspace for each system user (save system settings and interface).

Using a flexible query system.

Creation of an open structure of attribute databases integrated with modern corporate information systems and DBMS.

Create a modular application structure with the ability to expand or truncate user functionality.

The presence of a built-in programming language to add specialized functions.

Optimization of computer resources to ensure fast and comfortable user experience with large amounts of information. 10. Creation of animated GIS functionality, which has the ability to visualize data in the form of charts, graphs, diagrams, thematic and volumetric models.

Integration of GIS and the Internet, which is the ability to use data from the global network and create your own Internet resources.

Full integration of the entire range of software solutions within a single interface.

Conclusion

In fact, geographic information systems are database management systems (DBMS). However, there is one important difference: in GIS together with attribute data spatial (geographical) information is processed. Therefore, when designing GIS specialists use the same techniques and techniques as in the development of conventional DBMS.

Any database contains information about a certain subject area. A subject area is a specific area of the real world that is of interest to study.

The first stage of designing any information system is the formalization of the problem, i.e. at this stage, an infological model of the subject area is built. The creation of an optimal infological model includes the study of information flows characteristic of a given subject area, the establishment of objects of the subject area and the description of the relations existing between them. The infological model is created in any case, regardless of the hardware and software base on which the information system will be built.

The entity-relationship model is used as the Foundation for building patologicheskoi model database, which displays the logical relationships between data elements, regardless of their content and the storage environment. At this stage, it is necessary to take into account the various limitations that are imposed on the structure and functionality of the software.

The next step is to create a physical database model that links the datological model to a specific storage environment. This is a very important stage, because it is the development of user interface elements, issues of data integrity and reliability of the system are solved, access rights are distributed and means and methods of protection against illegal access are selected.

When designing geographic information systems, in addition to the above, you must perform the following actions:

– to develop requirements concerning the initial cartographic material (the necessary scale, projection, coordinate system);

– to determine the dimension of geographical data, which will have to work (two-dimensional 2D and/or three-dimensional 3D), as well as to establish a model of representation of spatial data (vector and/or raster); - design the layered composition of spatial information GIS;

– to establish the availability of digital maps of the territories of interest.

Working on the creation of GIS, we must not forget about the issues of project financing. GIS projects are usually very long, so problems in funding can lead to the closure of works. It is recommended to have several sources of funding and to provide an option of self-financing the project.

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Структура правового обеспечения экологически сбалансированного развития в условиях формирования аграрной политики

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Аннотация

Информационная система управления представляет собой совокупность информационных, экономико-математических методов и моделей, технических, программных средств, а также других технологических инструментов. Она предназначена для обработки информации и принятия управленческих решений. Классификация информационных систем управления зависит от видов процессов управления, уровня

управления, сферы функционирования экономического объекта и его организации, степени автоматизации управления. Автор отмечает, что географические информационные системы являются системами управления базами данных (СУБД), однако есть одно важное отличие: в географической информационной системе вместе с атрибутивными данными обрабатывается пространственная (географическая) информация. Поэтому при проектировании ГИС специалисты используют те же методы и приемы, что и при разработке обычных СУБД. Любая база данных содержит информацию об определенной предметной области. Первый этап проектирования любой информационной системы – это формализация задачи, т.е. на этом этапе строят инфологическую модель предметной области. Следующим шагом является создание физической модели базы данных, которая связывает модель данных с конкретной средой хранения. Работая над созданием ГИС, следует помнить о вопросах проектного финансирования. ГИС-проекты обычно очень длинные, поэтому проблемы с финансированием могут привести к закрытию работ. Рекомендуется иметь несколько источников финансирования и предоставить возможность самофинансирования проекта.

Для цитирования в научных исследованиях

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Ключевые слова

Дистанционное зондирование, образование, система, аграрный сектор, право, регулирование.

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