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GEOINFORMATION TECHNOLOGIES IN VARIOUS SYSTEMS

Abstract. This article examines geoinformation systems in various branches of education and industry. GIS-technologies are an effective tool for creating demonstration materials and electronic manuals for performing laboratory work, for mining, in finding the most favorable harvest places for the agricultural sector of the economy, etc. Thus, the search for minerals begins with the comparison of satellite imagery with the geological maps obtained earlier on the investigated territory of the Earth. Also, modern information technologies have become one of the main elements of new areas of resource-saving direction in the field of agricultural crops. Thus, a high degree of informatization of the society contributes to the active introduction and use of information technologies, both in the education system and in business.

Keywords: information technology, system, geography, maps, education, extraction, industry.

INTRODUCTION

The ideology of GIS education is built on the one hand to ensure the content of the courses being read by theoretical content and modern practical work, and on the other hand to use computer technologies for organizing the educational process. This is especially evident in the development of educational and scientific GIS. These systems serve as a means of planning and organizing topographic and geodetic works, many types of geographic, biogeographical and geological surveys, the results of which can be used by teachers. It should be noted that 90% of these GIS are created by students who pass all the GIS mapping cycles - from design to creation of thematic databases and maps. Geoinformation systems are an effective means of creating a demonstration-methodological material and electronic manuals for performing laboratory work.

In the Word editor environment, methodical instructions have been prepared for working with such systems as Surfer, MapInfo, Geodraw / Geographer, Microstation, illustrated with examples of performing separate procedures.

MAIN PART

The special task of students' GIS education is to teach the management of data and, more importantly, the use of professional models of socio-economic and natural processes, multidimensional analysis techniques and expert analysis in the optimization of nature management and environmental monitoring.

The basis of the GIS-discipline block is:

1. Introduction to GIS;
2. Databases;
3. Computer graphics;
4. Creation of GIS and
5. Use of GIS.

In the introduction to GIS, prototype GIS, historical reference, typical GIS architecture, functions of basic modules, data formats, organization of data management, basic methods of data analysis, a survey of modern GIS shells and their comparative characteristics, industry specialization of modern GIS.

Modern experience in the application of the software packages under consideration is discussed in the subject "Use of GIS". In this discipline, concrete results are examined from domestic and foreign practice.

The use of modern geology information systems is widespread and practically unlimited. GIS is used successfully in both military and civil affairs:

– creation of navigational and hydrographic maps;
– solving urban problems (planning, designing of engineering systems);
– in the management of forest, agricultural, fishery resources;
– topographic mapping;
– geology, geophysics;
– business (mapping of purchasing power zones of the population, analysis of transport access areas, delivery and routing);
– demographic analysis, etc. The use of school GIS-technologies contributes to the formation of the most important geographical skills:
– read information stored in digital geographic maps;
– search for geographical objects by specified parameters, for example, by object names;
– carry out measurements and calculations on digital maps;
– translate in the process of multiple exercises the ability to determine the geographical coordinates of the skill;
– To form the students' spatial thinking, demonstrating the studied natural objects in a three-dimensional dimensional dimension;
– Compose your own digital maps, especially from the observations of students, for example, the weather conditions of their locality.

Thus, a high degree of informatization of the society contributes to the active introduction and use of information technologies in the educational general educational process, which allows to bring the teaching to a higher level, to integrate knowledge into various fields and subjects, and to pupils to feel themselves active participants in the learning process, to acquire new knowledge, skills , skills and to be in constant search and development of oneself.

The search for minerals begins with the comparison of satellite images with geological maps obtained earlier on the investigated territory of the Earth. The main factor of the presence of natural resources in this or that sector is the presence of plicative (folded) structures, as well as zones of faults and lineaments (rectilinear geological formations that are well reflected in space images). Geologists, analyzes the direction, length, density, and other properties of the map according to the map and, from these data, determines deposits of minerals.

The active use of the power and flexibility of the technology of geology information systems (GIS technology) can drastically help solve the problem of increasing the efficiency of oil prospecting and operating with oil-related data. When combined with other oil software, GIS can significantly speed up data retrieval and reduce the cost of their exchange.

GIS is a system for collecting, storing, analyzing and graphically visualizing geographic data and associated information about the objects under study. In this article, the concept of the geographic information system is used as a software product.

Before the analysis of the oil data begins, the circulation to the necessary data from the universal computers can be taken from geologists three-quarters of the time. And when it comes to the actual analysis, data exchange between hundreds of analytical programs takes even more time. The use of GIS technology redistributes the time resources so that the main goal of geologists is fulfilled - to give an accurate forecast of the economic value of the proposed oil fields.

Software vendors for the oil and gas industry, which integrated GIS technology with their specialized products, have achieved the integration of petroleum data in one software environment. As a result, geologists can easily transfer data between different software for geophysical, petro physical and seismic analysis. Access to data based on a general-purpose computer is much faster when controlled by a software interface that minimizes data retrieval time.

Customers can download the data directly into the GIS and immediately begin the analysis. In addition, data vendors integrate many types of data in multimedia GIS databases: aerial photographs, satellite data and paper maps. GIS can combine all these data sources, transforming them into a complete digital map of the oil-bearing region. With this integration capability, data vendors are likely to deliver even more specialized products to the market, along with data.

This enhanced integration enhances the power of GIS systems, especially their flexibility in adapting too many areas of the oil industry - now mostly applications in exploration and production, but they will obviously be followed by application programs in other areas. GIS will remain a vital tool for oil geologists and a central element in the integration of data and applications for this industry.

Modern information technologies have become one of the main elements of new areas of resource-saving direction in the field of agricultural crops, known as "precise farming" or "precision farming". This approach, as international experience shows, provides a much greater economic effect and, most importantly, improves the reproduction of soil fertility and the level of ecological purity of agricultural products. World practice has shown that with the right use of precision agriculture, technology pays off quickly by saving fertilizers, seeds, fuel, by reducing labor costs, by increasing the fertility of soils. According to statistics, 80% of farmers in the United States to some extent use technology of precision farming. And they, of course, know how to take profits.

The first significant results in the use of electronic devices on farming. Technicians have developed machines for plant protection. For example, the Tecnoma Hydroelectron sprayer, which won a gold medal at the SIMA-1976 international exhibition in Paris, was equipped with an electronic regulator for supplying the solution in proportion to the speed of the unit. A similar machine was developed by the English company Agmet. In comparison with the analogues used in the CIS countries, they maintain a constant solution flow per unit time, and the rate of its application per 1 ha varies significantly with each gear change, engine speed and wheel slippage, which saves up to 20% of the pesticides. And this is not only an economic, but also an environmental effect.

It was more difficult to solve the problems of the exact sowing of seeds of grain crops. Experimental samples of such seeders were shown at an international exhibition in Munich in 1982, and the serial machine with the electronic regulator of seeding by Blanchot appeared only after three years and was marked at the Paris exhibition SIMA-1985. The company Rider (Germany) went even further, creating a Saxonia seeder, which provides the exposure not only of the specified distance between the seeds in a row, but also the depth of their bedding.

Significant successes in the electronization of agricultural crops. Techniques have reached the firm Amazone, Diadem, Rotina, Lely, etc. In centrifugal type machines, they have achieved a correlation of fertilizer application rate per hectare from the unit speed. In addition, the frequency of rotation of the scattering discs and the actual dose of fertilizers applied per hectare are constantly displayed on the monitor, and the last tractor driver can change from his workplace.

Using modern information technologies, farmers can obtain very accurate data on the state of the field and use this information to improve crop cultivation, and to maximize profits from each square meter of the field. This became possible due to the use of precision growing technologies, precision or "precision" farming technologies including:

- Geoinformation systems (GIS);
- Earth remote sensing technology (ERS);
- Global Positioning Technology (GPS);
- variable rate technology (Variable Rate Technology);
- Technology management of agricultural machines using sensors and microcontrollers;

1. Yield Monitor Technologies.

The main difference between traditional and exact farming is the use of modern information technologies for the collection, processing and analysis of various data with high spatial and temporal resolution for decision making and agricultural work. Thus, the basis of all production technologies for precision farming is geoinformation systems based on remote sensing (ERS) technologies, which allows you to shoot, store and process information to indicate characteristics of crops or arable land.

CONCLUSION

Detailed digital field maps obtained using unmanned aerial vehicles make it possible to plan, strictly record and control all agricultural operations, as they are based on accurate knowledge of the area of fields, the extent of roads, information about fields and other objects. Based on these maps, a full analysis of the conditions that affect the growth of plants in this particular area (or even in 10x10m or 100x100m areas) is carried out. Field maps form the basis for crop rotation models and are used to optimize production in order to maximize profits, as well as for the rational use of all resources involved in production.

Using a multispectral camera as a sensor for remote sensing of UAVs, as well as geology information technologies of GIS, it is possible to carry out an effective survey and inventory of lands, to accompany reclamation, to quickly create NDVI maps, to plan fertilization and to supervise agro technical activities.

When conducting regular aerial surveys of agricultural lands, daily or once a week, and post-processing them in specialized software, it is possible to trace the dynamics of changes within the same field. These data can be accurately correlated with the productivity of land.

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ГЕОИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ В РАЗЛИЧНЫХ СИСТЕМАХ

Аннотация. В данной статье рассматриваются геоинформационные системы в различных отраслях образования и промышленности. ГИС-технологии являются эффективным средством в создании демонстрационно-методического материала и электронных пособий для выполнения лабораторных работ, для добычи полезных ископаемых, в поиске наиболее благоприятных урожайных мест для аграрного сектора экономики и т.д. Так, поиск полезных ископаемых начинается со сравнения спутниковых снимков с полученными ранее геологическими картами об исследуемой территории Земли. Так же современные информационные технологии стали одним из основных элементов новых областей ресурсосберегающего направления в области сельскохозяйственной культуры. Таким образом, высокая степень информатизации общества способствует активному внедрению и использованию информационных технологий, как в систему образования, так и в бизнес.

Ключевые слова: информационные технологии, система, география, карты, образование, добыча, отрасль.

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ТҮРЛІ ЖҮЙЕЛЕРДЕГІ ГЕОИНФОРМАЦИОНДЫҚ ТЕХНОЛОГИЯЛАР

Аннотация. Бұл мақалада білім беру мен өнеркәсіптің түрлі салаларында геоақпараттық жүйелер қарастырылады. ГАЖ-технологиялар - зертханалық жұмыстарды орындауға, тау-кен өндіруге, экономиканың агроөнеркәсіп секторына қолайлы егін жинау орындарын табуға және т.б. көрсету үшін демонстрациялық материалдар мен электронды нұсқаулықтарды жасаудың тиімді құралы. Осылайша, минералды іздеу ғарыштық суретті Жердің зерттелген аумағында бұрын алынған геологиялық карталармен салыстырудан басталады. Сондай-ақ, заманауи ақпараттық технологиялар ауылшаруашылық дақылдары саласындағы ресурстарды үнемдеу бағытының жаңа бағыттарының негізгі элементтерінің бірі болды. Осылайша, қоғамды ақпараттандырудың жоғары дәрежесі білім беру жүйесінде де, бизнесте де ақпараттық технологияларды белсенді енгізуге және пайдалануға мүмкіндік береді.

Түйін сөздер: ақпараттық технологиялар, жүйе, география, карталар, білім, өндіріс, өнеркәсіп.