Monitoring System for the Demand of Specialists in the Sphere of Subsurface Management

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Abstract— **The article shows a solution of the problem of employment of graduates by creating a geographic information system for monitoring of the available vacancies. The authors present a program for working with the Panorama cartographic system, in which was developed a geographic information system containing information on the current vacancies of the city of Kislovodsk.**

Keywords— employment; graduate; university; vacancies; geographic information system; staff training

I. INTRODUCTION

The problem of the "entry' of young specialists who have a higher education into the labor market is stipulated with social and psychological factors associated with the fact that graduates' ideas about the prospects of employment and future labor activity as a whole do not always coincide with the real situation and with the supply and demand ratio in the labor market. And the question is not only in the quality of training. The initial underperformance of career-guidance centers, low level of awareness of future applicants about various aspects of the chosen profession, social immaturity, and psychological unpreparedness for entering the labor market lead to a negative perception by employers of university graduates. The modern labor market is characterized by an increase in the gap between the labor claims of young specialists and the opportunities of the employer to satisfy them. Initially, the main requirement of employers for an employee is the presence of practical experience in the field of training. The absence of such an experience is the most common reason for denial of employment to a graduate. On the other hand, high salary requirements make it difficult to find a suitable job for young professionals [1].

II. FORMULATION OF THE PROBLEM

At the same time, it is quite difficult for a graduate to navigate among employers: it is difficult to find out about the employment and demand for specialists in his field. This in turn affects the choice of the profession for which the applicant is going to study. The analysis of this problem showed that to maximize the knowledge of the applicant and the graduate about various aspects of the labor market, it is effective to use geographic information systems. On the map, the graduate will be able to immediately see where the potential employer is located. Let us consider this issue in more detail.

III. THE SOLUTION TECHNOLOGY

Geographic information systems (hereinafter – GIS) are a new type of integrated computer systems that appeared at the end of the 20th century. [5]. Now they are the most promising and universal geodata control system. Nowadays cheapening of the technology and a significant increase in its computing power made it possible to use GIS in any area of everyday life. GIS is a a powerful and flexible geodata control system [1–6]. Its main advantage over conventional database control tools (hereinafter referred to as the CTCB) is that it has a structure as a DBCT, but it has a geo-referencing data in two or three dimensional space to a specific point on the ground.

In addition, GIS has a built-in spatial analysis system, which is not presentsd in a conventional CTCB. Elements of a geographic (archaeological) map are provided with semantics, whih can be analyzed. The most common definition for GIS is an automated information system designed to process spatio-temporal data, the basis of integration of which is a geographical information. We can also analyse the relationships between these elements. Most of all, GISs are convenient and useful in creating information systems of individual geographical regions. GIS data is divided into two categories:

- spatial data (locating);

- non-spatial data (specifying attributes).

The database of electronic maps has a hierarchical structure. At the lower leve it stores the information about individual map objects.

Objects can be combined into groups, layers and map sheets. The assembly of map sheets of the same scale and type makes up the area of work – a separate database of electronic maps. The description of an individual object consists of metric data (coordinates on the ground), semantic data (object properties), text reference data, illustrative graphic data and other data, including a unique object number through which is performed the logical communication with external relational databases (hereinafter referred to as the database) [7].

IV. THE PRACTICAL EXAMPLE

Panorama Design Bureau is the only manufacturer of vector maps in the Russian Federation with all the permissions to create large-scale maps.

Professional GIS "Map 2005" is a universal cartographic system developed by the Panorama design bureau, which has the means to create and edit vector maps, perform various measurements and calculations, overlay operations, build of 3D models, process raster data, and prepare graphic documents in electronic and hard copy, as well as tools for working with databases. This environment is also compatible with international classifiers, which makes it possible to import and export cards from one environment to another. Fig. 1 shows the general GIS diagram of the city of Kislovodsk.
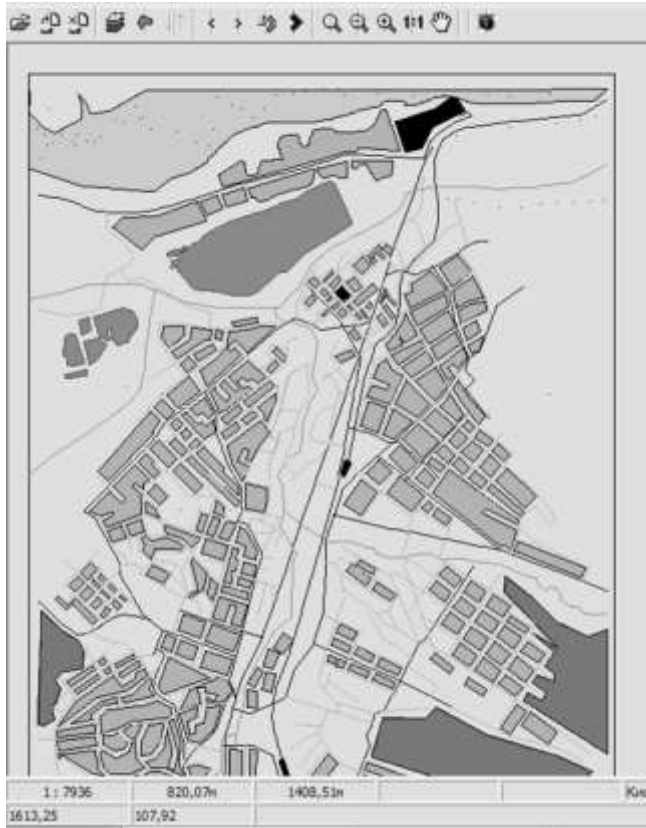

Fig. 1.   Map of the city of Kislovodsk

Relational databases are most often used for storing, structuring and managing data in GIS, where common fields are used to link tables. When using such a geoinformation database, two databases are simultaneously loaded into the system. One can be launched by pressing the button general data, data on the city are displayed with an indication of demand (Fig. 2), which shows the level of employment in color, and when you click on each object, you can see which specialists are in demand at the moment.

Fig. 2.   Demand in the city general statistics

The second is with the search for the vacancies through the employer button.

For the program to work, a monitoring software product was written. An example of a compilation project is shown in Figure 3.
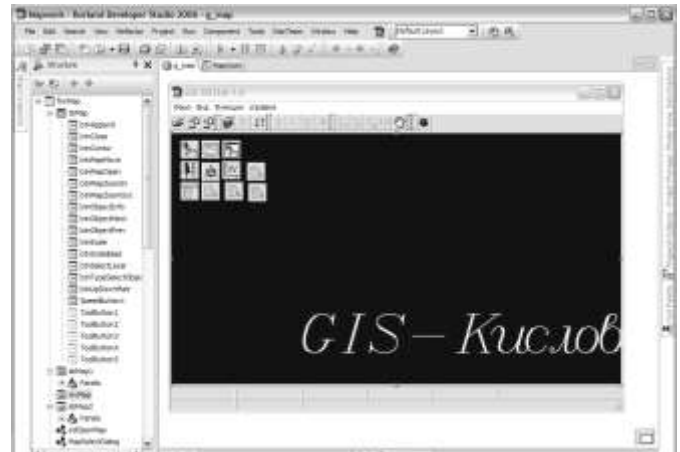

Fig. 3.   Environment Monitoring Program in BDS 2006

V.   CONCLUSION

The developed GIS allows to save significant time resources on the search for the necessary employment objects. The use of the developped technologies are such that even specialists without work experience, or with little experience in their field, can quickly get the information they are interested in.

The introduction of the developed program module in the employment center of the city of Kislovodsk allowed to get a fourteen percent increase in profits, due to the reduction of time for selecting a vacancy and in-time orientation of applicants to the training necessary for the industry. The algorithms and software systems obtained in this work can be applied in other industries [1–17].

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