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Creation of a database for the compilation of digital land Cadastral maps.

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Annotation: This article provides information on the creation of a database for the creation of digital land cadastral maps, a group of errors that occur when creating a database.

Keywords: digital, cadastre, map, GAT, database, GPS, polygon, program, attribute, geography.

Introduction.

Geoinformation systems have been influencing many fields such as geography, geology, geodesy, cartography, which have been developing since ancient times. Based on the experience, traditions, and ideas of these fields, emerging science and technology contribute to their development. Geoinformation systems, providing quick and accurate, accurate and complete information, are finally taking an important place in managing territorial and regional development and making relevant decisions. Geodesy, cartography and cadastre widely use the advantages of Geoinformation systems in solving their tasks.

The purpose of this research work is to open the relationship between the rapidly developing fields of geodesy, cartography and cadastre and Geoinformation systems. In connection with this purpose, their brief definition and history, their relationship with other sciences are covered. The reason for paying attention to the cartographic basis of geography information systems is to help to correctly imagine their positive and negative features when using these technologies [1-5].

From a theoretical point of view, it can be considered that the problems of entering the map into the computer memory have been sufficiently solved, and during the last 50 years, a lot of experience has been gained, methodologies and technical tools are developing rapidly. Therefore, practical issues were highlighted in this graduation thesis, some recommendations were paid attention to, as well as the methods were described and the ways of using technical tools were shown.

The most important issue is the use of Geoinformation systems. On the basis of such a map, as well as regional and spatial analysis, which has been used since ancient times in Earth sciences, special land information systems for cadastral registration, advisory systems for decision-making and administration in various fields have been created. With the help of these systems, the tasks of creating new information products, providing information, making effective decisions and managing based on information are being solved [6-10].

Result And Discussion.

Each attribute has its own indicators, and several issues should be paid attention to when entering them correctly:

1. What is the type of definition? (text, number, number, date, etc.)
2. What is the largest and smallest amount of indicators?
3. What is written in the appropriate cell of the table without any indicator? (most often -999 records indicate that there is no information)
4. How to separate objects with the same name?
5. Which attribute can be connected with other data? (The ID date is set in the table for this purpose, and therefore all attributes take their place and do not disappear)

Similar questions need to be answered first when building a database. The order of attributes is determined using a special tool, that is, a data representation module. In some geographic information systems, this work is done very easily. The data entry module helps to control the process and prevents the entry of data that does not comply with the established rules. The system checks the type of the definition of each entered attribute and its compliance with the specified amounts, and if the execution of the work does not comply with the law, it will definitely warn by means of special symbols. By drawing attention to the occurrence of an error, the system requires the immediate elimination of this error.

An important stage of entering data is checking and editing the entered data. In some cases, these tasks require more time than input. Ways to eliminate errors are to delete any records or data altogether. Therefore, it is necessary to avoid errors during data entry and pay attention to entering lines and fields carefully. It is advisable to carefully observe the image created on the screen while entering data. An incomplete line or open space indicates an error [11-15].

Errors can also occur as a result of setting incorrect parameters, and such errors are easy to detect and correct due to their systematic nature, i.e., repetition of the same amount or order. Such errors can be detected by distortion of the shape of the image, for example, by the shape stretching or shrinking in one direction as a result of incorrect scaling.

Random errors are the result of a technical tool or program error, and some of these errors are shown in the pictures. As you can see, such a situation occurs when 0 or a very large number of indicators are entered instead of real coordinates due to an error of a computer program or tool. If a line or point is entered twice, if the line is not brought to the end, if the points are left unconnected, then the error is the operator's error and the work must be done again.

A map's topology refers to how it connects lines, constructs certain shapes, and places points within areas. The programs are designed to perform such work and try to connect points that are close to each other automatically. If the points are entered incorrectly, too small "hatolic polygons" are created. If the number of polygons increases, then there is an error [16-20].

It is much easier to identify errors by outputting them from a printer or plotter. Another way to edit is to color the constructed shapes and use the color to check and correct the position of the points.

Editorial work is not just about checking coordinates. Attributes also take a lot of time to check because it is necessary to look at the tables row by row and compare the names and values of the attributes. Geographical information systems have the function of placing objects within an area or line width, and it helps to identify errors in attributes. As shown above, attribute and coordinate data are interdependent, and when a correction is made to one of them, it is automatically made to the other.

It is necessary to check whether the coordinates and attributes are correctly entered through their logical connection. This can be checked on the basis of geometrical elements of the map, such as the fact that the lines are joined at joint points, the order of the lines is correct, and the forms with external and internal areas are suitable for each other.

The accuracy of the data should be understood as the accuracy of their spatial location, that is, the location of the object on the map is checked against its actual location. A digitized map will necessarily contain errors compared to the "most accurate map". Spatial positioning error can be determined by comparing the constructed map with a high-resolution map or high-resolution data obtained in the field.

In addition to the spatial accuracy, it is also necessary to check and correct the semantic accuracy, and it is desirable that the names of the objects, their indicators, and the basis of division into categories are correctly indicated on the digital map. It is possible to perform such checks and corrections automatically, because the data is included in the computer database, and the geographic information management system can perform such tasks.

Of course, the important mathematical elements of the map must be entered into the computer in a correctly defined case. The accuracy and quality of a digital map cannot be better because it depends on the scale and projection of the map used as a source for its creation, as well as the basis of its content structure. If the distance between the points is not less than the distance of 10 meters when converting the elements of the map into a digital form, it is not logical to use the information on such a map to compare it with maps with higher accuracy. Therefore, digital maps have errors similar to errors in paper maps, and their distribution has the same nature and laws. For this reason, it is appropriate to correctly imagine the possibilities and qualities of a digital map [21-25].

During the process of digitalizing the map, editing possibilities are limited. In order to reduce errors, it is necessary to perform the following tasks:

- Check that all existing lines are connected
- Checking that all existing polygons are mowed

Examples of common errors: small polygons that do not have a geographical meaning, "hanging" points, lines that are not carried to the end. Such errors should be identified and corrected immediately.

The nature of errors is divided into several groups:
- Operator errors
- Incorrectly selected parameters during digitizer operation
- Specific programming errors

How to find errors? Experience shows that errors can be avoided if digital conversion is carried out according to simple conditions, i.e.:
- paint the polygon
- compare with the source from the printer
- check that all the parts are aligned with the polygons and lines

The ways to determine accuracy and correctness are as follows:

The location of the objects or, in other words, their coordinates are checked with a high-resolution map or by comparing them with the results of GPS observations;

It is determined by checking the correctness of the attributes, that is, their compatibility with the relevant objects. Checking in the database can also be done automatically.

The scale of the source affects the accuracy of the data. Since the cartographic image has a generalized nature, the location and classification of objects has a great impact on accuracy. If a small-scale source is used, it is wrong to compare the resulting digital data with a large-scale map [26-30].

It is necessary to know the large and small errors in the geographic information system database and their distribution. Many errors are caused by incorrect use of digital conversion methods and procedures. Some errors occur during data processing, storage, management and analysis.

There are terms that describe the accuracy of spatial data and they mean:

1. when it comes to the accuracy of spatial databases

it is necessary to separate the specific accuracy of the data and the accuracy of the database.

2. closeness of indicators considered as data accuracy to real indicators. Spatial data are often generalized and therefore it is not easy to determine their true indicators. The indicators shown or measured in practice are assumed to be valid. For example, in the task of calculating the boundary length of the polygon according to digital data, in order to check the accuracy, this indicator is compared with the calculated boundary on the source map. Such limits cannot be tested in the field, because they are actually loads. It follows from this that the accuracy of the database and the accuracy of the results calculated based on the information in it are not the same. For example, the accuracy of the slope slope calculated on the basis of the digital model of the place is not equal to the accuracy of the heights of this model and depends on the accuracy of the measurements (for example, km, m, cm, mm, 0.1 mm, 0.01 mm, etc.). It should be noted that high-precision observations may not be reliable.

3. The calculation accuracy of the geographic information system is high and it is higher than the data accuracy. The accuracy of all existing spatial data is lower than the capabilities of the geographic information system. That is why the following questions arise:

How to measure accuracy?

How to trace the distribution of errors?

How can the required accuracy be ensured at a sufficient and necessary level?

What is the quality of data?

There are standards that define the accuracy of digital data, and these standards define data quality in several ways:

- Positioning accuracy
- Accuracy of attributes
- Logical compatibility
- Completeness
- Creation processes

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Location accuracy means that the location information of the object corresponds to the real coordinates [31-32]. For example, on the map, objects are displayed with an accuracy of 0.5 mm, and in place, if a map with a scale of 1:25000 is used, this corresponds to 12.5 meters, if a map with a scale of 1:250000 is used, it is up to 125 meters. it will come. It can be considered that the conditional accuracy of data obtained from 1:25000 scale maps in the database is equal to 0.01, 0.01, 0.001. How to check the location accuracy? A HIGH resolution source should be used and they are:

- Large scale map
- GPS (Global Positioning System GPS) observations
- Soyomka in the field

Other ways can be to use internal symbols or to specify checks for ambiguity symbols, ie unclosed polygons, missing or missed lines, etc. Their uppercase and lowercase indicates accuracy.
Accuracy is calculated based on errors from various sources:
The resolution of the map used as a source is, for example, 1 mm
accuracy in the process of map registration and digitization is 0.5 mm
if the sources are processed directly, the total accuracy is considered as mean squared error
The accuracy of the attributes is understood as the correspondence to the real indicators. Information about the location of the object may not change over time, but the attributes change. Therefore, their accuracy is calculated in different ways. For continuous objects (surfaces), observation or measurement error is acceptable. For example, the height measurement accuracy is equal to 1 meter [1-4].
For qualitative indicators, several questions are checked, namely:
Are the object categories defined with sufficient precision and truthfulness?
Is the object correctly included in the required category? For example, isn't a store included instead of a sports field?
If "A" type of two types of soil or plants occupies 70% of the area and "B" type occupies 30% of the area, such landfill is designated as "A". It is not easy to determine the border between the areas occupied by type "A" and type "B". Type "A" may be in the center of the polygon, but type "B" is more likely to be found on the edges.
This is the way to check the accuracy of attributes. Miscategorization is proposed by constructing a matrix, that is, checking randomly selected points and determining the appropriate category according to the database, comparing them with field observations for accuracy and correctness.
Logical compatibility. Topological compatibility means logical compatibility. In other words, such questions are examined:

- Does the database match the terms?
- If there are polygons, are their limits epic?
- Only one character inside the polygon?
- Are there dots where the lines meet?
- Or do the lines connect without a point?

Completeness of information. An indicator that indicates the quality of information, or indicates that all relevant information is included. In addition, it answers the questions about the sorting procedure, generalization rules, and whether the effect of scale is considered or not [5-8].
The quality and accuracy of the data are greatly influenced by the order of their creation, the nature and content of the performed work, and the selected accuracy parameters.
The errors that occurred during the establishment of the database can be divided into several groups, and they are:
1. Object location errors depend on the method used. More in Amaliet
geodetic control and GPS methods are used. Geodetic control is the most accurate method, but in some cases it is not easy to connect to geodetic points. GPS fault finding is one of the most effective modern methods and should be used. Aerial photos and images from space are also suitable for inspection. Text annotations have low accuracy and are not reliable. For example, the comment "the border passes between dare" does not help to check the accuracy.
2. There are several types of errors according to the methods of digital conversion of the map:

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In the digitizer, the coordinates of the points of the line are determined and entered into the computer, and the accuracy of this method depends on the selected parameter and the method of working with the digitizer. Operator errors stand out when using a digitizer. For example, if the line does not look good, the location of the line will be marked and entered with an error. It is not easy to identify and correct such a mistake. But the errors caused by the digital conversion process are not the main reason and this error does not exceed 0.5 mm.
3. The error is calculated by comparing the real line and its digitized line.
4. The registration error and the error of the location of the control points have a great impact on the accuracy of the database.
5. Errors appear as a result of coordinate processing.
6. Errors in attributes occur as a result of observations in the field and their processing. But not all processing results can be checked in the field. The data obtained from the aerial photograph may also contain errors.
7. The process of creating a map causes the following errors:
content and indicators are summarized
the lines are drawn correctly and the elements change their place. For example, the location of the car track is often changed so that it does not overlap with the railway [10-15].
8. Processing errors are different and they are:
- ✓ Logical errors
- ✓ Generalization and interpretation errors
- ✓ Mathematical errors
- ✓ Low-level calculation errors
- ✓ Errors as a result of converting vector data to raster.

Conclusion

In conclusion, there is a way to store accuracy information and use it to check the quality of digital data.
In raster data, the information stored in each cell is considered to be displayed with some probability. According to the resolution and detail of the data obtained from the space, the probability of dividing the objects into categories varies. In the digital model of the place, it can be considered a constant indicator due to the height uncertainty in the raster, and this indicator is stored once in any part of the annotation.
And in vector data, there are 5 levels of storing information about uncertainty, because the data consists of:
1. map
2. a group or class of objects
3. Polygon
4. Arch
5. point

In vector data, one level of uncertainty is not equal to another level of uncertainty. It follows that:
1. the uncertainty of a point is not equal to the uncertainty of the arc formed from it
2. but the uncertainty of the polygon location can lead to the uncertainty of the arcs
3. Calculated precision is stored as an attribute for lines and polygons:

for an arc, this is the width of the zone between the two polygons
for the class of the object, for example, the location error of the path
it is assumed that the map as a whole, i.e., all borders and lines have been digitized with some accuracy
for point- its attribute, class or map
Attribute ambiguity is maintained in two ways:
as an attribute of a separate object. For example, 90% of the landfill is covered by soil type "A".
as an attribute of the entire category. For example, soil type "A" is 90% accurate.

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