Informatıon search in Geographıc Databases

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Abstract

A geographical database is an important tool for storing and organizing data related to geographic features and locations. It is used extensively in various fields such as geology, ecology, urban planning, and anthropology, among others. Building a geographical database involves collecting, processing, and organizing geospatial information, such as maps, satellite imagery, and gps data. The process of building a geographical database requires careful consideration of the scale and level of detail required, as well as the sources and formats of the data used. The database must also be designed to accommodate various types of queries for data retrieval. The purpose of this paper is to provide an overview of the process of building a geographical database and data retrieval, including the various techniques, tools, and approaches involved. We will discuss the challenges involved in building a geographical database, such as data quality and accuracy, and the importance of establishing standards and protocols for data sharing and interoperability. We will also review the various methods for data retrieval, such as spatial and attribute queries, and discuss the various software and tools available for data visualization and analysis. Finally, we will present some examples of applications of geographical database and data retrieval in various fields, including environmental monitoring, land-use planning, and disaster management. Overall, building a geographical database and implementing effective data retrieval is an important step towards leveraging the power of geospatial information for decision-making and analysis.

Key Words:geodatabase, gps, location and attribute queries, data retrieval

In recent years, there has been a significant increase in the volume of geographic data due to the development of technology and globalization. And the amount of geographic data available has grown exponentially, making it difficult to search and retrieve any information. Therefore, an efficient process of information retrieval in geographic databases is essential to obtain meaningful insights. A geographic database is a database that stores geographic data such as maps and spatial data. Geographic information systems (gis) have become an important tool for data retrieval and management techniques that provide a platform for spatial analysis and decision-making processes. It is an essential tool for various industries including transportation, urban planning, disaster management and many others. In the article, we will explore the application of information retrieval methods by creating a geographic database.

An important factor is the information search process in geographic databases and the optimal construction of the database for effective retrieval of geographic information. For this, let's look at the following sequences:

1. Define the scope and purpose of the database: before creating a geographic database, it is important to define its scope and purpose. What geographic area will the database cover? What types of data will be included in the database? What are the purposes of a database? These questions will help guide the design and development of the database.

2. Choose a database management system: a geographic database can be implemented using a variety of database management systems (dbms), such as oracle, sql server, or postgresql. The choice of dbms will depend on factors such as data volume, desired functionality, and available resources.

3. Obtain and process data: the next step is to obtain and process the data to be entered into the database. This may involve various methods such as collecting data from field surveys, digitizing paper maps or using remote sensing data. Standardization, cleaning and processing of data may be required to ensure accuracy and quality.

4. Design the database schema: a database schema is a blueprint of the database structure that defines the relationships between tables and data types for each field. The schema must be designed to meet the specific needs of geographic information.

5. Build the database: once the schema is designed, the database can be built by creating tables, indexes and relationships. The data can then be loaded into the database.

6. Implement data retrieval methods: various methods can be used to retrieve data from the database, such as sql queries, spatial queries or geocoding. Spatial queries are used to retrieve data based on spatial relationships, such as proximity or intersection. Geocoding is used to assign geographic coordinates to data based on addresses or place names.

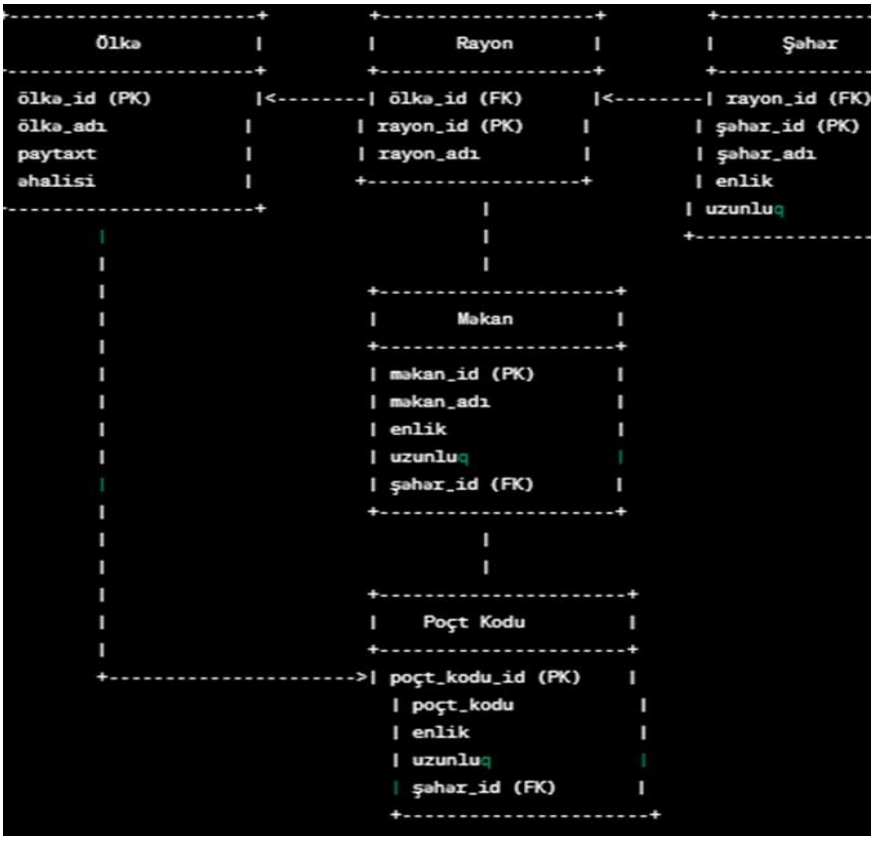

Figure 1. Database Diagram

Each table has a primary key field (denoted "pk") that uniquely identifies the table, and each table that is related to another table has a foreign key field (denoted "fk [related table]") these keys indicate relationships between tables.

A country can have many regions, many regions can belong to a country, many cities can belong to a region, many landmarks can belong to a city, many zip codes can belong to a city.

Entering Data İnto Tables

-- Ölkə (Country) Table

INSERT INTO Ölkə (Ölkə_İd, Ölkə_Adı, Paytaxt, Əhalisi) VALUES

(1, 'Azərbaycan', 'Bakı', 10000000),

(2, 'Türkiyə', 'Ankara', 82000000),

(3, 'Rusiya', 'Moskva', 144000000),

(4, 'Fransa', 'Paris', 67000000),

(5, 'Birləşmiş Ştatlardı', 'Vashington', 328000000);

-- Rayon (Region) Table

INSERT INTO Rayon (Rayon_İd, Rayon_Adı, Ölkə_İd) VALUES

```
    (1, 'Bakı', 1),
    (2, 'İstanbul', 2),
    (3, 'Moskva', 3),
    (4, 'Île-De-France', 4),
    (5, 'California', 5);
  -- Şəhər (City) Table
  INSERT INTO Şəhər (Şəhər_İd, Şəhər_Adı, Enlik, Uzunluq, Rayon_İd) VALUES
    (1, 'Bakı', 40.4093, 49.8671, 1),
    (2, 'İstanbul', 41.0082, 28.9784, 2),
(3, 'Moskva', 55.7558, 37.6173, 3),
    (4, 'Paris', 48.8566, 2.3522, 4),
    (5, 'Los Angeles', 34.0522, -118.2437, 5);
  -- Məkan (Landmark) Table
  INSERT INTO Məkan (Məkan_İd, Məkan_Adı, Enlik, Uzunluq, Şəhər_İd) VALUES
    (1, 'Qız Qalası', 40.3666, 49.8357, 1),
    (2, 'Ayasofya', 41.0085, 28.9802, 2),
    (3, 'Kızıl Meydan', 55.7539, 37.6208, 3),
    (4, 'Eyfelin Qalası', 48.8584, 2.2945, 4),
(5, 'Disneyland', 33.8105, -117.9189, 5);
  -- Poçt Kodu (Postal Code) Table
  INSERT INTO Poçt Kodu (Poçt_Kodu_İd, Poçt_Kodu, Enlik, Uzunluq, Şəhər_İd) VALUES
    (1, 'AZ1000', 40.4093, 49.8671, 1),
    (2, '34716', 41.0082, 28.9784, 2),
    (3, '103073', 55.7558, 37.6173, 3),
    (4, '75001', 48.8566, 2.3522, 4),
```

Writing Sql Queries To Retrieve Data

Name, Capital And Population Of All Countries:

```
SELECT Adı, Əhalisi, Paytaxt
FROM Ölkə;
```

The Name Of Each Region And The Name Of The Country İt İs Associated With:

```
SELECT Adı, Ölkə_Adı
FROM Region
JOIN Ölkə ON Region.Ölkə_İd = Ölkə.Ölkə_İd;
```

Name And Latitude And Longitude Of All Cities Belonging To A Selected Region:

```
SELECT Adı, Enlik, Uzunluq
FROM Şəhər
WHERE Region_İd = {Region_İd};
```

Name And Latitude And Longitude Of All Locations İn A Selected City:

```
SELECT Adı, Enlik, Uzunluq
FROM Məkan
WHERE Şəhər_İd = {City_İd};
```

The Name And Latitude And Longitude Of All Zip Codes İn A Selected City:

```
SELECT Poçt_Kodu, Enlik, Uzunluq
FROM Poçt Kodu
WHERE Şəhər_İd = {City_İd};
```

Non-spatial data refers to information about the properties of the object. In cis technology, such a set of data is called attributive data. For example, object name, area, etc. These are all non-spatial data. Non-

spatial data is mapped to spatial data. Properties associated with geographic objects are composed of a textual description. Attributes are stored as a tabular collection of numbers and symbols. Multiple attribute data files can be linked together using a common identifier code [7, 9].

Conclusion.

Geographical database information retrieval is a complex process involving various methods such as query language, spatial indexing, geocoding, geographic analysis, and spatial queries. In this paper, we have applied database information retrieval through query language. To obtain meaningful insights from geographic data, this a combination of methods can be used. With the increasing amount of geographic data available, it is important to have an efficient data retrieval process to extract relevant information from the database.

References

[1] Əsgərov T.K.. Coğrafi Və Ekoloji İnformasiya Sistemləri Fənni Üzrə Laboratoriya İşləri. Dərs Vəsaiti / – Bakı: ADNA-Nın Nəşriyyatı, - 2014. -158 S.

[2] Əsgərov T.K.. Coğrafi İnformasiya Sistemlərində Verilənlərin Strukturu Və Emalı // Azərbaycan Ali Texniki Məktəblərinin Xəbərləri, 2015, №2(96), S. 68-72.

[3] Karimov S.G., Asgarov T.K. Organization Information Retrieval In The Database And Knowledge Base On Intellectual Information System On Ecology // Applied And Computational Mathematics. An International Journal. 2010, Vol 9, N 2, P. 232-240.

[4] Aybet J. Integrated Mapping Systems – Data Conversion And İntegration. Mapping Awareness, 1990, 4(6):18-23.

[5] Chrisman N.R. The Role Of Quality İnformation İn The Long Term Functioning Of Geographical İnformation System. Cartographic Journal,198421:79- 87.

[6] Cowen D.J. GIS Versus CAD Versus DBMS: What Are The Differences? Photogrammetricengineering And Remote Sensing,1988, 54: 1551-1555.

[7] Yue Hong Chou.Exploring Spatial Analysis İn Geographical Information Systems

[8] Goodchild, M.F. Statistical Aspects Of The Polygon Overlay Problem. In Harvard Papers On Geographical Information System. 1978, Vol.6Addison Wesley, Reading Press.

[9] Т.К.Аскеров, С.Г.Керимов. Организация Экологического Мониторинга С Применением Интеллектуальной Информационной Системы // Системы Управления И Информационные Технологии, 2010, №1(39), С. 71-74.