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Educational Decision Making Based On GIS

Gite S.N, Dharmadhikari D.D, Ram Kumar

Abstract: ***This paper introduces the system which is the combination of GIS information along with Educational information. This system will make Educational decisions very much easier. It provides several functionalities like browsing the educational information to make educational decisions. By using thematic map it shows suitable region to apply new educational scheme and also shows in which region which scheme is active.***

Keywords: Decision support system, Geographic information system, Quad tree, Spatial data, Education based decisions.

I. INTRODUCTION

Decision making is important for any management and effective decision making which gives better efficiency .In decision making firstly collect current information status, apply the logic to that information and design the schema. Among that schema we have to select the best alternative schema in each round.

For decision making enough should be provided. This information is provided in GIS format as well as educational information is also used in combination. By browsing the system it will be easier to get the educational information which will be useful for students, parents or any other interested user. In a single look it gives clear idea about current educational schemes in different regions. It is very easier to find suitable region to apply new scheme. GIS maintains an incredibly broad scope of application. This project attempts to demonstrate how GIS can give policy makers another way of displaying and manipulating demographic and statistical data. The intention is not to entirely move away from tables and graphs; these are important data manipulation and display tools. Workforce development and community college funding, however, is very much a geographic problem. Displaying and manipulating data as such provides a unique and important vantage point from which one may be more capable of making informed decisions affecting the individuals within the boundaries that make up planning units.

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***** Correspondence Author (s)
Gite S.N*, Master of Engineering Scholar, MIT College of Engineering & Technology, Aurangabad (Maharashtra) India, E-mail: sandeepgite37@gamil.com
Asst. Prof. Dharmadhikari D.D, Department of Computer Science & Engineering, MIT College of Engineering, Aurangabad (Maharashtra), India, E-mail: dipa.dharmadhikari@gamil.com
Asst. Prof. Ram Kumar, Department of Computer Science & Engineering, MSS'S College of Engineering & technology, Jalna (Maharashtra), India, E-mail: hr.coet@gamil.com

II. PROJECT

The main objective of this project is to make available educational decision making information easily. User can browse the system and can make educational decisions easily, fast and much effectively. This system supports GIS based as well as text based queries and produces output in text as well as GIS format. Arc GIS tool is used which allows creating maps, editing the existing maps etc.

III. FUNCTIONAL DESIGN

1. **Spatial Decision Support Systems** (SDSS) developed in parallel with the concept of decision support systems (DSS).

An SDSS is an interactive, computer-based system designed to support a user or group of users in achieving a higher effectiveness of decision making while solving a semi-structured spatial problem. It is designed to assist the spatial planner with guidance in making land use decisions. For example, when deciding where to build a new airport many contrasting criteria, such as noise pollution vs. employment prospects or the knock on effect on transportation links, which make the decision difficult? A system which models decisions could be used to help identify the most effective decision path.
An SDSS is sometimes referred to as a policy support system. A spatial decision support system typically consists of the following components (GIS+DSS=SDSS).

- Decision support system DSS
- Geographic information system GIS

In more detail that means:

1. A database management system – This system holds and handles the geographical data. A standalone system for this is called a geographical information system, (GIS).
2. A library of potential models that can be used to forecast the possible outcomes of decisions.
3. An interface to aid the users interaction with the computer system and to assist in analysis of outcomes.

2. Information Support Tool-.

The Field Information Support Tool (FIST) is a field-based collection system using commercial-off-the-shelf (COTS) smart phones, customized software, and

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a robust information management backend known as Fusion Portal with a deployable sensor fusion system known as Fusion View that enables information to flow from the point of capture to an analyst in near real-time regardless of location or physical proximity. FIST is designed to operate in a variety of environments and supports a variety of mission sets such as counterinsurgency operations (COIN), counter-narcotic missions (CN), and humanitarian assistance and disaster response (HA/DR). The overarching principle of FIST is the development of a user-friendly data collection tool that utilizes automated information systems to enable unstructured data to be collected, processed, and structured for analysis and visualization in a variety of analytic packages. Fusion View enables real-time integration of disparate sensor systems that provides a powerful common operating picture critical for today's decision makers. Fusion Portal allows for data to be exported and analyzed using geospatial, geo-statistical, link, and social network analysis in addition to enabling the exchange of information with external databases such as the Worldwide Civil Information Database (WCID), the International Studies of Violent Groups (ISVG), and the Combined Information Data Network Exchange (CIDNE).

3.Thematic map:

It is a type of map or chart especially designed to show a particular theme connected with a specific geographic area. These maps "can portray physical, social, political, cultural, economic, sociological, agricultural, or any other aspects of a city, state, region, nation , or continent".

A thematic map is a map that focuses on a specific theme or subject area, whereas in a general map the variety of phenomenon geological, geographical, political regularly appears together. The contrast between the both of them lies in the fact thematic maps use the base data as coastlines, boundaries and places, only as point of reference for the phenomenon being mapped. In general maps the base data as landforms, lines of transportation, settlements, and political boundaries are there for their own sake.

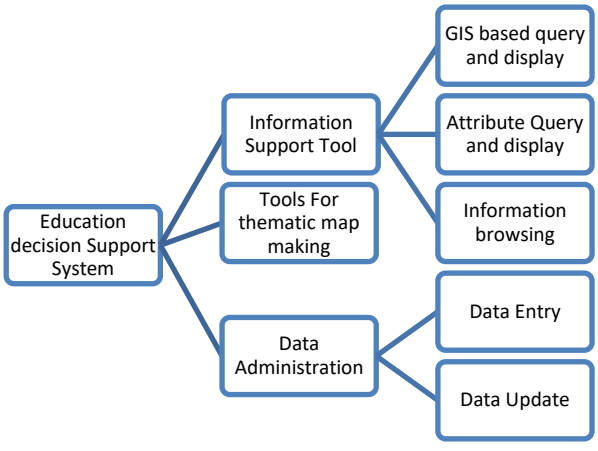

Figure1- Functional design

Thematic maps also emphasize spatial variation of one or a small number of geographic distributions. These distributions may be physical phenomena such as climate or human characteristics such as population density and health issues. Barbara Petchenik described the difference as "in place, about space." While general reference maps show where something is in space, thematic maps tell a story about that place. (e.g. city map) Thematic map are sometimes referred to as graphic essays that portray spatial variations and interrelationships of geographical distributions. Location, of course, is also important to provide a reference base of where selected phenomena are occurring.

Thematic maps serve three primary purposes.

- First, they provide specific information about particular locations.
- Second, they provide general information about spatial patterns.
- Third, they can be used to compare patterns on two or more maps.

Common examples are maps of demographic data such as population density. When designing a thematic map, cartographers must balance a number of factors in order to effectively represent the data. Besides spatial accuracy, and aesthetics, quirks of human visual perception and the presentation format must be taken into account.
In addition, the audience is of equal importance. Who will "read" the thematic map and for what purpose helps define how it should be designed. A political scientist might prefer having information mapped within clearly delineated county boundaries (choropleth maps). A state biologist could certainly benefit from county boundaries being on a map, but nature seldom falls into such smooth, man-made delineations. In which case, a dissymmetric map charts the desired information underneath a transparent county boundary map for easy location referencing.
4. Data Administration- It supports for data entry, updating the existing data in the system which is very important for correct decision making.

5. Spatial query & Attribute query- A spatial query is a special type of database query supported by geo databases and spatial databases. The queries differ from SQL queries in several important ways. Two of the most important are that they allow for the use of geometry data types such as points, lines and polygons and that these queries consider the spatial relationship between these geometries.
The term 'geometry' refers to a point, line, box or other two or three dimensional shape. Attribute query gives attribute related information.

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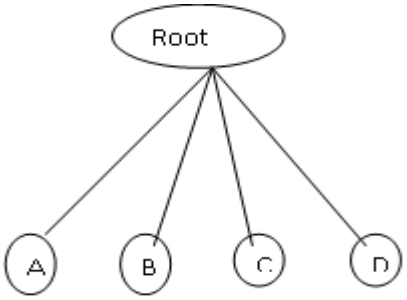
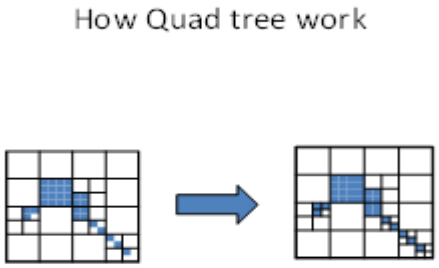
IV. SPATIAL DATABASE

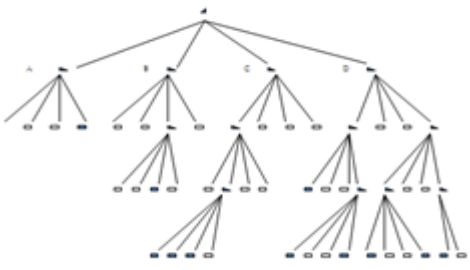
This system uses spatial database system. Spatial database system is a database system which offers spatial data types in its data model and query language. It supports spatial data types in its implementation, providing at least spatial indexing and efficient algorithms for spatial join database. There is a need to manage geometric, geographic, spatial data which means data related to space. Use of quad tree for fast access of spatial data which provides fast access to maps.

V. QUADTREE

Image needs some data structure to represent. Traditional data structure only use on single dimension data structure by using the concept of quad tree multidimensional data structure can be used. Quad tree is a structure to represent a multi-dimension data into tree. It contain rapid search and manipulation of spatial data. It Can present a Image via use Tree structure with less storage space. Quad tree is easy to represent image by quadrant division. It takes less space than grid file and run length encoding .It can do some easy image processing







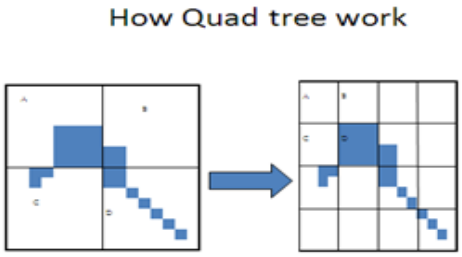


Figure.2- Quadrant tree

GIS software uses two basic types of data:
1. Spatial data - containing the coordinates and identifying information describing the map itself
2. Attribute data - containing information that can be linked to the spatial data--for example, matching addresses or coordinates in the spatial data

VI. SPATIAL DATA AND ATTRIBUTE DATA

Spatial data contain the coordinates and identifying information for various map features. Three types of features can be represented in the map: points, lines, and areas. The various physical aspects of the map--political boundaries, roads, railroads, waterways, and so forth--are organized into layers according to their common features.
For example, the collection of points that represent park locations can be organized into a parks layer, the collection of lines that represent streets can be organized into a streets layer, and the collection of areas that represent census tracts can be organized into a tracts layer. A layer can be either static or thematic. Static layers use the same graphical attributes (color, line width, and so forth) for all features in a layer. Thematic layers can use different graphical attributes to classify the features in the layer. For example, a thematic area layer representing sales regions could use different colors to show the quarterly sales performance of each region. A thematic line layer representing highways could use different line widths to show the classes of roads.

The second type of data used in a GIS is attribute data. With SAS/GIS software, SAS data sets or data views can be associated with the map through links to the spatial data. For instance, the spatial data might represent a county and contain information for city boundaries, census tract boundaries, streets, and so forth.

An attribute data set with population information for each census tract can be linked to a map by the corresponding tract value in spatial data. Two of the ways in which you can use attribute data in SAS/GIS include using variables from the attribute data as themes for layers. For example, an attribute data set containing population data could provide a theme for a map of census tracts Creating actions that display or manipulate the attribute data when features are selected in the map.
The actions can range from simple, such as displaying observations from an attribute data set that relate to features in the map, to complex, such as submitting procedures from SAS/STAT software to perform statistical analyses.

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VII. CONCLUSION

This system is designed to make the smart and effective education based decisions. It combines GIS data with educational information so by browsing these system users like parents, children's etc information can be made easily available.

By using thematic map making it provides in which region which scheme is currently active. Also we can find suitable region to apply the new scheme. In this system quad tree is used which provides fast access to map.

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