LIBRARY INFORMATION SYSTEM USING GRASS SOFTWARE

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ABSTRACT

Library Information System assists the library in providing digitally delivered services and collections to local and remote patrons of the library. It provides direct support to the students in obtaining the project details. The objective of this project is to create a library portal through which complete information of the project reports can be accessed and the data used for the project can be retrieved– A case study for library of IRS. The project details are collected from the library of Institute of Remote Sensing (IRS) and they are segregated on the basis of technical, theoretical and spatial criteria. A database has been designed for different types of data such as point, line and polygon and populated using MS-Access. The different layers of spatial data have been overlaid and it is linked with the project database in GRASS/QGIS. Finally customization is done for the Library Information System for easy querying, updating and retrieving the data.

KEYWORDS: Library, Ms-Access, GRASS, QGIS, Querying, Retrieving.

I. INTRODUCTION

Libraries have the mandate for organizing, preserving, indexing, and providing access to technical and other types of information. Libraries are a neutral ground for accessing, integrating, combining, and otherwise querying sensitive and diverse data. Libraries provide free and open access to government information. Libraries can provide a technical bridge between the user community and GIS technology. Library staff has a user–service orientation.

In recent years, geographical information system has became popular in all application due to its user – friendly means to access data via geographical database. Geographic Information Systems (GIS) are computer systems that aid in the management and analysis of geographically referenced data. GIS allows the user to link location or spatial data with tabular data in order to see relationships and patterns. GIS technology provides a graphical interface to an application database: the database stores information on object, while the GIS display the information on the screen. One of such application in GIS is Library Information System.

The library community, particularly those who organize and maintain spatial data collections, is well suited to play a strong role in providing services to the user communities. The information–organization skills of the trained librarian are readily transferable to GIS approaches to data organization.

There are many philosophical, technical, and institutional reasons why the institution of the library provides a superb

opportunity for organizing and maintaining access with GIS.

B.GEOGRAPHIC INFORMATION SYSTEM: Geographic Information System is defined as a tool that is useful to capture, store, retrieve, manipulate, display and querying of both spatial and non spatial data to generate various planning scenarios for decision making. GIS differs from the conventional database systems and information systems in the sense that every piece of data elements in GIS is directly or indirectly associated with the location on the earth surface with respect to any one of the coordinate system. In addition to this graphic and non graphic data can be merged and analyzed simultaneously. It is possible to integrate thematic maps on different scales, projections and tabular information using GIS which is very difficult and time consuming by manual methods. The repeatability of work can be avoided and certain complex calculations are solved easily by using GIS tool.

It is a computer-based tool that stores geographically referenced, or geo-referenced, data (i.e., data identified according to their locations) and links it with non-geographic attributes (tabular data about the location) to allow for information processing. In addition to mapping of data, GIS software also allows to see, explore, and analyze data by location, revealing hidden patterns and trends that are not readily apparent from spreadsheets or statistical packages.

C.GRASS**:** GRASS (Geographic Resources Analysis Support System) is the leading Open Source GIS software package. Development of this software was started in the early eighties by the US Army Construction Engineering Research Laboratory and was published as public domain software according to United States law. Originally developed as a landuse management and environmental planning tool, the focus was on raster analysis. In the past twenty five years, the software has become a tremendous and powerful tool to perform raster and vector analyses which offer unequalled opportunities. In addition, GRASS comes with modules to analyze remote sensing data and perform image processing. GRASS is Geographic Information system which runs on all platforms. It can be used as Desktop GIS and can serve as a backbone in a complete GIS infrastructure as well. It supports nearly all common raster and vector GIS file formats. A variety of sophisticated interfaces to software packages exist, from related domains like statistical analysis and databases and even to other GIS software packages. GRASS can connect to Relational Database Management System (RDBMS) through an ODBC driver and can directly connect to PostgreSQL/PostGIS, SQLite and MySQL.

E. OBJECTIVES:

The objective of this project is to create a library portal through which complete information of the project reports can be accessed and also the data used for the projects can be retrieved – A case study for library of IRS.

II. METHODOLOGY

The project details are collected from the library of Institute of Remote Sensing (IRS) and they are segregated on the basis of technical, theoretical and spatial criteria. A database has been designed for different types of data such as point, line and polygon and populated using MS-Access. The different layers of spatial data have been overlaid and it is linked with the project database in GRASS/QGIS. Finally customization is done for the Library Information System for easy querying, updating and retrieving the data.

A .STEP WISE PROCEDURE:

STEP 1:

- Data collection
    - Spatial Data
    - Non-Spatial Data - Project Details

STEP 2:

- Database Creation
- Design
- Population

STEP 3:

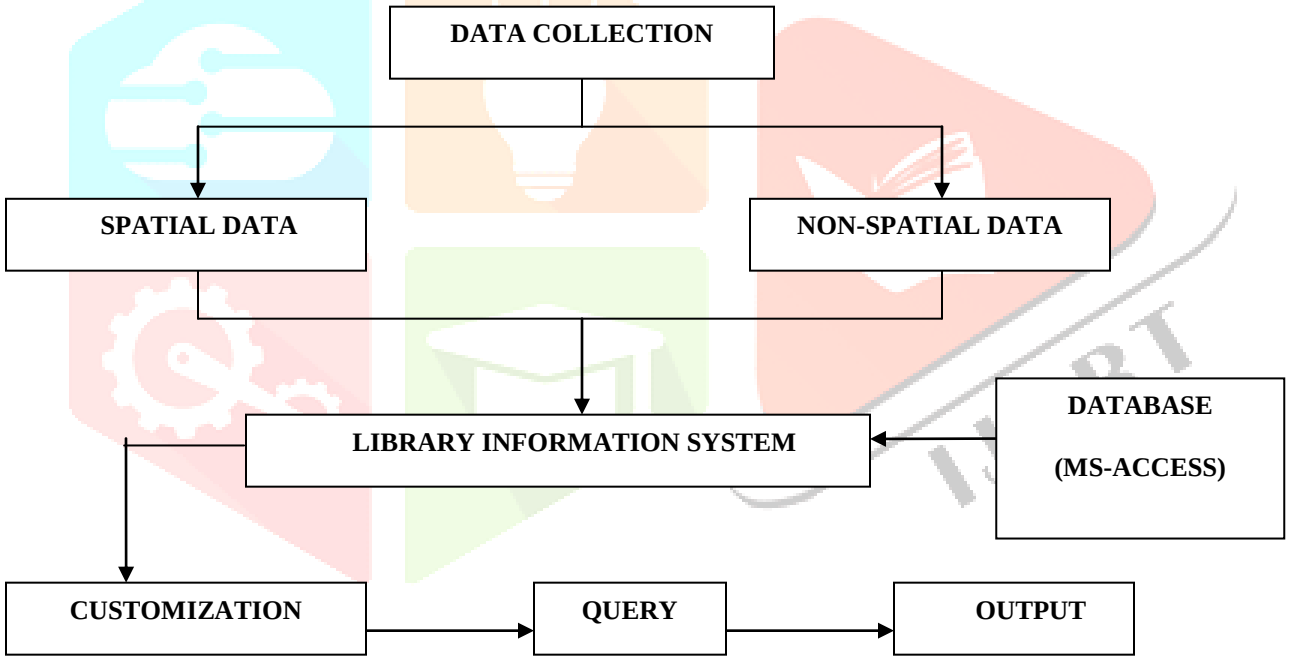
- Overlaying of all boundary layers

STEP 4:

- Linking of the Database with the spatial data

STEP 5:

- Customization.



B. DATABASE DESIGN

The database contains totally seven tables and attributes included in these tables are listed as follows:

Table 1: PROJECT, Project ID, title, Guide, Year and Data type. In this table the Primary key is Project ID.

Table 2: STUDENT, Roll No Project ID Name Degree. The Primary key is Roll No and the Foreign Key is Project ID.

Table 3: AREA ,Project ID, Lower latitude, Upper latitude, Lower longitude, Upper longitude, Study area, Area covered. The Primary key is the Project ID

Table 4: LENGTH, Project ID, Lower latitude, Upper latitude, Lower longitude, Upper longitude, Study area, Area covered in length. The Primary key is the Project ID.

Table 5: POINT, Project ID, Latitude, Longitude, Study area The Primary key is the Project ID.

Table 6: SATELLITE, Project ID, Images Used, Techniques Used, Study area. The Primary key is the Project ID.

Table 7:THEORETICAL, Project ID, Techniques used. The Primary key is the Project ID.

C. RELATIONSHIP:

The relationship between various tables is displayed in the following figure.

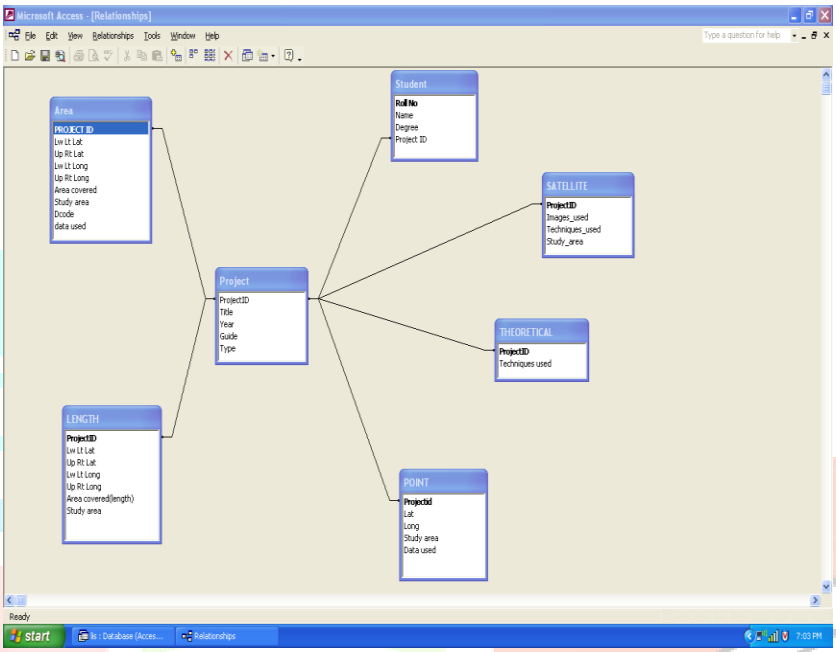


Figure 1- RELATIONSHIP DIAGRAM

D. SPATIAL DATA

The following boundary maps of Tamil Nadu are overlaid and a single vector map is created using GRASS/QGIS and it is displayed in figure

- Toposheet grid
- State boundary
- District boundary
- Taluk boundary
- Block boundary

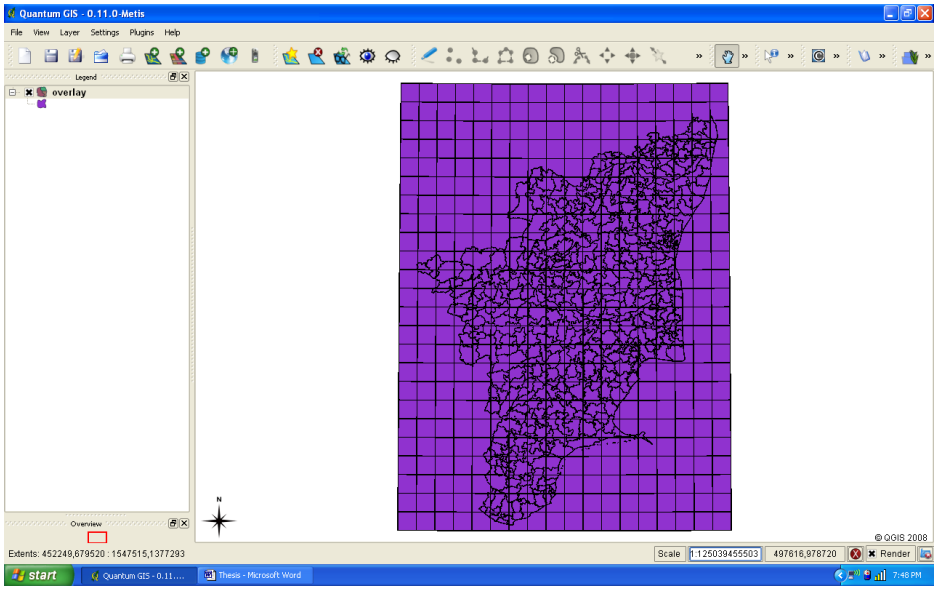


Figure 2-OVERLAY

IV. RESULTS AND DISCUSSIONS

A. BIBLIOGRAPHIC SEARCH

- Search by clicking:
- Map your search results:

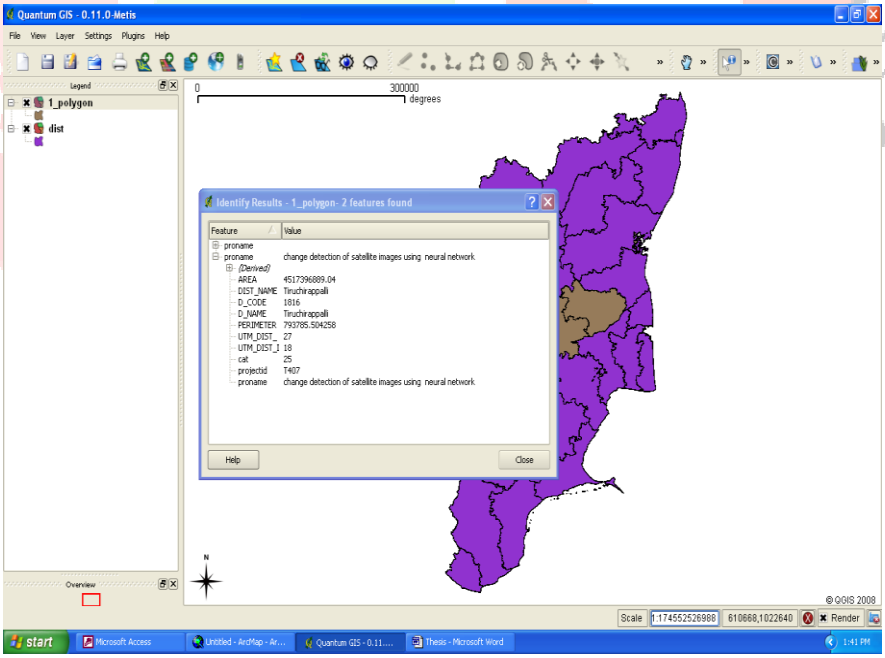


Figure 3-INFORMATION DISPLAY

When a polygon is selected by the identity tool, it displays the details of the project as shown in the fig 3.

B. CUSTOMIZATION

The Library Information System has been customized for easy querying and updating the database using Net Beans software.

The query can be made based on the project title keywords and it is shown in the figure 4.

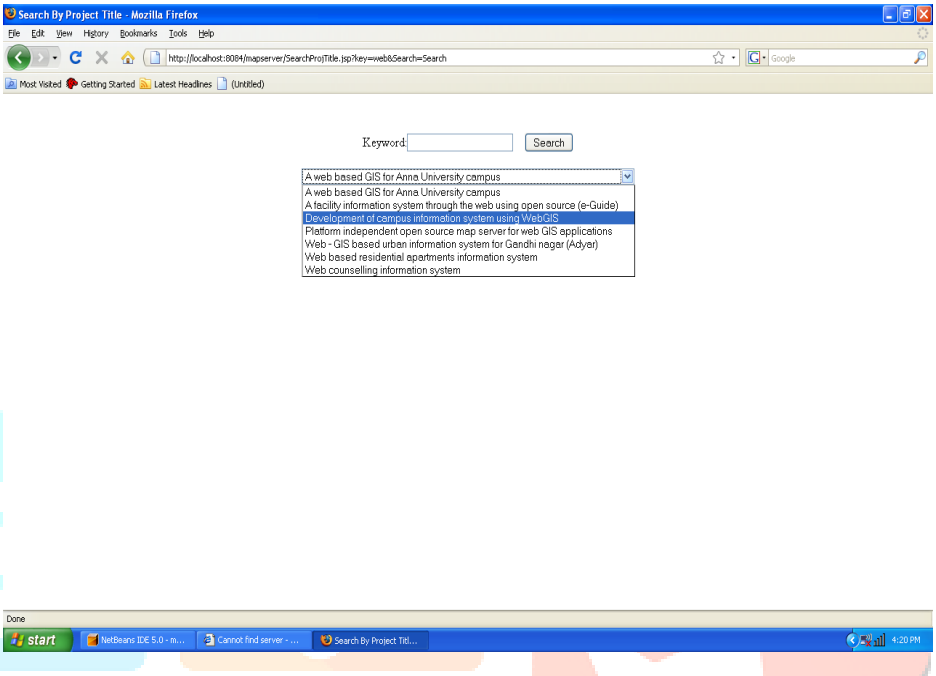


Figure 4-SEARCH BY PROJECT TITLE

The search result for the above query is shown in the following figure 5

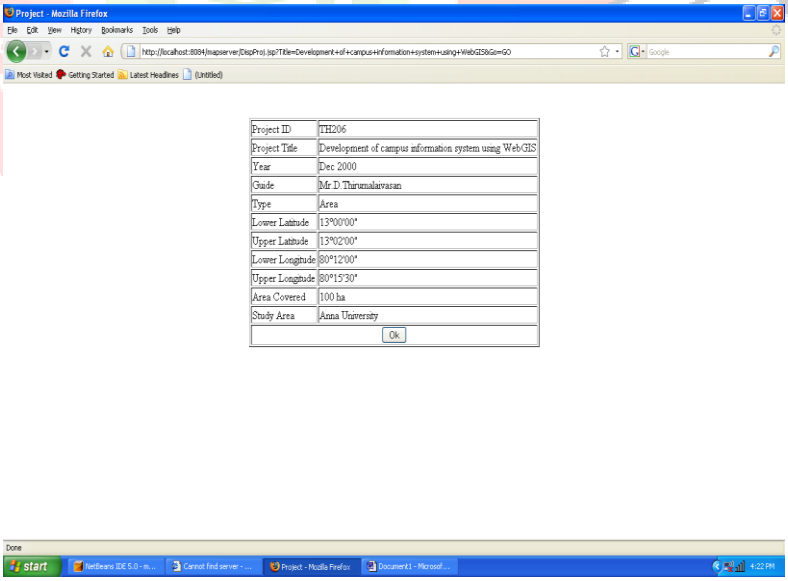


Figure 5-SEARCH RESULT

The database can be updated by entering the respective fields as shown in the figure 6

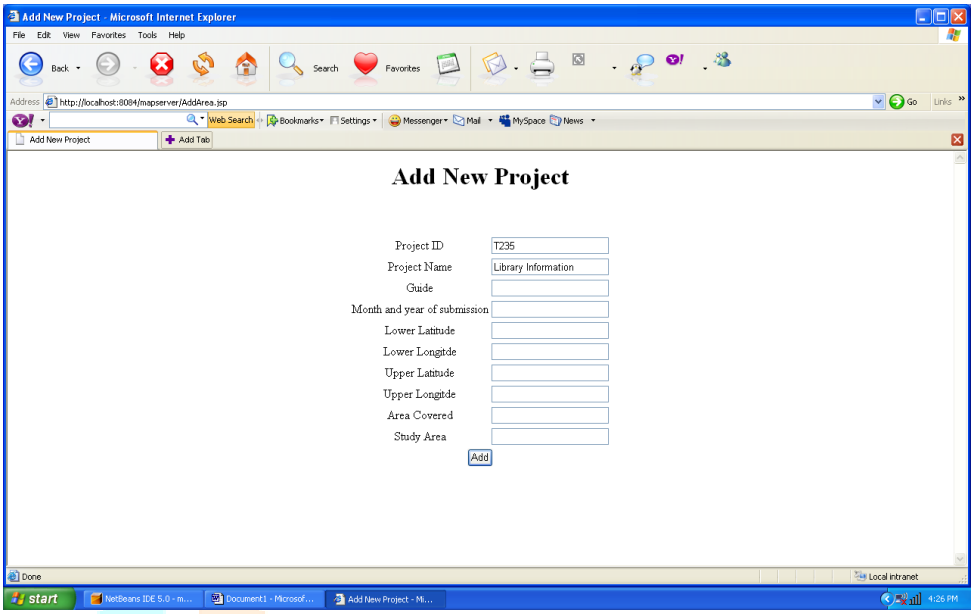


Figure 6-DATABASE UPDATION

V. CONCLUSION

The need for the study has been well understood and by considering the objectives, a database is created and it is linked with spatial data using GIS in order to prepare Library Information System. Based on the results obtained, we can see that the library information system will provide the means to eliminate some of the barriers to information access.

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