

## **GIS Based Educational Information System**

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**Abstract-**GIS based educational information system is a tool towards identifying with precision the details of various educational institutes, in terms of their location, facilities provided, courses available, ranking, contact details, and all possible information. GIS add an extra edge to the work by enabling the user to geographically locate the same. Thus it provides the user with all the information that is

Concise

Accurate

Present at single place

The presented work corresponds to locating the position of the all the Indian National Institute of Technology on the Indian map providing the specific information of each, like the name of the director, the contact details, location information.

For this, shape files have been designed using Arc GIS software, for all states of India, outlining the boundary and clubbed into the entire map of India. These shape files are then imported on GeoServer for testing. This feature provides user the information of the institute which he chooses on the map.

GoogleEarth is chosen as the user-interface. The second aspect of the work is completed using this software. The shortest distance between two institutes is found out and is demonstrated to the user in terms of the distance to be travelled, the road to be taken to reach there in minimum distance and the estimated time required for the journey.

Thus on a whole the user sees complete India map on GoogleEarth. Now, when the user clicks on any institute, he finds the information regarding that institute and when the user needs to find the distance between two institutes, he can find the route, which provides him with all the necessary details.

**Key words:** Shape file, geoserver, Arc GIS, GoogleEarth

### **I. INTRODUCTION**

GIS is a system of computer hardware and software that designed to allow users to

- Collect
- manage,
- analyze and
- retrieve

large volumes of spatially referenced data and associated attributes collected from a variety of sources.

- They can be used to create and maintain geographic database and are suited for analysis in planning related activities.
- The GIS has wider applications in decision making, storage of various kinds of data, querying and analyzing the large amount of data and designing and presenting final maps and reports.

A “geographic information system” (GIS) is a computer-based tool that allows you to create, manipulate, analyze, store and display information based on its location. GIS makes it possible to integrate different kinds of geographic information, such as digital maps, aerial photographs, satellite images and global positioning system data (GPS), along with associated tabular database information (e.g., ‘attributes’ or characteristics about geographic features).

Using GIS, you can incorporate all of this information into a single system and execute common database operations. For example, GIS allows you to perform statistical analysis or spatial queries, to explore 'what-if' scenarios, and to create predictive models. For example, GIS can help answer questions such as:

What exists at a given location?

Where does something occur?

What has changed since a specific point in time?

What spatial patterns exist?

What happens if...?

GIS allows to examine and analyze geographic information at different levels of detail or from different perspectives. Then, it enables to customize the display of your maps and analyses for presentation to particular audiences.

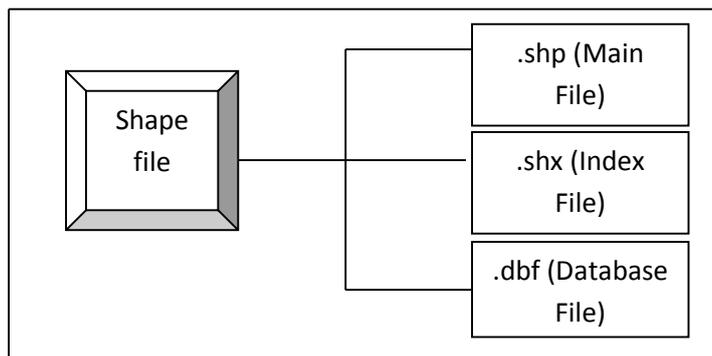
Any variable that can be located spatially, and increasingly also temporally, can be referenced using a GIS. Locations or extents in Earth space–time may be recorded as dates/times of occurrence, and x, y, and z coordinates representing, longitude, latitude, and elevation, respectively. These GIS coordinates may represent other quantified systems of temporo-spatial reference. Units applied to recorded temporal-spatial data can vary widely but all Earth-based spatial–temporal location and extent references should, ideally, be relatable to one another and ultimately to a "real" physical location or extent in space–time.

## II. BASIC ASPECT OF SHAPEFILE

The ESRI Shape file or simply a shape file is a popular geospatial vector data format for geographic information systems software. It is developed and regulated by ESRI as a (mostly) open specification for data interoperability among ESRI and other software products. A "shape file" commonly refers to a collection of files with ".shp", ".shx", ".dbf"[2].

### The Shape file Format

ESRI (Environmental Systems Research Institute) is a leading developer of GIS software and the Shape file format used by their products is one of the most popular mediums for storing vector map data. An ESRI shape file is actually composed of three separate files: a main file with a .SHP extension, an index file with a .SHX extension, and a dBase file with a .DBF extension that contains the associated attribute data. The three files must have the same base name and follow 8.3 naming conventions as shown in the figure below



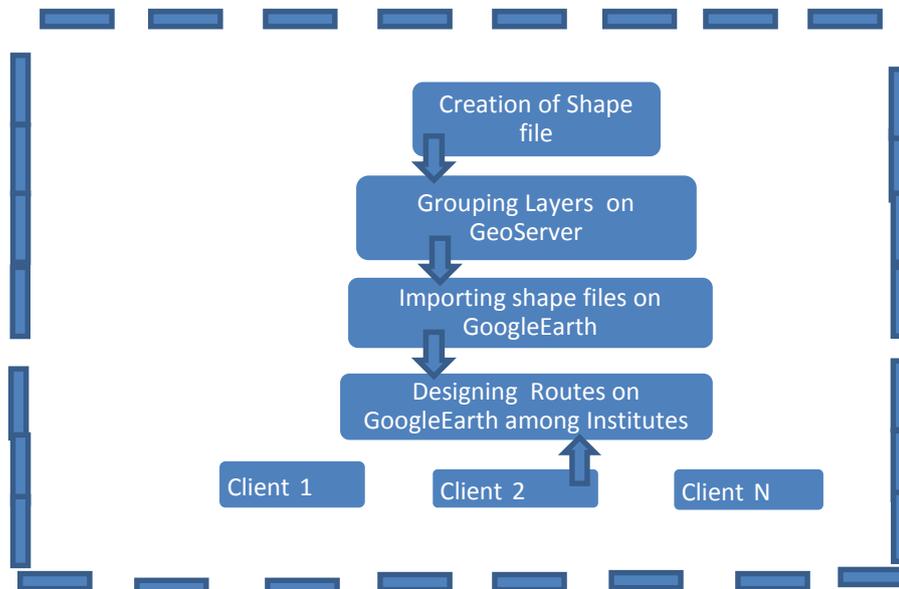
Component of Shape file.

The main file (with a .SHP extension) is the primary component and its structure begins with a fixed-length, 100-byte header containing information about the total length of the file, the file version, and the type of shapes it contains. This file header is then followed by a list of variable-length records, with each record defining the geometry for a single ESRI shape[3]. An ESRI shape might be a polygon that represents the political boundary of a country, a polyline that represents the path of a city street, or a point

object that indicates the location of a city. The figure below illustrates the format of a .SHP file. It contain record file, header file with a header name constituting 100 byte. The other supporting file which are required are to collect information about File number, File version, File code, File length and Shape type. We use class ShapeFileHeader to read the content of the shape file which usually contain the address of 100 byte header file.

### III. METHODOLOGY

The methodology adopted for the present work has been shown with the help of a flow diagram in Figure.



GIS data for project output elaboration should be created with following properties:

- Relevant coordinated values for creation.
- ESRI data format.
- xBase file format convention attributes.
- Software ArcGIS from ESRI.

GIS data should be developed in ArcGIS :

- The correct topology and information about each coordinate and shapes of the polygon.
- The project format for ArcGIS is .shx, .db, and .shp.
- The final file format for the given project is .kml file obtained from google earth.

### IV. DETAILED PLANNING

The methodology adopted for the thesis work is based on the following factors:

- Preparing Shape files using ARC GIS. The different layer that are prepared using this software are
  - a. State Layer
  - b. Country Boundary Layer
- All the existing GIS data are transferred into ArcGIS personal database format.
- Gathering information and creating database in shape file.
- Grouping of different layers to develop shape file of India using GeoServer.
- Import these shapefiles on GoogleEarth
- Designing routes on GoogleEarth between institutes

- Gathering each route information.
- Mapping route-information with each route.

## V. RESULT

- Shape file of INDIA showing location and information about different NITs on GoogleEarth.
- Routes and Routes Information between Different NITs.
- The webpage showing the information about all NITs present in India.
- Website containing the information and database of all the NITs with its location.
- The following website helps the user in getting the information about the particular NIT and the speciality of the particular NIT along with its information.
- The map of India containing all the NITs along with its database is being shown on the webpage.

## VI. FUTURE RECOMMENDATION

- The project could be enhanced for a larger number of institutes.
- Rich amount of information can be presented for an institute.
- The project could be enhanced by adding railway networks and airport to the located city of the NIT.
- The website could be enhanced by adding the comparison of the NIT among each other giving the speciality of the NIT.
- The look and feel of the project could be worked upon to enhance end-user experience of the project.

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## SNAPSHOTS

- **Informaton About states**



- **Information about an NIT**



- **ROUTE description**



