Research Paper

GIS ENABLED HOSPITAL SERVICES AND FACILITIES INFORMATION SYSTEM FOR COIMBATORE CITY (G-HIS FOR CBE)

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Readily available authentic Information about services and facilities are very vital to the Citizens. In case of Hospitals, the information is still more critical as even the slightest delay in decision making can have serious impacts. Such a comprehensive information base is absent in the case of the services and facilities offered by hospitals. The present study aims at developing a GIS based information system for all available services and facilities of hospitals in city. GIS allows the integration of geographic and non-geographic (attribute) information to facilitate realistic decision making. The GIS environment also allows exploring the availability of services, various options based on proximity, availability of doctors, etc., in a user friendly interactive interface.

Keywords: Database, GIS, Hospitals, Information system, User friendly interface

INTRODUCTION

Readily available authentic information about services and facilities are very vital to the citizens. In the case of hospitals, the information is still more critical as even the slightest delay in decision making can have serious impacts. As medical industry is getting more and more advanced and sophisticated with diagnostic, healing and other healthcare services, providing such information to the citizen as well as those working in the industry itself, helps better and timely decision support.

The specific objectives of the study were the following:

- To develop a GIS based spatial database of Coimbatore city.
- To survey and map the hospital locations.
- To carry out a detailed primary survey on hospital services and facilities.
- To develop a Relational Database Management System (RDBMS) of the hospital information system.
- To establish a desktop based, integrated GIS and RDBMS environment.

METHODOLOGY

The methodology of the study involved two major components; GIS and RDBMS.

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The base map of the city was digitized in GIS environment, keeping the scanned survey of India map as backdrop image. The image was georeferenced using the Ground Control Points (GCPs) collected using Global Positioning System (GPS) at various landmark locations of the Coimbatore city.

The geographic coordinate locations of 32 identified major hospitals were collected using GPS. The data was stored as MS ACCESS table and the same was added in GIS environment as a new layer with proper identification numbers.

After a few discussions held with an expert community working in the various sectors of medical industry such as hospital administration, public health, healthcare etc., a data entry form was designed. This form consisted the details such as name, address, contact number, category type and website ID of hospitals and second part being information on services, doctors, etc.
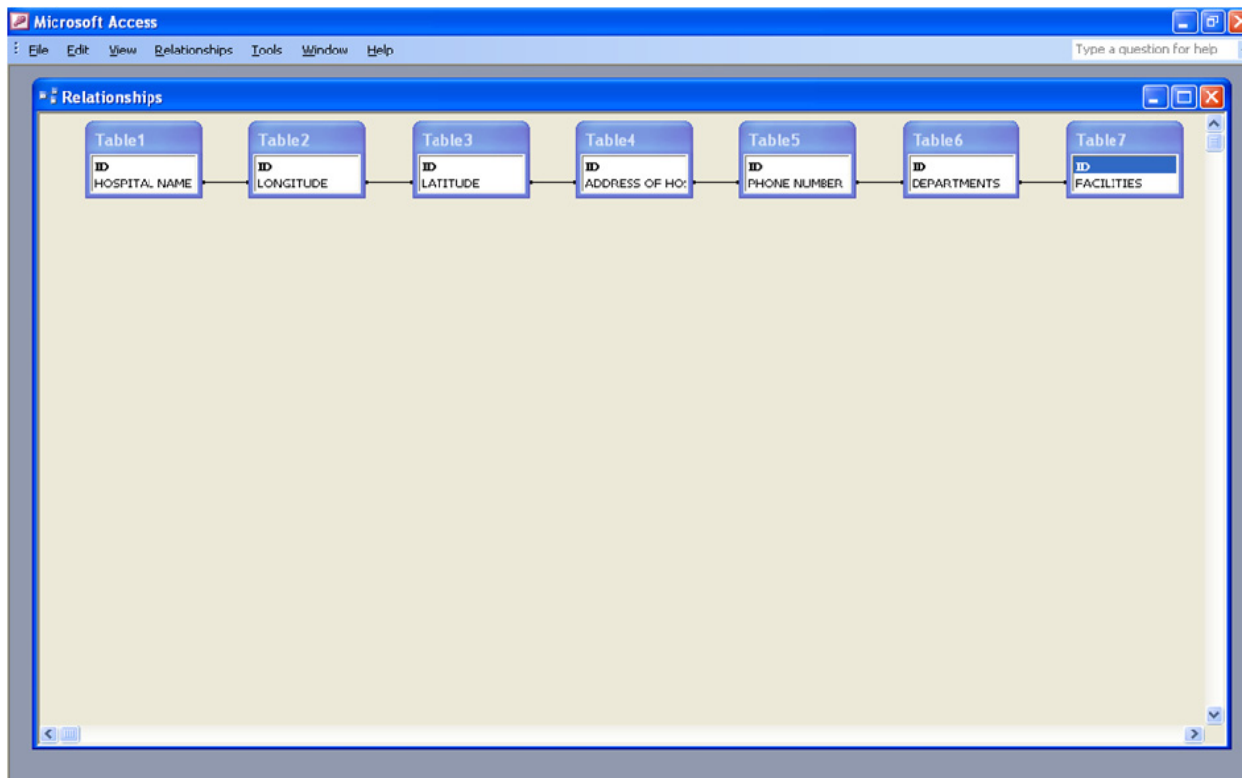
The database consist the following tables

• Hospital – basic profile

• Departments

• Services and facilities

A database schema was designed in MS ACCESS containing multiple tables, structures and various logical relations among tables. (Screenshot No. 1)

In the desktop GIS environment all the spatial and RDBMS data were added. The hospital layer was connected with the RDBMS using appropriate foreign key.

Screenshot No. 1: Showing The Database Structure

Since the hospital information included multiple tables, one-to-many relationship was established in the GIS information that connected the detailed tables with the hospital layer.

The G-HIS is used technologies such as Arc GIS 9.1 for digitization and Microsoft Access for database creation, Table and Spatial Query Analysis by use of Arc View 3.2a .Network Analyst for network analysis and coordinate collection with the help of Magellan Sportrak GPS.
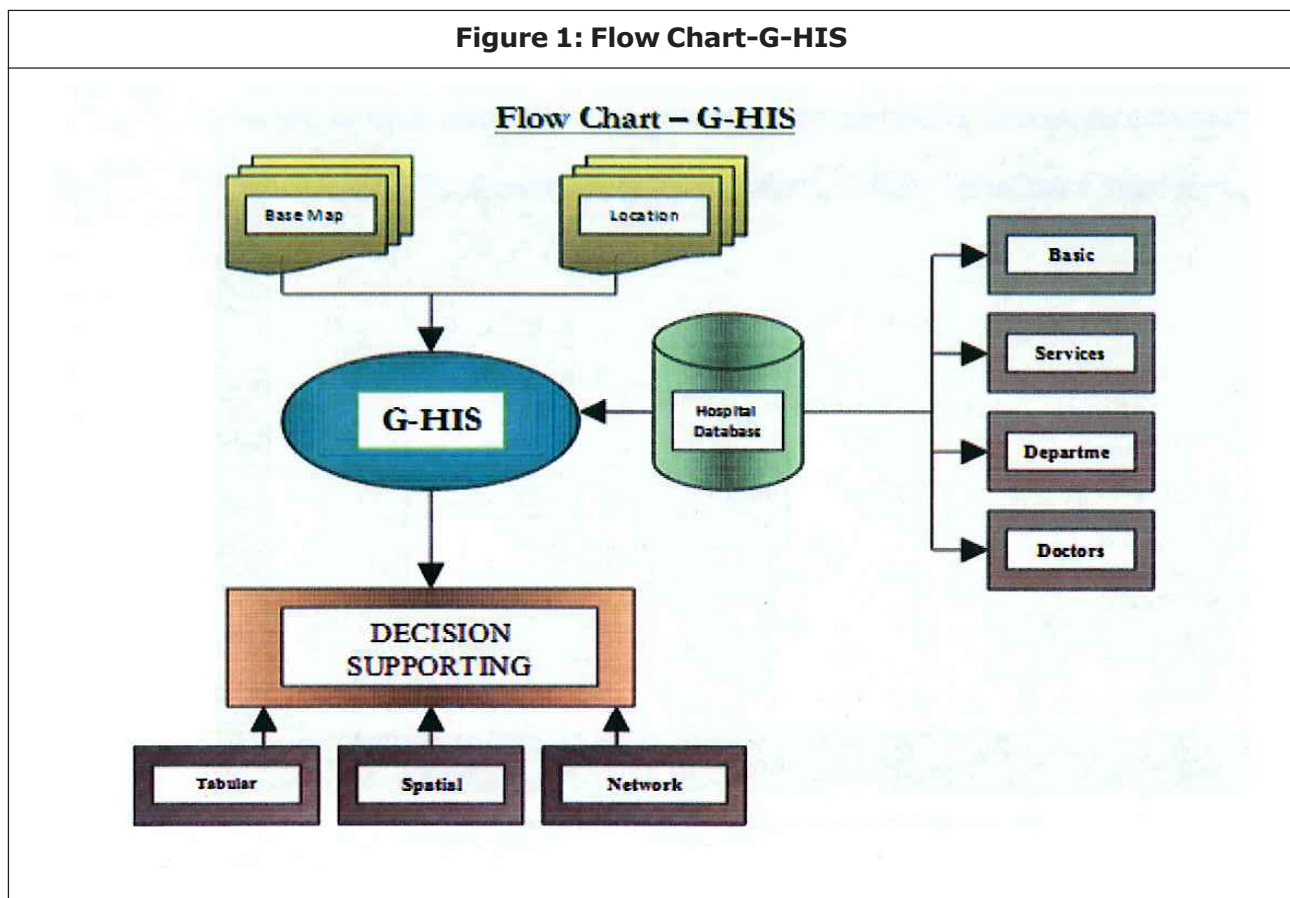
The GIS-RDBMS integration was achieved in Arc View by using "SQL connect" function. The analysis such as spatial query, Tabular query and network analysis were carried out in the Arc view 3.2a.
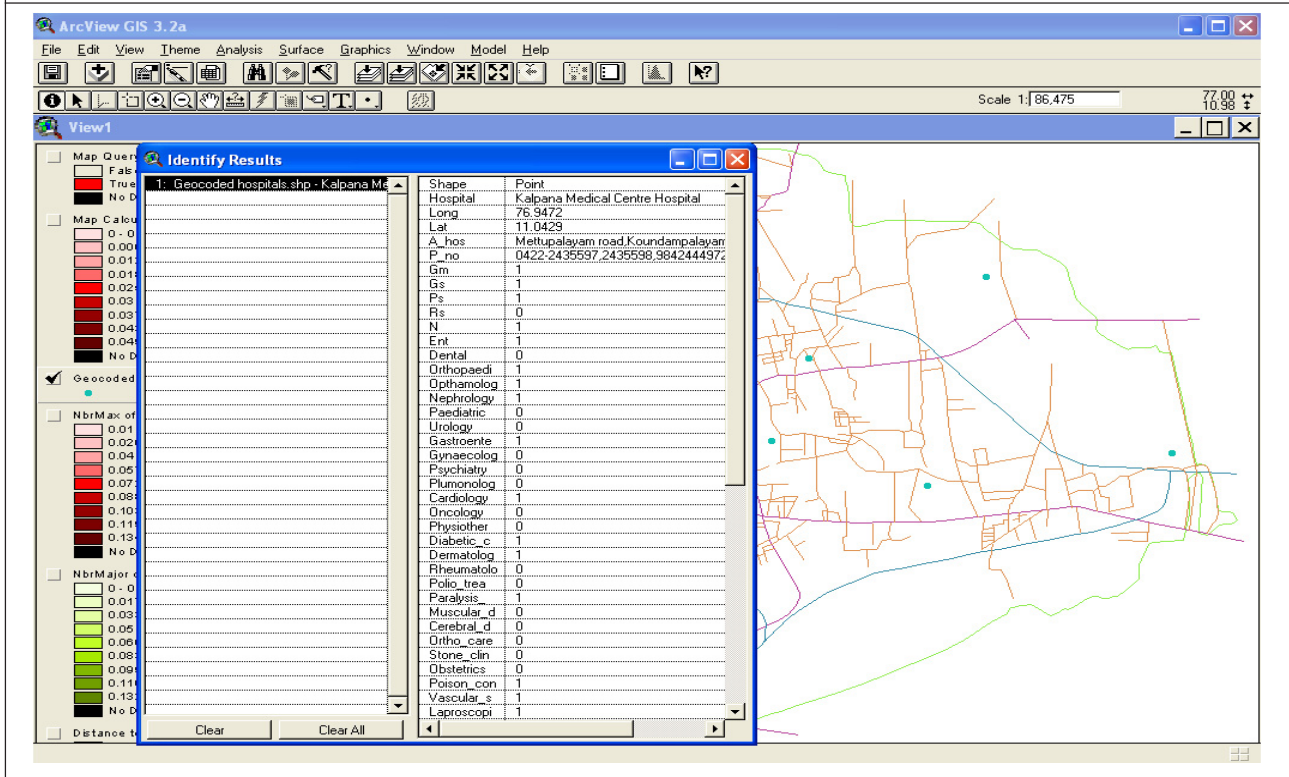
RESULTS

The analysis results a GIS enabled Hospital Services and Facilities Information System (G-HIS) which provide desktop GIS based application facilitating user friendly query of basic information regarding the nearest hospital, available services and departments and an interactive shortest route application to any selected hospitals (Screen shot No. 2).

The results involved three analyses, such as tabular query, spatial query and network analysis. The tabular query is based on attribute value. A location satisfying the query is highlighted and attached record will also be highlighted. For example if a user wants to know the hospitals having cardiology department, the user has to execute a simple
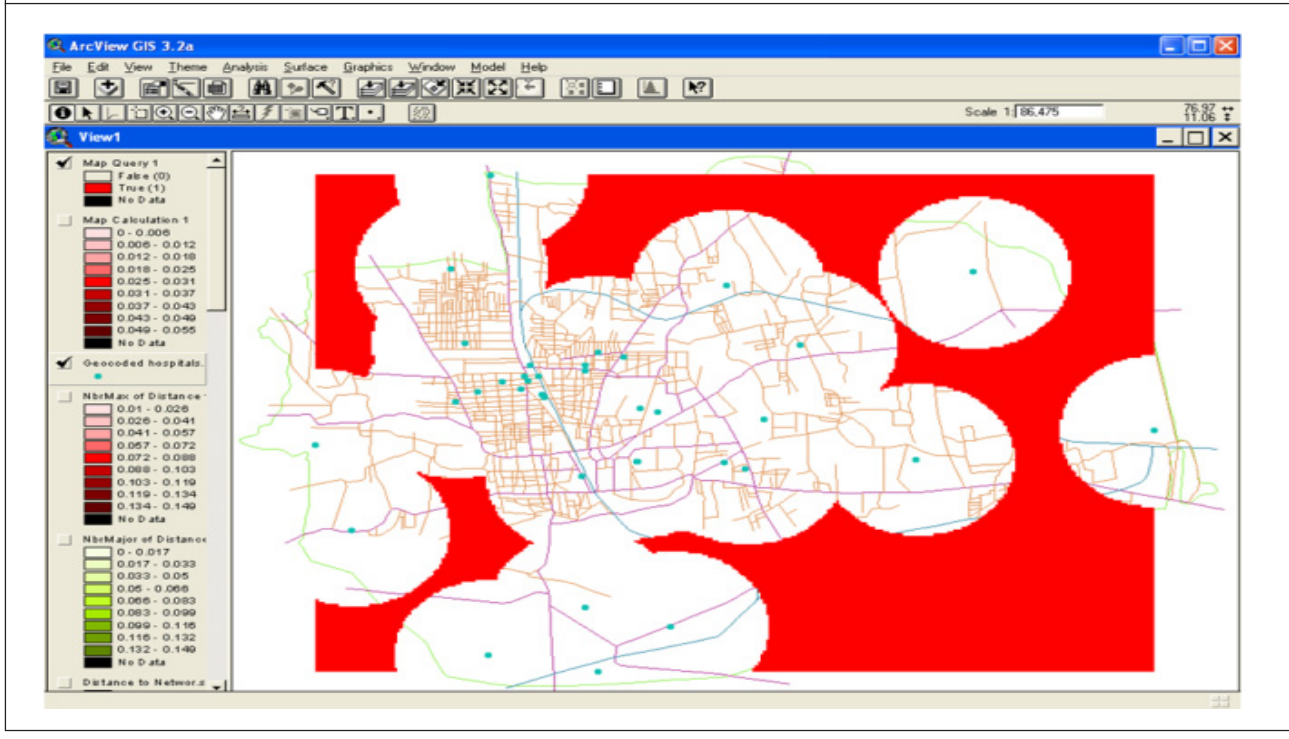

Figure 1: Flow Chart-G-HIS

Screen Shot No. 2: Of G-his Facilitating User Friendly Query Of Basic Information Regarding The Selected Hospital, Address And Departments

Screen Shot No. 3: Of G-his Showing Results Of Spatial Query To Find The Number Of Hospitals Falls Within The Distance Of 2km

Screen Shot No. 4: Attributes Detail In Arc View

Screen Shot No. 5: Of G-his Showing Results Of Network Analysis

query using mouse and by selecting the department cardiology from the list, the query satisfying hospitals are highlighted (Screenshot No. 3).

Tabular query also facilities combination search such as hospitals having both cardiology and neurology departments. The location of kalpana hospital, Ellen hospital, KG Hospital, etc., will be highlighted.

The spatial query is based on a spatial relationship of objects. For example , to execute a query to find the number of hospitals falling within a specified distance from a selected point, the "select by theme" function may be used.

Network analysis module of GIS provides shortest path between two specified locations. The shortest route function between two hospital displayed in red colored route. (Screen shot No. 5)

CONCLUSION

Hospital service is one area where information is very critical. Unfortunately the information is either incomplete or disintegrated. GIS and Database enabled information system not only manages the information systematically, but also allows the user to adopt effective decisions.

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