

Components of GIS – An Overview

Manickavasagam S.¹, Ponmani M.¹, Mariselvammurugan A.², Mariappan S.¹, Anbarasan M.³ and Santhosh Kumar M.⁴

¹Tamil Nadu Dr.J.Jayalalithaa Fisheries University (TNJFU), Nagapattinam, Tamil Nadu

²M.F.Sc Fish Nutrition and Feed Technology Research Scholar, Kerala University of Ocean Studies, Panangad, Kerala

³M.F.Sc Division of Aquatic Animal Health Management Research Scholar, SKUAST-K, Faculty of Fisheries, Rangil, Jammu and Kashmir

⁴M.F.Sc Research Scholar, Central Institute of Fisheries Education, Panch Marg, Off. Yari Road, Versova, Andheri (West), Mumbai, Maharashtra

SUMMARY

GIS is defined as an information system that is used to input, store, retrieve, manipulate, analyze, and output geographically reference data or geospatial data, to support decision-making for planning and management of land use, natural resources, environment, transportation, urban facilities, and other administrative records. Based on the functionality of a GIS, there are in general five components of a GIS namely hardware, software, data, people and methods.

INTRODUCTION

GIS is the acronym for Geographic Information System. GIS stores information about the World as a Collection of themed Layers that can be used together. A layer can contain similar features such as Land Cover, Water bodies, Road Networks, Buildings, etc. Geographic information contains either an explicit geographic reference such as a latitude and longitude or national grid coordinate, or an implicit reference such as an address, postal code, census tract name, forest stand identifier, or road name. An automated process called geocoding is used to create explicit geographic references (multiple locations) from implicit references (descriptions such as addresses). These geographic references allow you to locate features such as a business or forest stand and events such as an earthquake on the Earth's surface for analysis.

Geography: Geography is the science that deals with the Earth and life on the Earth and Provides Position Data (Spatial Data).

Information System: It is a system used for collecting, storing, manipulating, and retrieving Spatial Data.

GIS Components

Hardware.

It consists of the computer on which the GIS software runs. The GIS runs on the whole spectrum of computer systems ranging from portable personal computers to multi-user supercomputers. Computer hardware is used to obtain inputs, processing, output, and storage of data. Hardware should be robust and should have the future potential to deal with heavy software patches and updates. Latest high-chip and AI-based processors, Motherboards, and even GPUs are needed in today's world to handle GIS software and data.

Software.

Software is the primary focus while setting up any of the systems. The GIS Software provides the functions and tools that are necessary to store, analyze, and display geographic information. The software can be classified into two main types, Licensed and Freeware. Licensed software requires heavy investments and has business subscriptions attached to it, while Freeware is easily available on the internet. Some examples of GIS GIS-related software are -Arc View, Arc GIS, Arc SDE, MAP Info, QGIS, GRASS, MIDAS, etc. Good software that handles a large amount of geospatial data, GUI (Graphic User Interface) for manipulating data and querying the environment for analyzing and visualizing large data sets is a perfect fit for GIS.

Data

Data are named as geospatial data in GIS. The sources of spatial data are digitized maps, aerial photographs, satellite images, statistical tables, and other related documents. These are some technologies used to collect geospatial data: Field surveys, Drones, Satellites, and SONAR-LIDAR technology. The digital map forms are the basic input for GIS. Tabular data related to the map objects can also be attached to the digital map data.

People

People are an important catalyst in doing a GIS Components setup. With the help of proper management and technical expertise, all the known-unknown problem areas can be addressed. Project-Program Management is then used to understand any scope of a GIS project. GIS Analysts and Technicians play along with the GIS data to analyze and monitor various forms of data sets. GIS developers and database administrators look after the front end and the backend part of the setup. People with the right level of geology, information systems, and statistics knowledge participate in the project setup's technical aspects. GIS projects require a strong workforce and inventory management, and hence people also concentrate more on the overall project development lifecycle techniques.

Methods/Procedure

A computer system for GIS consists of hardware, software, and procedures designed to support the data capture, storage, processing, analysis, modeling, and display of geospatial data. A successful GIS operates according to a well-designed plan and business rules, which are the models and operating practices unique to each organization.

CONCLUSION

A geographic information system (GIS) is a computer system that creates, manages, analyzes, and maps all types of data. GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there). This provides a foundation for mapping and analysis used in science and almost every industry. GIS helps users understand patterns, relationships, and geographic context.

REFERENCES

- <https://www.esri.com/en-us/what-is-gis/overview>
- https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf
- <https://doi.org/10.1016/B978-0-08-102295-5.10548-7>
- <https://rashidfaridi.com/2008/06/27/topology-and-layers-in-gis/>
- <https://www.dspmuranchi.ac.in//pdf/Blog/FUNDAMENTAL%20CONCEPT%20OF%20TOPOLOGY.pdf>
- <https://eos.com/blog/spatial-analysis/#:~:text=What%20Is%20Spatial%20Analysis%3F,of%20tasks%20and%20their%20complexity>