DSPMU UNIVERSITY, RANCHI.
DEPARTMENT OF GEOLOGY

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GEOGRAPHIC INFORMATION SYSTEM (GIS)

A **geographic information system** (**GIS**) is a information system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. In a more generic sense, GIS is a software tool that allows users to create interactive queries, analyze the spatial information, edit data, maps, and present the results of all these operations.

The 4 main ideas of Geographic Information Systems (GIS) are:

- **Create** geographic data.
- **Manage** it in a database.
- **Analyze** and find patterns.
- **Visualize** it on a map.

Why is it so useful?

GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared. An example of this is given below-

Example-1

It's really hard to visualize latitudes and longitudes coordinates from a spreadsheet data as given below-

CITY	LATITUDE	LONGITUDE
Seattle	47.5°	122.3°
New York	40.7	73.9°
Miami	25.8°	80.2°
Los Angeles	33.9°	118.2°

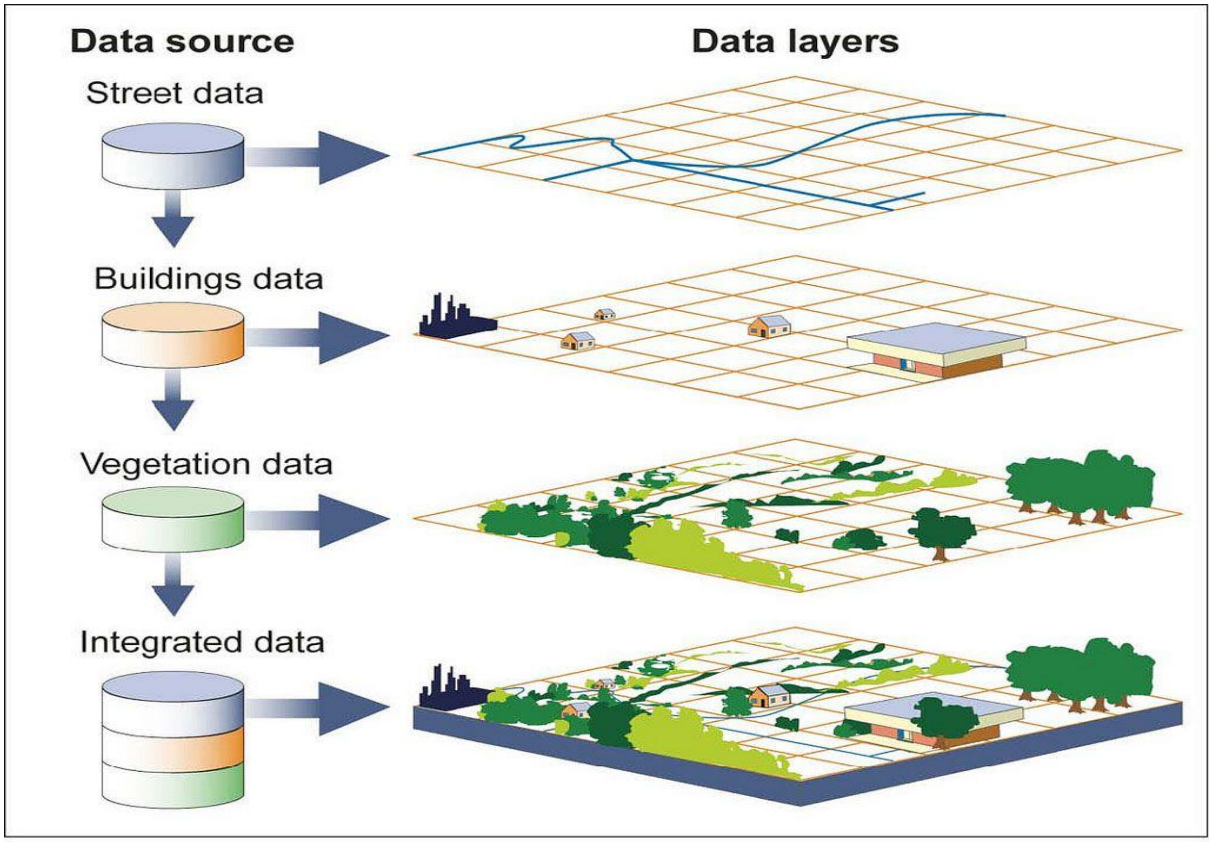
But, by connecting geography (map) with this data using GIS we get such maps as shown below-

GIS is a computer-based tool that also examines spatial relationships, patterns and trends. Thus, When you have geographic context, you don't only see where they are in a map. But you can also calculate

- how far points are from each other or
- find the optimal route between cities and much more.

Example-2

Many different types of information can be compared and contrasted using GIS. The system can include data about the landscape, such as the location of streams, different kinds of vegetation, and different kinds of soil. It can include information about the sites of factories, farms, and schools, or storm drains, roads, and electric power lines etc as shown below-



Source: GAO.

GIS is used in multiple disciplines such as:

Agriculture
Archaeology
Architecture
Business
Computer Science
Environmental Science
Engineering
Journalism
Military Science
Natural Resource
Management
Geography
Geology
Meteorology
Oceanography
Law Enforcement
Public Health
History
Sociology Urban
Regional Planning etc.