

## Geographic Information System: The Software for Geographic Locations on the Earth

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### DESCRIPTION

A Geographic Information System (GIS) is computer software that collects, stores, verifies, and displays data about geographic locations on the Earth's surface. GIS can represent a vast range of data, including streets, buildings, and plants, on a single map. This makes it easier for people to recognize, assess, and comprehend patterns and relationships. This creates the foundation for mapping and analysis, which are used in science and almost every industry. Users can use GIS to better understand patterns, relationships, and their location's context. In 1854, it was employed for the first time to chart a disease outbreak in the City of London.

GIS allows comparing and contrasting a wide range of data types. People's data, such as population, income, and educational attainment, can be incorporated into the system. It may contain information on the landscape, such as the location of streams, various types of vegetation, and various types of soil. It could include details about companies, farms, and schools, as well as storm drains, highways, and electricity lines.

### GIS mapping

Geographic Information Systems (GIS) are based on four key concepts:

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

A person can make better decisions with GIS because viewing and analysing data on maps affects our understanding of data.

### Data formats

Both hardware and software solutions are used in GIS applications. Cartographic data, photographic data, digital data, and spread sheet data are examples of these applications.

- Cartographic data is already in map form and may include information such as river, road, hill, and valley locations.
- A large component of GIS involves photographic interpretation. Analyzing aerial images and evaluating the features that show is what photo interpretation entails.
- GIS can also be used to enter digital data. Computer data gathered by satellites is an example of this type of data.
- Another technology that can be linked into a GIS is remote sensing. Imagery and other data from satellites, balloons, and drones are used in remote sensing.

### GIS data types

In GIS mapping, various forms of data are utilised. GIS data is divided into two categories: vector data and raster data. There is a specific format for each type of data.

#### Data in a vector format

Vector data is a type of spatial data that may be found in mapping sites like Open Street Maps and Google Maps. There are points, lines, and polygons in it.

- Nonadjacent features or unique data points are often represented using point data. You can't measure the length or area of a point because it has no dimensions.
- Arc data is another name for line data. Rivers, streets, and pathways are examples of linear features. Because line data only has one dimension, it has a beginning and an end point.
- Polygons are commonly used to represent places like towns, lakes, and forests. Polygons, unlike point and line data, are two-dimensional and can be used to calculate a geographic feature's perimeter or area.

#### Data in raster form

Pixels make up raster data, also known as grid data, and each pixel has a value. Raster data can be found on topographic maps, satellite pictures, and aerial surveys by anyone. Continuous and discrete raster data are the two types of raster data.

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- Continuous rasters are grid cells that alter over time. Aerial photography, height, and temperature are among examples. A fixed registration point produces continuous raster surfaces.
- Discrete rasters have a distinct theme or class to which each pixel is assigned. Discrete data, unlike continuous data, can only take specified values, not values within a range.