Importance of raster data in gis

Science

Basically there are two types of models in GIS:

Vector Data Model (representation of the world using points, lines and polygons)

Raster Data Model (representation of the world as a surface divided into regular grid of cells).

What is raster data?

In its handiest shape, a raster includes a matrix of cells (or pixels) prepared into rows and columns (or a grid) wherein every cellular carries a value representing records, together with temperature. Rasters are virtual aerial photographs, imagery from satellites, virtual photos, or maybe scanned maps. While the shape of raster information is simple, it's far incredibly useful for a huge range of applications. Within a GIS, the uses of raster records fall under four foremost categories:

Rasters as basemaps

- Rasters as basemaps
- Rasters as surface maps
- Rasters as thematic maps
- Rasters as attributes of a feature.

Raster as basemaps

A commonplace use of raster facts in a GIS is as a background display for different feature layers. For example, ortho photographs displayed beneath other layers offer the map user with self-assurance that map layers are spatially aligned and represent real gadgets, as well as additional records.

Three principal assets of raster basemaps are orthophotos from aerial pictures, satellite TV for pc imagery, and scanned maps. Below is a raster used as a basemap for street data.

Raster as surface maps

Rasters are nicely suitable for representing information that adjustments constantly throughout a panorama (floor). They provide a powerful technique of storing the continuity as a surface. They additionally provide a frequently spaced illustration of surfaces. Elevation values measured from the earth's floor are the maximum commonplace software of floor maps, however different values, consisting of rainfall, temperature, awareness, and population density, can also outline surfaces that can be spatially analyzed. The raster below presentations elevation — the use of inexperienced to show decrease elevation and purple, crimson, and white cells to reveal better elevations.

Raster as thematic map

Rasters representing thematic facts can be derived from analyzing different facts. A common analysis utility is classifying a satellite picture with the aid of land-cowl categories. Basically, this activity companies the values of multispectral information into instructions (which includes plant life type) and assigns a specific fee. Thematic maps also can end result from geoprocessing operations that integrate records from numerous assets, including vector, raster, and terrain information. For instance, you can process facts through a geoprocessing model to create a raster dataset that maps suitability for a specific hobby. Below is an instance of a categorized raster dataset displaying land use.

Rasters as attribute of a feature

Rasters used as attributes of a characteristic can be virtual pictures, scanned files, or scanned drawings related to a geographic item or area. A parcel layer can also have scanned prison files identifying the modern day transaction for that parcel, or a layer representing cave openings might also have photographs of the actual cave openings associated with the factor functions. Below is a virtual photograph of a huge, antique tree that might be used as an attribute to a panorama layer that a metropolis may additionally hold.

Advantages of storing data as raster

- A powerful format for superior spatial and statistical evaluation
- The capability to symbolize non-stop surfaces and carry out surface analysis
- The capability to uniformly shop factors, lines, polygons, and surfaces
- The ability to perform fast overlays with complex datasets
- An easy facts structure
- A matrix of cells with values representing a coordinate and sometimes linked to a characteristic table.