

Title: *Explore QGIS*

WHAT IS GIS?

GEOGRAPHIC INFORMATION SYSTEMS



Definition:

Geographic Information Systems (GIS) store, analyze and visualize data for geographic positions on Earth's surface. GIS is a computer-based tool that examines spatial relationships, patterns and trends. By connecting geography with data, GIS better understands data using a geographic context.

The 4 main ideas of GIS are:

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



Three Components of GIS

1. Data: GIS stores location data as thematic layers. Each data set has an attribute table that stores information about the feature.

The two main types of GIS data are raster and vector:

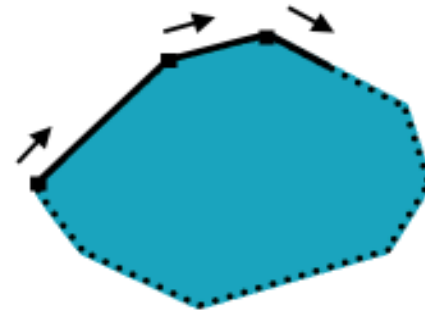
RASTER

Raster look like grids because they store data in rows and columns. They can be discrete or continuous. For example, we often represent land cover, temperature data and imagery as raster data.



VECTOR

Vectors are points, lines and polygons with vertices. For example, fire hydrants, contours and administrative boundaries are often vectors.

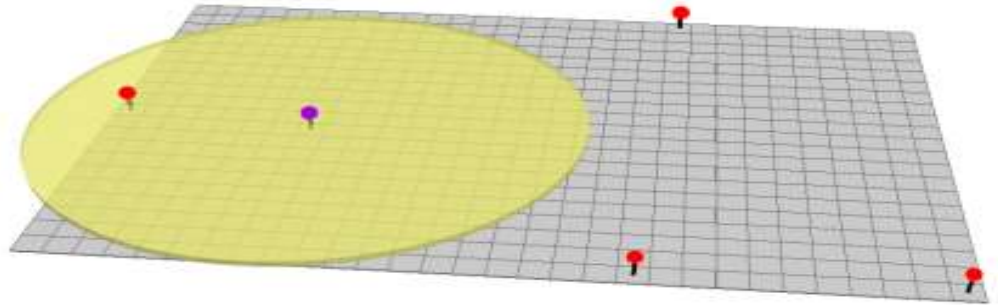


- 2. HARDWARE:** Hardware runs GIS software. It could be anything from powerful servers, mobile phones or a personal [GIS workstation](#).
- 3. SOFTWARE:** GIS software specialize in spatial analysis by using math in maps. It blends geography with modern technology to measure, quantify and understand our world. Ex. QGIS, ArcMap.

Spatial Analysis

BUFFER:

The **buffer tool** generates a polygon around features at a set distance. By creating buffers, you can find the surrounding features that are within buffers.



What is Network Analysis?

Network analysis enables you to solve problems, such as finding the most efficient travel route, generating travel directions, finding the closest facility, defining service areas based on travel time.



Query

It is one of the operation used in GIS to analyse data.

In analysis of Spatial data

- Attribute query
- Spatial query
- Alteration of original data

An **attribute query** is a way to search for and retrieve records of features in a set of data based on its **attribute** values.

Like in a country's map, name of states which contains "PRADESH".

Involves selecting features based on location or spatial relationships, which require processing of spatial information

- Like areas within some distance

3 broad categories of SPATIAL QUERY

- DIRECTION
- DISTANCE
- TOPOLOGY

Exercise on *Qunatum GIS*

Specifically, you will learn how to:

- Add layers to your project
- Display data to your specifications (e.g. colors, symbols, line weights)
- Navigate the data using the zoom, pan, and full extent tools
- Identify features and their attribute data
- Query the map based on your criteria
- Plugins
- Create a map layout
- Create a map project