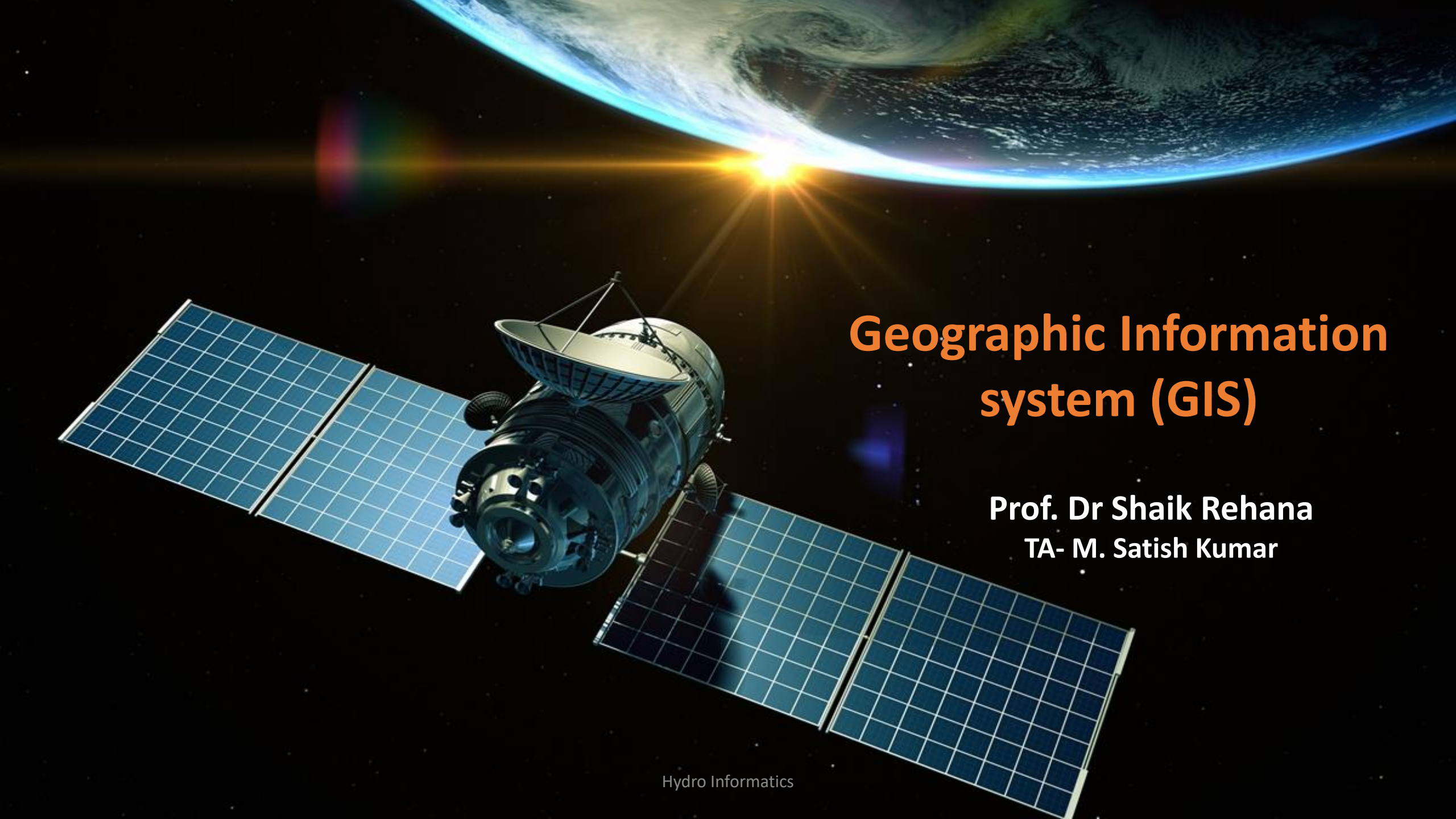

Geographic Information system (GIS)

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Introduction

- GIS stands for Geographical Information System. The geographical information system (GIS) consists of two distinct disciplines, namely geography and information system.
- Geography is the scientific study of geo-spatial pattern and process. It seeks to identify and account for the location and distribution of human and physical phenomena on the earth's surface.
- Geography aims to develop general rather than unique explanations. It proceeds from the assumption that there is basic regularity and uniformity in the location and occurrence of phenomena and that this order can be identified and accounted by geographical analysis.

Introduction

- Information system most often refers to a system containing electronic records, which involves input of source documents, recording on electronic media, and output of records, along with related documentation and any indexes.
- The information system can be defined as an interactive combination of people, computer hardware and software, communications devices, and procedures designed to provide a continuous flow of information to the people who need information to make decisions or perform analysis.

OBJECTIVES OF GIS:

Some of the objectives of GIS are as follows:

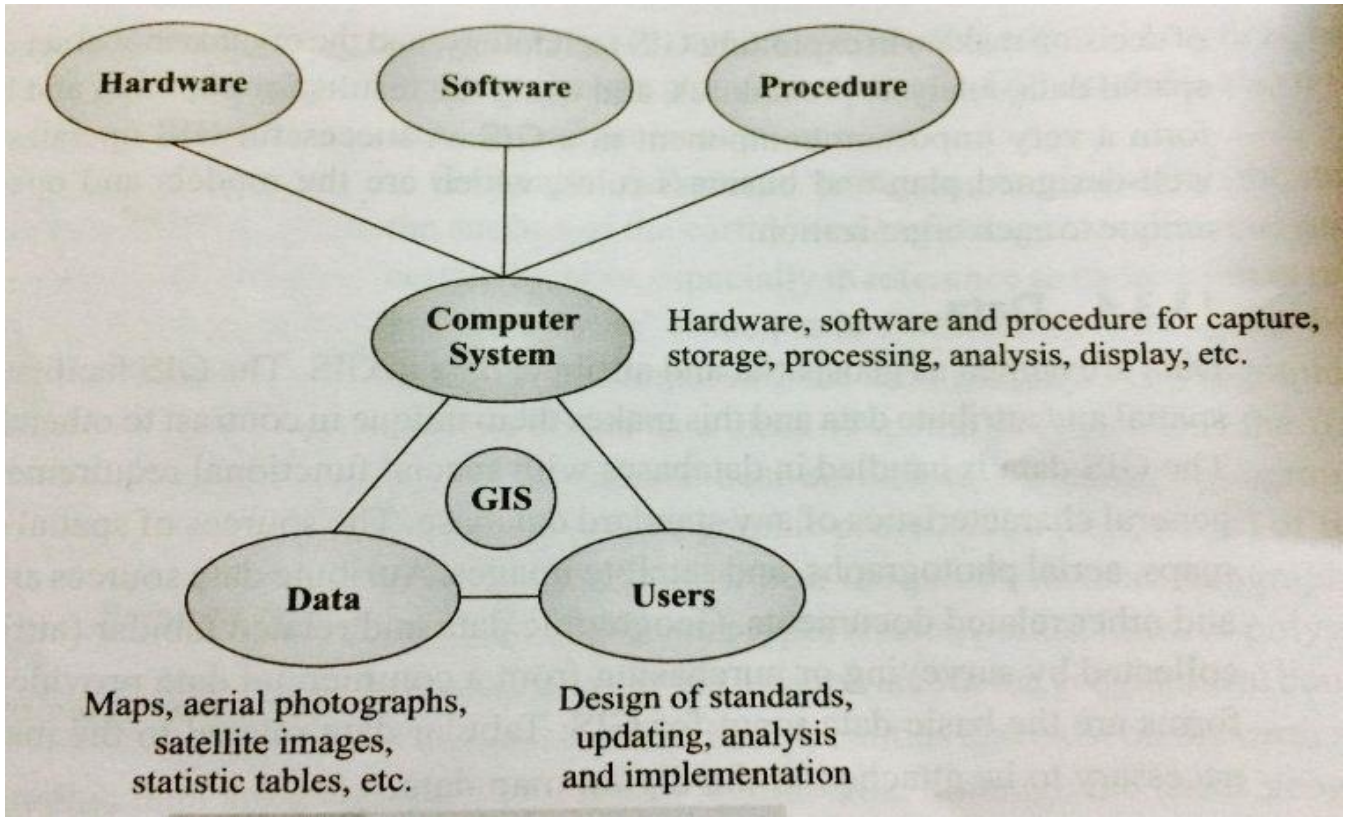
- Maximizing the efficiency of planning and decision making.
- Integrating information from multiple sources.
- Facilitating complex querying and analysis.
- Eliminating redundant data and minimizing duplication.

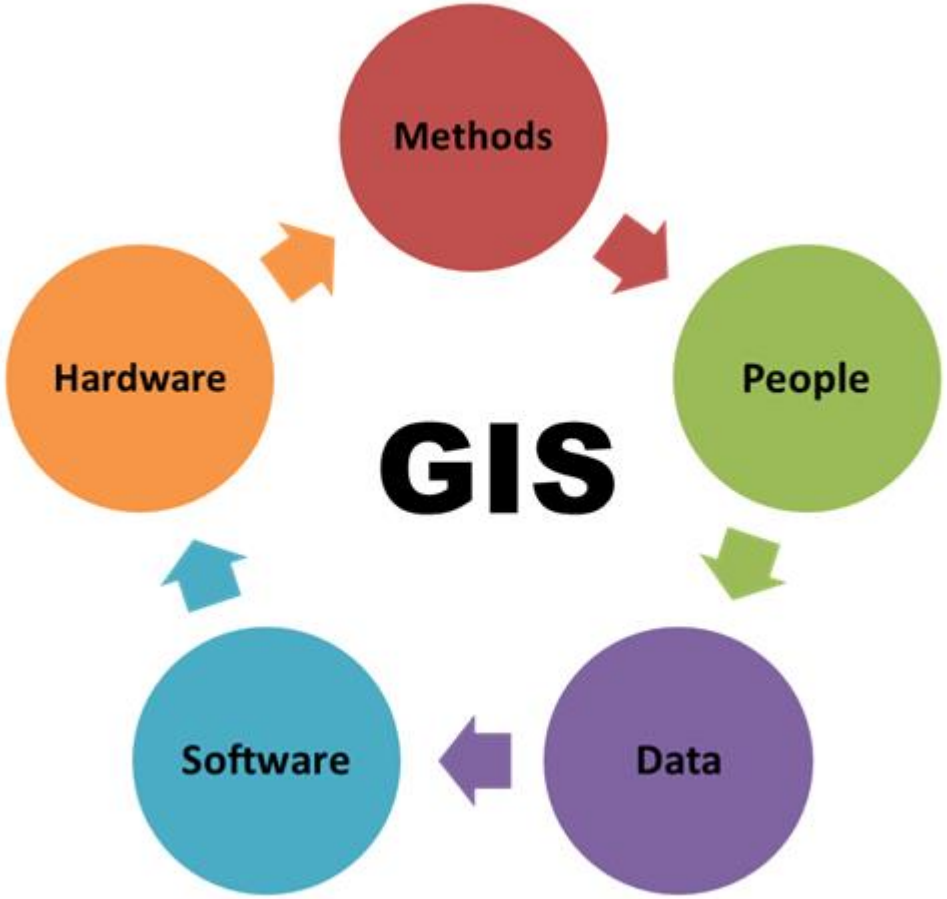
Definition of GIS

- The GIS is an information system designed to work with data referenced by spatial/geographical coordinates.
- **GIS is defined as** an information system that is used to input, store, retrieve, manipulate, analyze and output geographically referenced data or geospatial data, in order to support decision making for planning and management of land use, natural resources, environment, transportation, urban facilities, and other administrative records.
- A geographic information system is a facility for preparing, presenting, and interpreting facts that pertain to the surface of the earth.

Components of GIS

The GIS constitutes of five key components, namely, hardware, software, procedure, data, and users as shown in figure.





The development of open source GIS has provided us with freely available desktop GIS such as Quantum, uDIG, GRASS, Map Window GIS etc., GIS software's.

Data representation in GIS

SPATIAL DATA:

- Spatial data also known as geospatial data or geographic information it is the data or information that identifies the geographic location of features and boundaries on Earth, such as natural or constructed features, oceans, and more.
- Spatial data is usually stored as coordinates and topology, and is data that can be mapped.

ATTRIBUTE DATA:

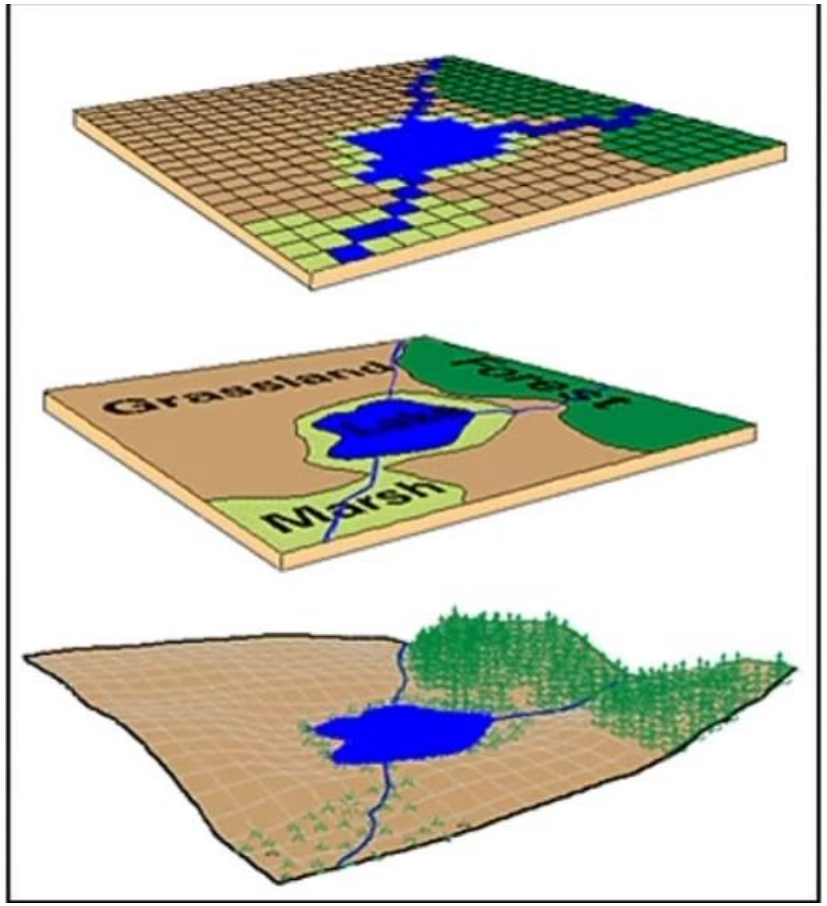
- Attribute data is qualitative data that can be counted for recording and analysis. Attribute data is not acceptable for production part submissions unless variable data cannot be obtained.

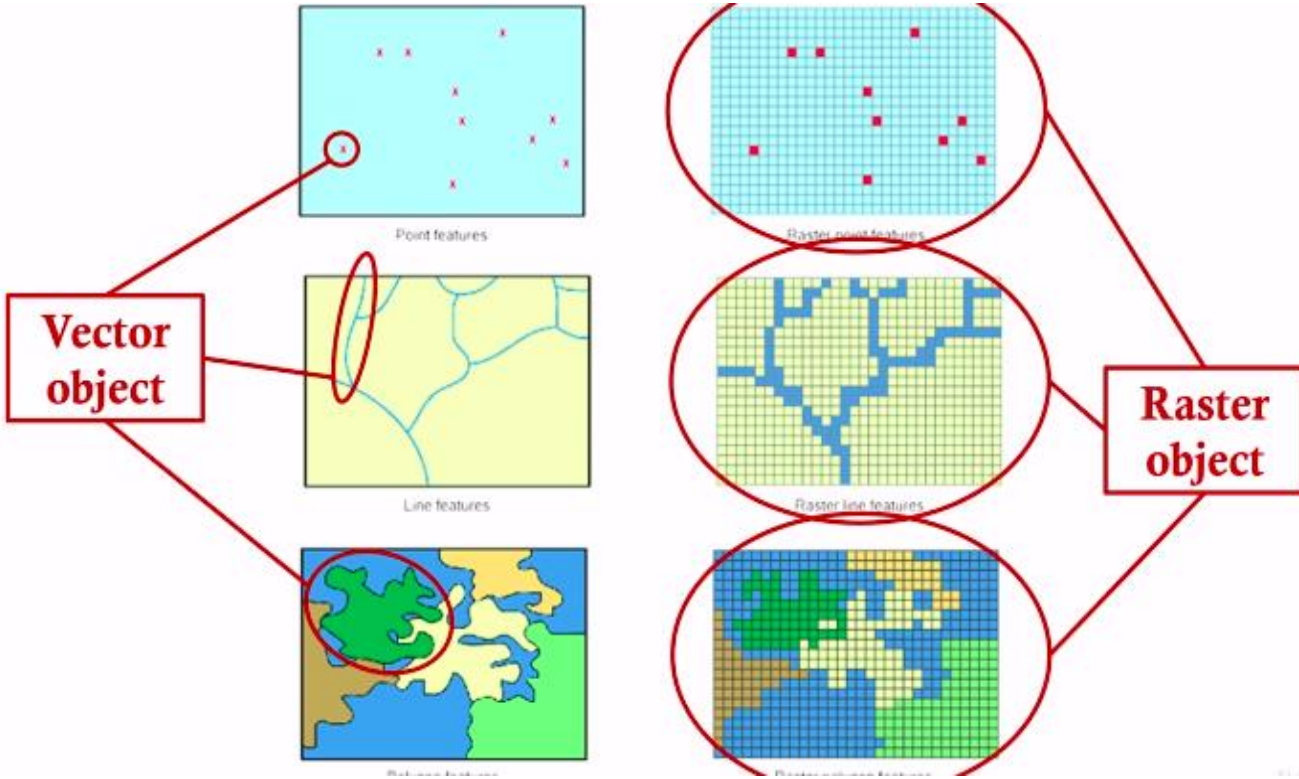
Spatial Data

Raster

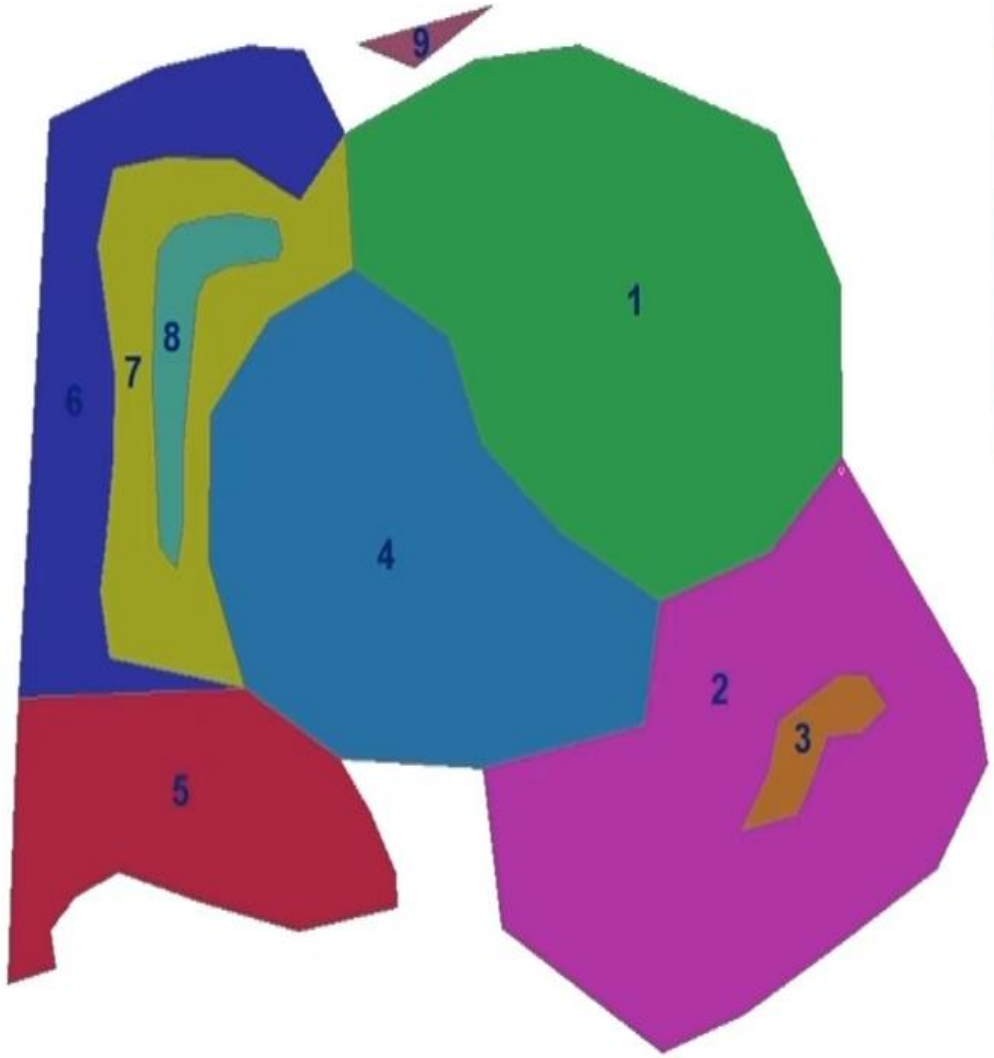
Vector

Real World





Attribute Data



FID	Id	Area	Value
1	2	4546464	5566780
2	3	4345	354353
3	4	1465656	8675640
4	5	46546466	345241
5	6	5454646	4224540
6	7	546464646	362342565
7	8	546546446	5865824380
8	9	4546646	5646342

atics

Raster vs Vector

ADVANTAGES:

	Raster Model	Vector Model
1.	Simple data structure	It is a smaller file size
2.	Easy and efficient overlaying	Individual identity for discrete objects like line, polygon etc.
3.	Compatible with remote sensing imagery	Efficient for topological relationships.
4.	High spatial variability is efficiently represented.	Efficient projection transformation
5.	Efficient to represent continuous data.	Accurate map output and easy to edit.

Raster vs Vector

Disadvantages:

Raster Model		Vector Model
1.	Larger file size	Complex data structure
2.	All the objects are series of pixels, no identity for discrete objects other than points/pixels.	Difficult overlay operations.
3.	Difficult to build topological relationship.	High spatial variability is inefficiently represented.
4.	Inefficient projection transformation.	Not compatible with remote sensing imagery.
5.	Loss of information when using larger cells	Not appropriate to represent continuous data
6.	Difficult to edit.	