

Remote Sensing: Concept, Definition, and stages

Prepared by Satyajit Paul, Assistant Professor, Gour Mahavidyalaya, Mangalbari, Malda

Concept:

Remote sensing is a technology that involves the collection of information about an object, area, or phenomenon without direct physical contact. It utilizes sensors, usually mounted on aircraft or satellites, to capture data from a distance. The primary goal is to gather data about the Earth's surface, atmosphere, or oceans to analyze, monitor, and interpret various aspects of the environment.

Definition:

Remote sensing can be defined as the process of acquiring information about an object or phenomenon without making physical contact with it. This is achieved through the detection and measurement of electromagnetic radiation, such as visible, infrared, and microwave radiation, emitted or reflected by the target. Remote sensing has widespread applications in fields like agriculture, forestry, environmental monitoring, urban planning, disaster management, and more.

Stages of Remote Sensing:

Remote sensing typically involves several stages, each contributing to the overall process of data acquisition, analysis, and interpretation.

- **Data Acquisition:**

Sensor Deployment: Instruments, such as cameras, spectrometers, and radar, are deployed on platforms like satellites, airplanes, drones, or ground-based stations.

Energy Source: Remote sensing relies on the interaction of electromagnetic radiation with the Earth's surface. The Sun is the most common natural source of energy for this purpose.

- **Data Transmission:**

Transmission to Ground Stations: Once the sensors capture data, it is transmitted to ground stations or directly to data processing centers. Satellite communication systems or other transmission methods are employed for this purpose.

- **Data Preprocessing:**

Radiometric Calibration: Adjustments are made to account for variations in sensor sensitivity and atmospheric conditions.

Geometric Correction: Corrections are applied to ensure accurate spatial representation of the data.

- **Image Processing:**

Enhancement: Techniques such as contrast stretching or histogram equalization are applied to enhance features in the images.

Classification: Different elements in the images are classified into categories using algorithms to identify land cover types or other features.

- **Data Analysis:**

Interpretation: Analysts interpret the processed data to derive meaningful information about the Earth's surface or atmosphere.

Modelling: Mathematical models may be applied to predict and understand complex phenomena based on the remote sensing data.

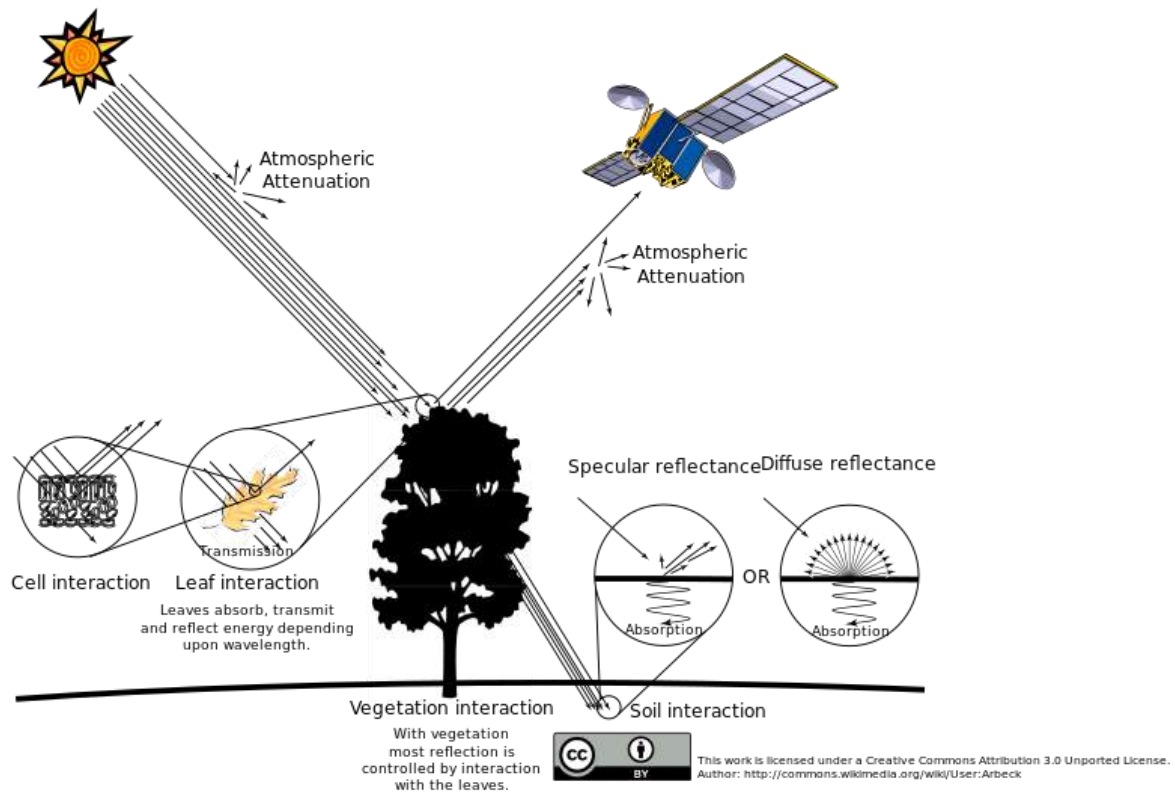


Fig: Stages of Remote sensing

- **Application:**

Decision-Making: The interpreted information is used for decision-making in various fields, including agriculture, forestry, urban planning, disaster response, environmental monitoring, and scientific research.