Training Day 1 Daily Dairy

5 June 2024

Studied about Basics of Remote Sensing and Google Earth Engine

- *What is remote sensing*
- *Active and Passive remote sensing*
- *Working of GEE (basics)*

Remote Sensing

Remote sensing is the science of obtaining information about objects or areas from a distance, typically from aircraft or satellites. It involves detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance.

Types of Remote Sensing

1. Active Remote Sensing:

Definition: Active remote sensing systems emit their own energy (such as radar or lidar) to scan objects and areas. When the energy encounters an object, it is reflected back to the sensor.

Example:

- Radar (Radio Detection and Ranging): Uses radio waves to detect objects and measure distances.
- Lidar (Light Detection and Ranging): Uses laser light to measure distances and create high-resolution maps.

Applications:

- Topographic mapping
- Vegetation and forest monitoring
- Ocean and ice monitoring

Manveer Kaur   CRN-2215112   URN-2203502

- Urban planning

2. Passive Remote Sensing:

Definition: Passive remote sensing systems detect natural energy that is reflected or emitted from the Earth's surface. The most common source of radiation detected by passive sensors is sunlight.

Examples:

- <u>Optical sensors</u>: Detect visible, infrared, and near-infrared light reflected from the Earth's surface.
- <u>Thermal sensors</u>: Detect the heat emitted by objects.

Applications:

- Land use and land cover mapping
- Environmental monitoring
- Climate studies
- Disaster management

Google Earth Engine (GEE)

Google Earth Engine (GEE) is a cloud-based platform for planetary-scale environmental data analysis. It provides access to a vast archive of satellite imagery and geospatial datasets, enabling users to visualize, analyse, and share spatial data.

Basic Working of GEE:

1. Data Access:

- GEE hosts a comprehensive catalog of public geospatial datasets, including satellite imagery from Landsat, Sentinel, MODIS, and other sources.
- Users can access these datasets directly from the platform without the need for local storage.

2. Data Processing:

- GEE provides a JavaScript and Python API for data manipulation and analysis.
- Users can perform complex computations on large datasets using GEE's powerful cloud-based processing infrastructure.
- Common operations include image classification, change detection, time-series analysis, and spatial statistics.

3. Visualization:

- GEE offers interactive tools for visualizing spatial data.
- Users can create custom maps, charts, and animations to explore and present their results.

4. Sharing and Collaboration:

- Users can share their analyses and visualizations with others via the web.
- GEE supports collaboration by allowing multiple users to work on the same project.

Summary

Remote sensing, an essential tool in Earth observation, can be divided into active and passive techniques. Active remote sensing systems emit energy to scan the Earth's surface and include technologies like radar and lidar. Passive remote sensing systems detect natural energy reflected or emitted from the Earth's surface, primarily using sunlight, and include optical and thermal sensors. Google Earth Engine is a powerful platform for analysing and visualizing large-scale environmental data, offering tools for accessing a vast array of datasets, performing complex analyses, and sharing results.