Take Home Assignment

In this **one-week** project, you will work with space-based satellite data and ground observations to explore **one of the following topics**:

1. ***The impacts of rapid urbanization on climate.***

2. ***Monitoring and assessing the damage caused by floods and forecasting their risk in the future.***

3. ***Studying the effects of deforestation and afforestation on carbon sequestration.***

Your goal is to use Python to analyze geospatial datasets and compare data across different time periods and geographic regions to gain insights into changes in Earth-related attributes.

Deadline ~ 1 Week

Task

1. Choose one of the topics listed above.

2. Analyze the effects of rapid urbanization on climate, flood monitoring, and damage assessment as well as forestry-related issues like deforestation, afforestation, and carbon sequestration using satellite data and ground observations.

3. Compare data from different time periods and geographic regions to investigate changes in Earth-related characteristics.

4. Employ Python for all analyses and visualizations.

Requirements

1. Use space-based satellite data and ground observations to analyze the chosen topic.

2. Provide a detailed document outlining your solution, key outcomes, and methodology.

Questions to answer in your document

1. Solution Summary

2. Define the geographic region of interest for your solution. Note that any type of geographic location is suitable.

3. List the key outcomes or takeaways from your solution.

4. Explain how you used geospatial data in your solution.

5. For solutions involving machine learning, clearly state the evaluation stage, metrics used, and validation set.

6. Identify connections among various environmental and human activities in your solution.

7. Are there areas where your solution could be improved in terms of data or methodology?

Resources

Here are some resources you could try. Feel free to try out any other resources, but please attribute them!

- NASA Earth Science Data

- Global Imagery Browse Services (GIBS)

- NASA Worldview

- NASA GIBS Service Endpoints

- NASA EarthData Search

- NASA EarthData Common Metadata Repository

- Global Covid 19 Viewer

- Copernicus Open Access Hub

- ECMWF CAMS Weather

Submission Instructions

- By the end of the week, please submit a Jupyter notebook that contains your code, visualizations, and a summary of your solution.

- To ensure reproducibility, kindly upload the source code, summary document, and all relevant assignment materials to **GitHub** and share the link. We will not accept any other mode of submission.

- Make a **<u>Private GitHub Repo</u>** and **add the username** to the repo - (Username - <u>@saheelBreezo</u>). <u>Follow these instructions on how to add contributors to your GitHub repository.</u>