

Development of a Python Package for Remote Sensing Indices using Google Earth Engine

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Google Earth Engine is a cloud-based platform which provides a geospatial processing service. The primary objective of this project is to utilize the computational capabilities of Google Earth Engine on the backend to develop a python package. This package will enable users to access standard Remote Sensing indices and generate their respective time series charts. For the extent of this project, we target Sentinel-2 and Landsat Satellite imagery. Depending on the time availability, we may consider including other satellite data and their corresponding indices in the package.

Method

In this project, the team will focus on creating and managing the GitHub repository, which includes overseeing all requests, issues, and collaboration within the team. Following this, we will collectively work on setting up the development environment, ensuring the installation of necessary packages and dependencies required for the project. Once the environment is set up, efforts will be made to provide a comprehensive documentation describing the Remote Sensing indices to be implemented, including mathematical formulation and application. The major task includes the creation of class and defining the functions for:

- Accessing user-specified satellite images
- Selection of image based upon user-specified data and area of interest.
- Aggregation of collection of images (if required)
- Selecting useful bands for indices calculation
- Calculating indices (EVI, NDBI, NDVI, NDWI)
- Generation of time-series charts

Then, we will develop detailed documentation covering installation instructions, usage guidelines, API references and examples. Finally, we will work on the creation of Python package, ensuring the organization of the codebase modular structure. Once the package is ready, we will deploy it to a suitable platform for accessibility and ease of installation.

GitHub Repo: [Link](#)

Responsibilities

ID	Task	Subtask	Responsible person(s)	Time estimations
1	Create and manage repository; handle merge requests from the contributors	-	Rohit Khati	Full duration of the project - 5h in total
2	Find common way of merging of the code	-	All	7h (prep. 5h/2h discussion)
3	Create class functions	User-specified image access	David Hansen	5h

		Image selection based on specified sensor, AOI, cloud percentage	David Hansen	5h
		Aggregation of image collection	Gernot Nikolaus	5h
		Band selection based on the specified index	Gernot Nikolaus	5h
		Index calculations	Asad Ullah	5h
		Mapping function for time-series	Gernot Nikolaus	5h
		Generating time-series chart	Rohit Khati	5h
4	Class	Class creation and harmonizing of implemented functionality	Rohit Khati (/David Hansen)	5h
5	Conda environment creation and distribution	-	Asad Ullah	5h
6	Documentation of Class and functions	Documentation Class	David Hansen	3h
		Documentation Functions	Creator of function	1h
7	Final testing		All members	1h
8	Deploying the package	-	Rohit Khati	(2h)
9	Regular weekly meetings	-	All	14h

Project Timeline

Date	Tasks	Milestones
29.04 - 05.05	Creation of repository	Repository; Overall scope of the project
06.05 - 12.05	Work on proposal: create collaborative document; assign tasks to contributors	Submit proposal
13.05 - 19.05	2, 3, 9	Finding a common way of merging code
20.05 - 26.05	3, 9	Finalize functions
27.05 - 02.06	4, 5, 9	-
03.06 - 09.06	4, 5, 9	Creating environment, Finalize code (class, functionality)
10.06 - 16.06	6, 9	Finish documentation
17.07 - 23.06	6, 7, 8, 9	Deploy package
24.06 - 02.07	End of project end of June/beginning of July	