**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](https://github.com/ro-hit81/GeoIndexity)

**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 |  |