Applied Research Team, Inc.
Denver, Colorado

School of Mines Field Session, Fall 2024 Project

July 2024 Proposal 2

Proposal Title: Utilities for Automated Download, Processing, and Display of Satellite Data

Company Background:

Our mission is to reimagine and reshape the future of climate adaptation with research and analytical tools that transform complex data into actionable information. Applied Research Team, Inc. is a Colorado company, established in January of 2022.

The leadership team at ARTi is composed of Jean Vieux, President/CEO (Environmental Scientist) and Dr. Baxter Vieux, Chief Scientist and Principal Engineer (Hydrologist). Both have decades of experience in the application of remote sensing and applications of information to protect the environment, improve water quality, and promote water resources management.

Introduction: Satellite remote sensing can play an essential role in the monitoring of water resources. Nearly global coverage offers clear advantages for a range of applications.

Work Description: Create an automated system that downloads satellite data, processes derived quantities and indices, and generates maps. The use-case is a set of utilities to download data from open data portal(s) for historic periods defined by a date range and area of interest (AOI). The system will need to efficiently handle memory and storage to download and process data for large areas, sub-setting to the AOI, and batch processing. Each time a job is requested, the system should check if raw data exists for the same AOI/dates and has already been downloaded and/or processed.

Python command line utilities are envisioned as follows:

1. Save data in cloud-optimized archival format
2. Calculate derived quantities/indices
3. Perform georeferencing, terrain processing and reprojection of mapped data.
4. Plotting timeseries of derived quantities/indices for 1) points or 2) areas (mean).
5. Output to a folder of plots and maps with time-stamp filenames. Maps stored as images of georeferenced quantities/indices representing dates of satellite passage during a given date range.

Suggested Resources: Xarray/Rioxarray, ZARR, Python, JSON, GeoPandas, Vscode with Source Control.

Team Size: 2-3

Work Location: Remote.

Internship Possibilities: Yes. Depending on the situation at the time of desired internship.

NDA: We will require an NDA for this project.

Intellectual Property: Applied Research Team, Inc. will retain ownership of all code developed.