

Installation and Set-up Guide for epidemia-gee

Last updated: 2020 June 24

Overview

The epidemia-gee package is a new python package in the EPIDEMIA system for interfacing with Google Earth Engine (GEE) from R via python. The package is built for an Ethiopian national-level data collection, and an example script is included in the epidemiar-demo project to show how this linkage can be used to gather GEE environmental data from a script in R, rather than using another external application (e.g. GEE code editor in a web browser).

Required software list

Please install the following if they are not already installed:

R: <https://www.r-project.org/>

RStudio: <https://rstudio.com/products/rstudio/download/>

Anaconda: <https://www.anaconda.com/products/individual>

An example script, EPIDEMIA_GEE_python.R, can be found in the GEE folder of the epidemiar-demo project: <https://github.com/EcoGRAPH/epidemiar-demo/releases/latest>

Anaconda set-up

First, we will set up and activate a conda environment, then install the epidemia-gee and Earth Engine packages.

1. Open the “Anaconda Prompt” (Windows; and “Terminal” for MacOS) and enter in the following commands:
2. Create a conda environment:
`> conda create --name gee-demo`
3. Activate the environment:
`> conda activate gee-demo`
4. Install git pip, which we will use to install the epidemia-gee package
`> conda install git pip`
And proceed (y) with installation of any other packages that it wishes to do.
5. Install the epidemia-gee package
`> pip install git+https://github.com/EcoGRAPH/epidemia_gee.git`
6. Install the Earth Engine package in the gee-demo environment
`> conda install -c conda-forge earthengine-api`

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7. And finally, authenticate with your Earth Engine account

```
> earthengine authenticate
```

This will open a browser window for you to log into the Google Earth Engine Python Authenticator, click Allow, and you receive an authorization token code to paste back into the Anaconda Prompt. After you paste in the token and it has successfully saved, you may close the Anaconda Prompt.

R/RStudio

In the epidemiar-demo project: <https://github.com/EcoGRAPH/epidemiar-demo/releases/latest> under the GEE folder, there is a script, EPIDEMIA_GEE_python.R that also contains the code below.

This script will allow us to call the python code to request our customized environmental data from GEE. We collected a variety of environmental variables: precipitation, land surface temperatures, spectral indices that are all summarized per woreda (district) in Ethiopia.

```
# #####
#
# This script can be used to request environmental data from GEE
# by going through the R package reticulate to a
# custom python package, epidemia-gee, and requesting our custom
# processed summarized daily data to be downloaded to a Google Drive.
#
# Please see the install instructions for epidemia-gee, including
# Anaconda and set-up here:
#
#     https://github.com/EcoGRAPH/epidemia-gee/releases/latest
#
# The python package is built around a national data set, and
# the environmental data cannot to used directly in this project.
# However, it was included to show how this set up works.
#
# #####

#load packages
if (!require("pacman")) install.packages("pacman")
pacman::p_load(reticulate)
```

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```
#use the conda environment we set up earlier in Anaconda
use_condaenv("gee-demo", conda = "auto", required = TRUE)

#import the Earth Engine library
ee <- import("ee")
#authenticate
ee$Initialize()

#import the epidemia-gee package
eth_gee <- import("Ethiopia")

#Now we have access to the gee_to_drive() function
#  which accepts a start and end date
#  and requests our daily summarized data for that range.
# The resulting .csv file will be downloaded to an "Ethiopiadata" folder
#  in the Google Drive of the authenticated account.

#example 1: start date of Jan 1, 2009 & end date of Feb 1, 2009
eth_gee$Et$gee_to_drive('2009-01-01','2009-02-01')

#example 2: start date of April 23, 2019 & end date of June 1, 2020
eth_gee$Et$gee_to_drive('2019-04-23','2020-06-01')
```

Updating

From the Anaconda Terminal you will active the conda environment and then uninstall and re-install the package.

```
> conda activate gee-demo
> pip uninstall Epidemia
> pip install git+https://github.com/EcoGRAPH/epidemia_gee.git
```