Geospatial Modeling Crash Course

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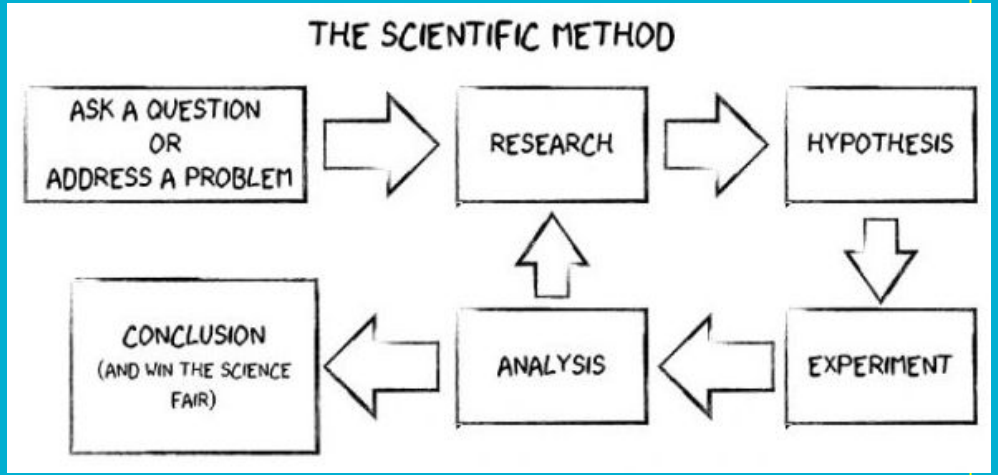
A bit of a kitchen sink

How to do this well

Personal Note on doing good science

- Collaboration
- Reproducibility
- Always learn
- Engaging in peer review process

This should look old and outdated…



Goal

Provide a training that exposes individuals to the framework and components of a common geospatial modeling process so they can more quickly engage with the material in their own work.

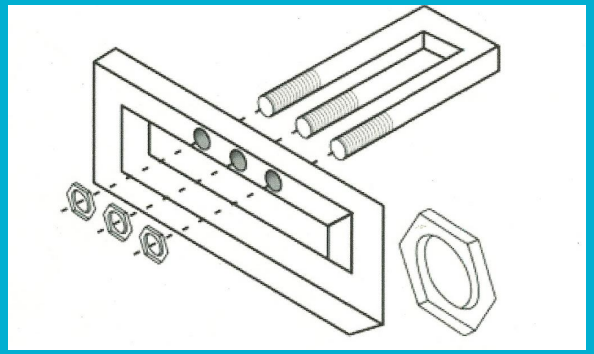
- Drive into the deep end
- Understand potential and follow the process
- Have a resource to look back on

Please Ask Questions

Outline

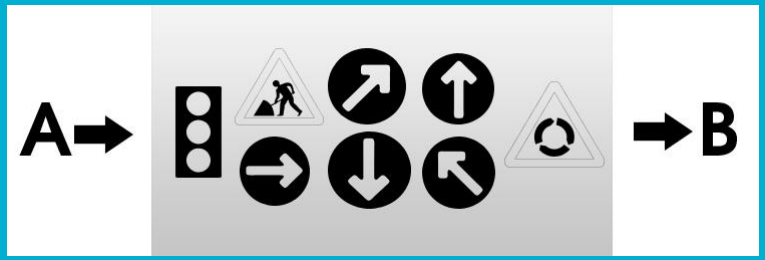
Part 1: Google Earth Engine (GEE)

- 4 sections
- A bit more straightforward
- You don’t need to know GEE



Part 2: R

- 2 sections
- A bit less straightforward
- You don’t need to know R (hopefully)



Introduction (Part 1)

GEE: Resources

https://drive.google.com/open?id=1W4TZS9eGWq_Sbd-2nmgeq48FbY3t-JxF

Introduction (Part 1)

GEE Presentation

https://docs.google.com/presentation/d/191dsyRePGyPruiH-fQ1nhx0jx7oJrJ2wa2pTP4NhK3E/edit#slide=id.g3556a9360b_0_25

Interact with GEE Drop Points (Part 2)

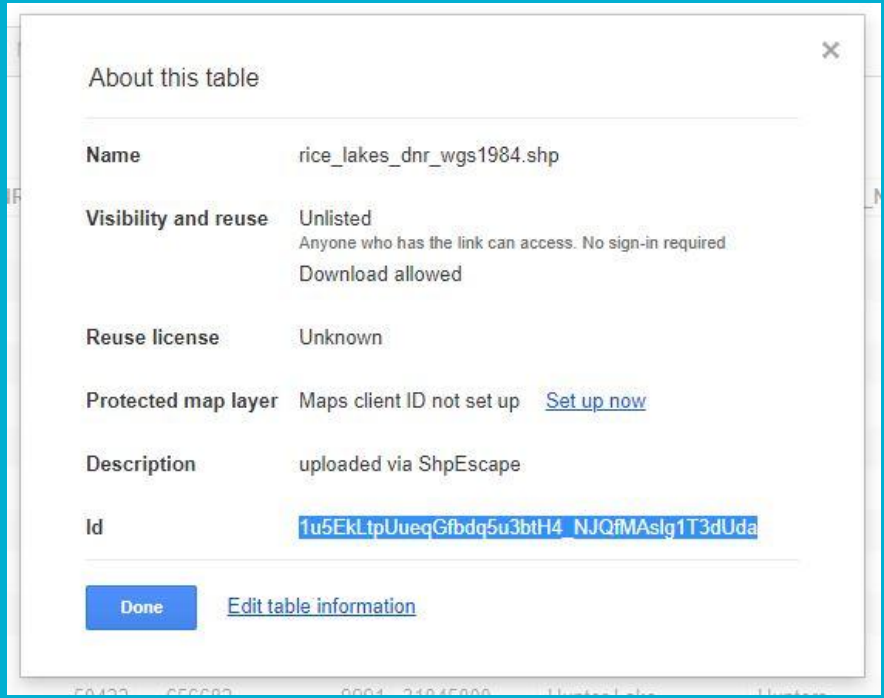
Generate potential training data in GEE

- NAIP imagery
- GEE basic functions

Import features in GEE (Part 3)

Learn how it import existing datasets into GEE

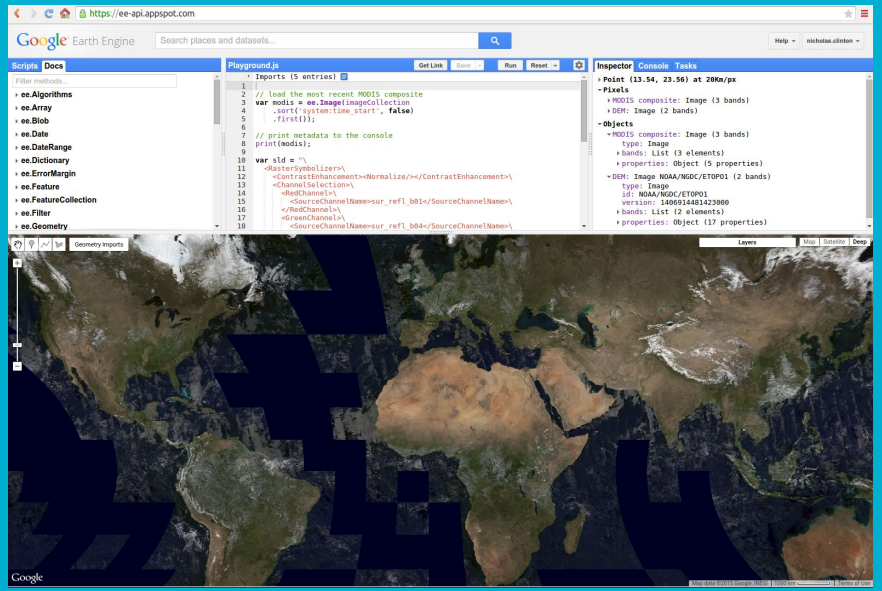
- Interoperability challenges



Modeling In GEE (Part 4)

Produce a geospatial model in GEE

- Apply advanced functions
- Generate Indices
- Visualize results



Break

R

Programming Language that allows for quick access to dataframes

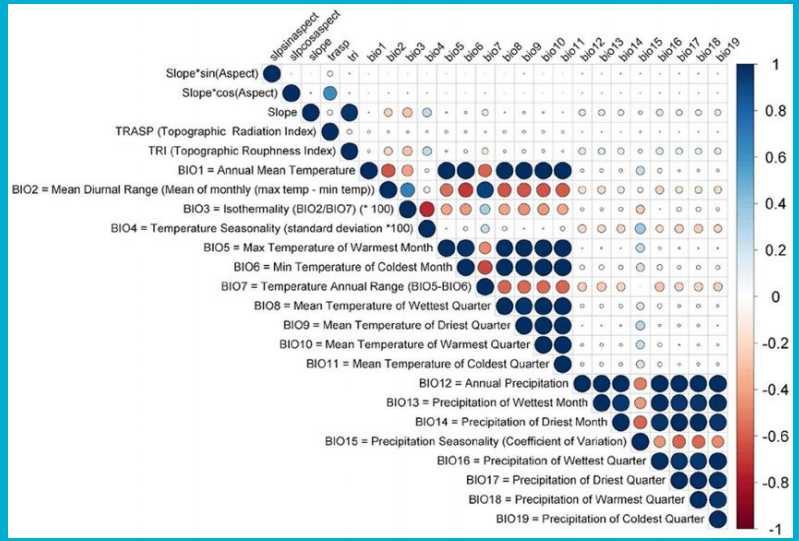
- Developed for statistical purposes so it kinda stand out relative to other computer science languages
- thisIsAThing <- “Why would <- mean =?”
- Call a function on a object object$function
- Case sensitive
- Paths <- “need\\double\\backslash\\on\\windows”

There is a lot more, we just can’t cover it here

Variable Selection in R (Part 5)

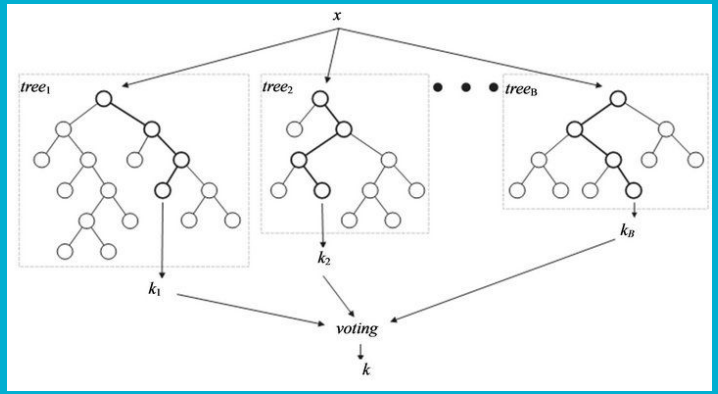
Engage with R packages to inform which predictors are important

- Manipulate dataframes
- Apply algorithms
- View statistical results



Random Forest Modeling in R (Part 6)

Apply a machine learning algorithm to predict



Bad Science

Process not Products

General Notes on Geospatial Modeling

Modeling is full of assumptions, know them

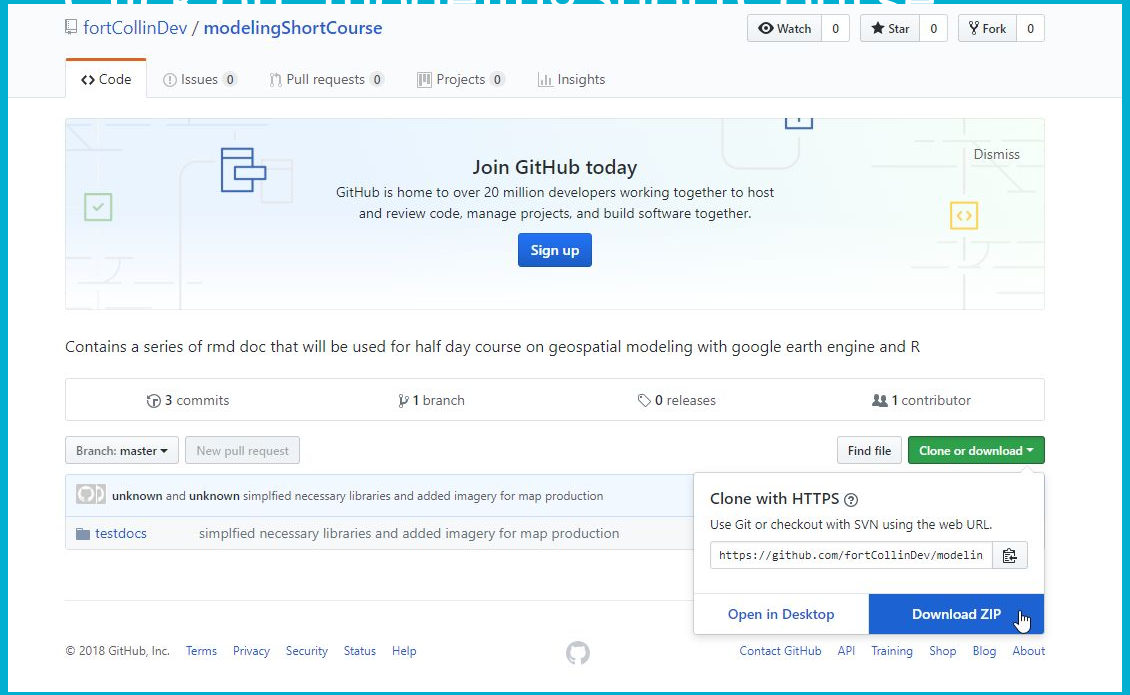
Understanding what it does poorly is equally as important as what it does well

Ideally your model provides more information then was previously available

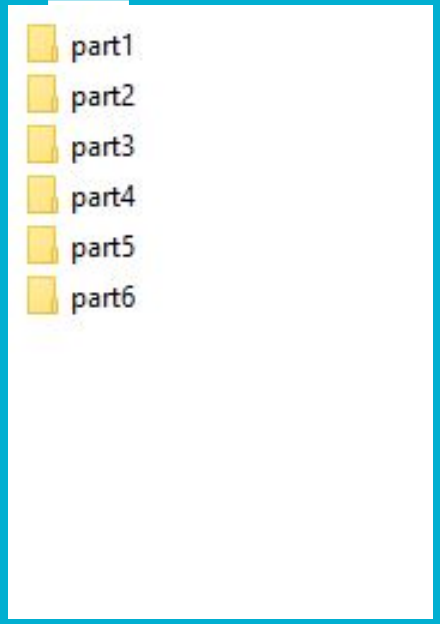
Understand where the largest uncertainty is and use that to limit the specificity of your output

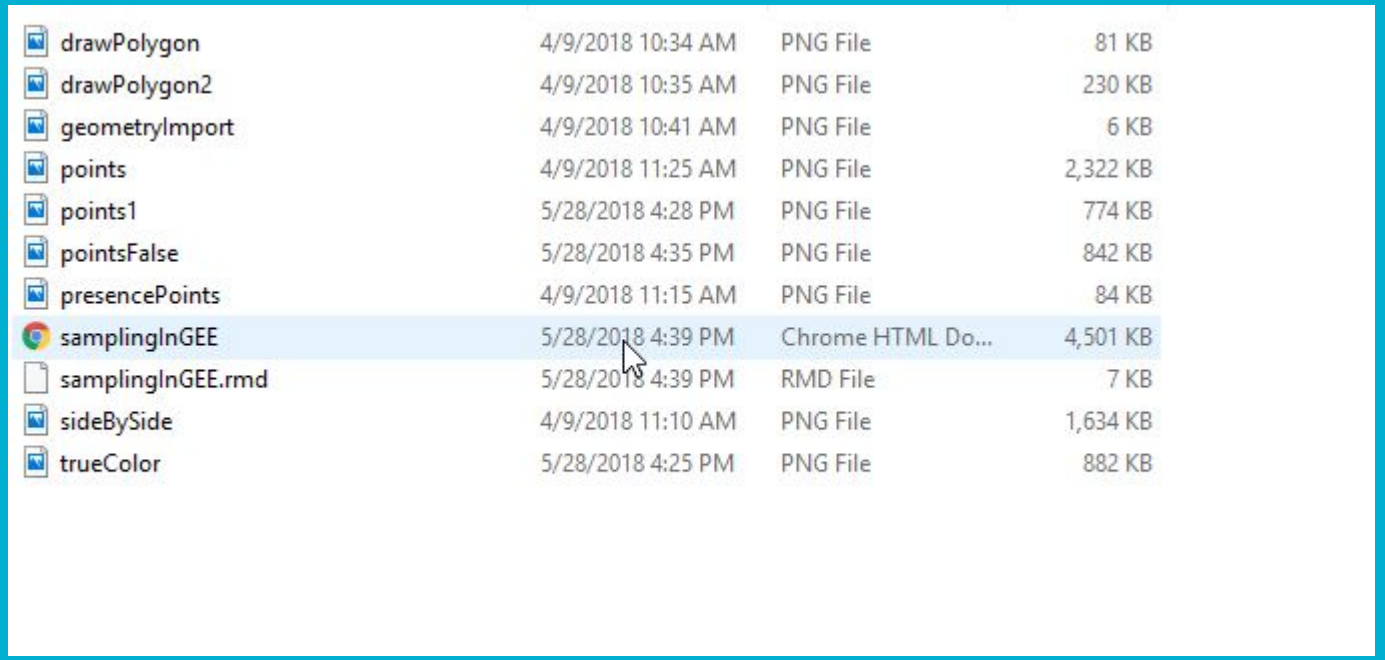
https://github.com/fortCollinDev

Click on “modelingShortCourse”



Follow Along by opening the html file





Ocular Sampling in Google Earth Engine

Dan Carver

05/28/2018

1 Google Earth Engine

This resource has changed our methods for working with remotely sensed data. Google Earth Engine is a web based analysis platform that provides access to large libraries of geospatial data. For the most part the available data is raster based. What is nice about the resource it that it takes away the downloading and preprocessing aspects of the working with these datasets. This allows you to move into asking your question and develop methodology very rapidly. GEE does require registration to a google account. You can sign up and read more at this link:sign up

1.1 Goal

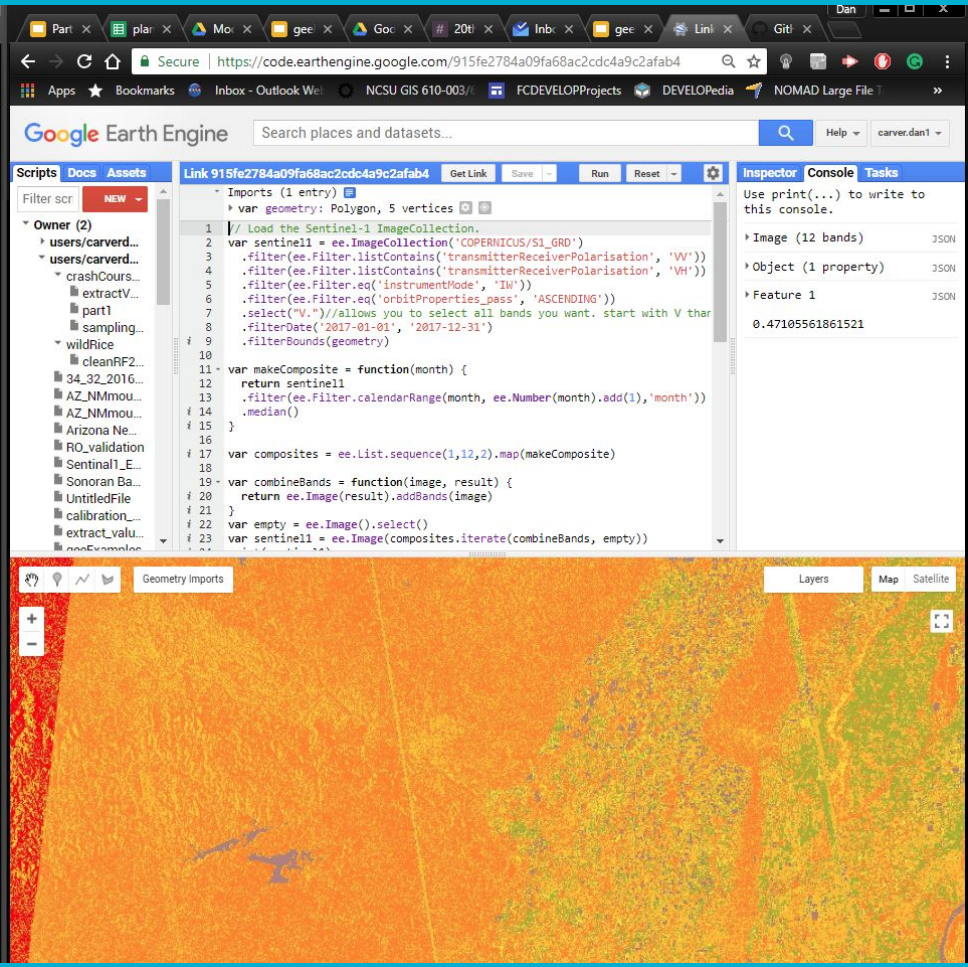
In this document we will show how to use high resolution NAIP imagery to visually sample for a specific land cover class. This is a method that allows you to add to existing presence and absence locations.

1.2 Setting up Sampling Interface

Depending on your location and time frame, NAIP imagery is collected in 4 bands, blue, green, red, and near infrared. The near infrared band is helpful in distinguishing between different types of vegetation. In this example we will sample deciduous forests in Iowa for 2015. We will load both true color and false color NAIP imagery to allow for the best distinction.

1.3 Define Region of Interest

Creating geometries in earth engine is as simple as pressing the geometry button.



Ask questions