



Google Earth Engine

An introduction to processing remote sensing data in
GEE

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Session plan

3 practical (**show and do**) modular sessions:

- **Session 1** - Introduction to GEE code editor, image collections, images and visualisation
- **Session 2** - Image functions, indices, colour palettes and exporting data
- **Session 3** - Import data and image classification

We'll break in between each session





Google Earth Engine

- Cloud computing platform with access to most publicly available EO data with pre-processing steps already applied.
- One-stop-shop for raster-based analysis
- Ability to perform large scale processing (Global/National) quickly and efficiently with Google Cloud Infrastructure.
- Access through a web-browser with Javascript code editor or a python API
- Free for research, nonprofit.

Geospatial data

- The power of where:
 - data + location
- Useful for mapping and using data in multiple contexts



Types of Geospatial data

- Vector
 - Points
 - Lines
 - Polygons
- Raster
 - A grid of values spatially referenced (e.g. satellite image)

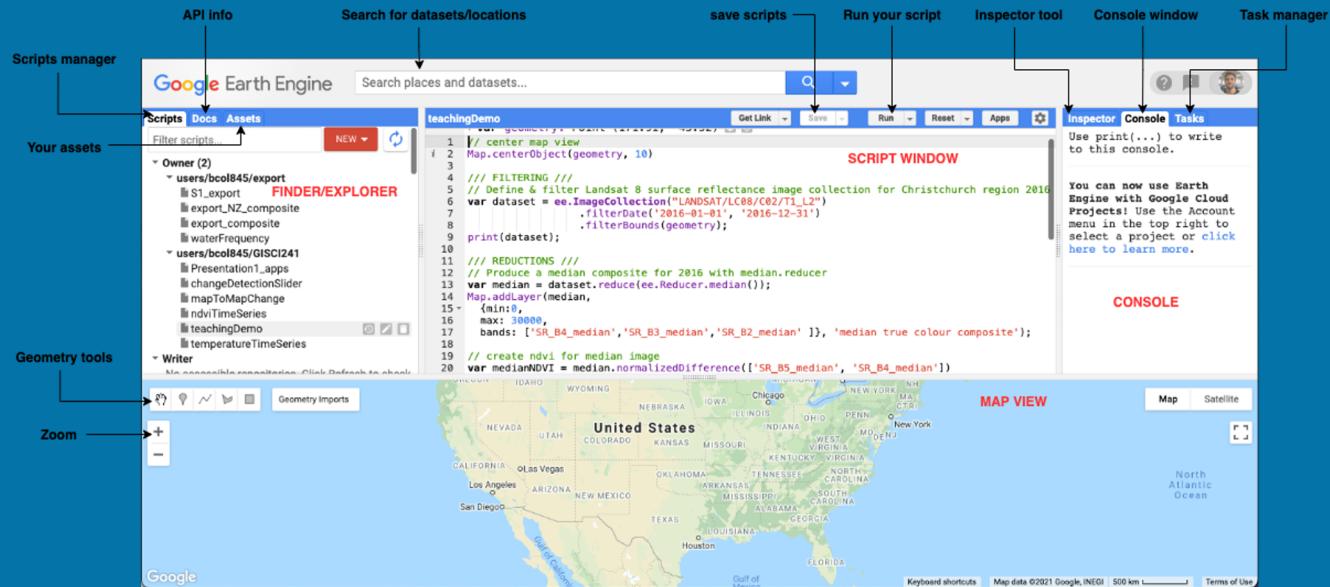
	1	2	2
	1	2	2
	3	3	3

Session 1 - The code editor, image collections, images and visualisation

Objectives:

- Understand how to search for datasets using the code editor and import them into scripts
- Learn how to create a geometry and use it in a script
- Learn about image collections and how to filter them
- Understand how the doc tab works to search for functions
- Understand images, visualisation parameters and visualising an image in the map

The code editor



<https://code.earthengine.google.com/?scriptPath=users%2Fbcol845%2FResBaz%3ASession1>



Let's take a break.

Session 2 - Image functions, indices, colour palettes and exporting data

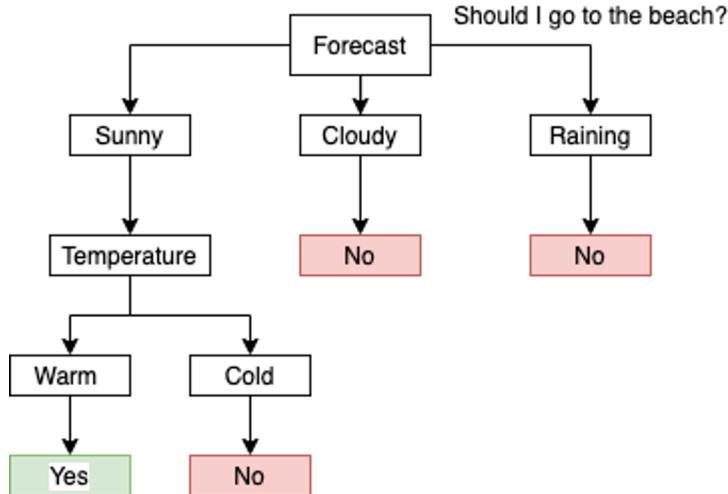
Objectives:

- Understand the concept of image functions and where to search for them
- Learn how to derive normalised indices in GEE using normalised burn ratio as an example
- Learn how to perform a difference between two images
- Learn how to apply a colour palette to an image
- Learn how to export data from GEE to use in other GIS/remote sensing software



Let's take a break.

Image classification with decision trees



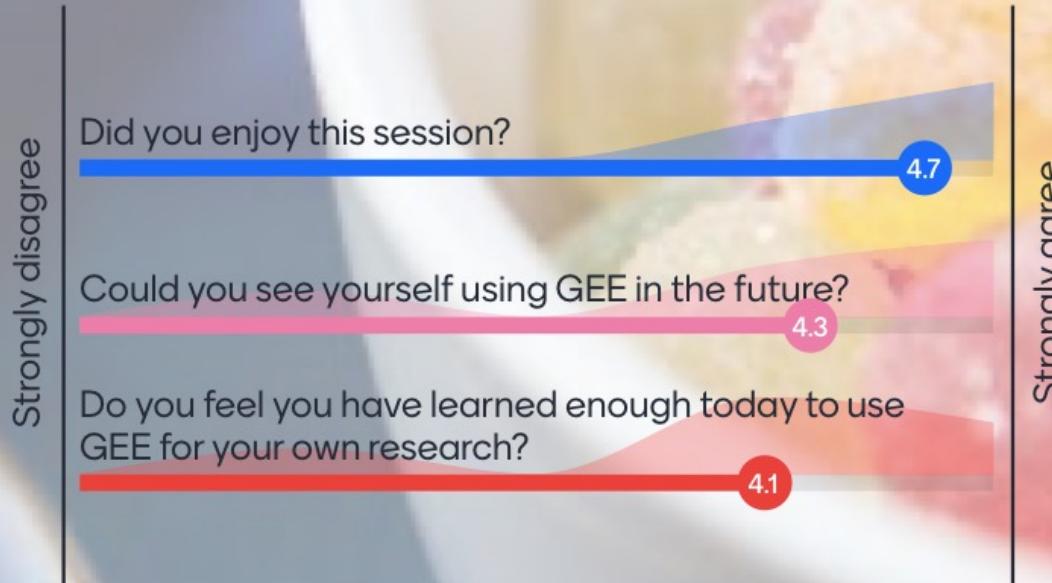
- Selection of decision tree machine learning algorithms available in GEE
- RandomForest is particularly useful for remote sensing image classification as final output is an aggregation of results from many trees minimising overfitting without increasing bias.

Session 3 - Ingesting data and image classification

Objectives:

- Learn about FeatureCollections and how they are useful for training classification algorithms
- Understand the concept of Assets, hows they are useful for storing your own data and for saving data/outputs you might use regularly
- Learn how to ingest a dataset into GEE as an asset
- Understand what classification algorithms are available in GEE and where to find them
- Learn how to apply a supervised classification algorithm in GEE
- Learn how to assess the accuracy of a classification output in GEE
- Understand the limitations of classification in GEE

How did you find the session?



Press S to show image

Summary

- Hopefully you have a tools/knowledge/resources to consider using GEE for your own research
- Check out the Resources cheat sheet for further tutorials and information
- Keen to hear your feedback on this session Qualtrics 1 up/1 down (1-3 mins) -
https://auckland.au1.qualtrics.com/jfe/form/SV_1XhCjrluNH4Zzue



ResBaz Sessions

- **Becoming a Data Scientist 101, Friday 9:30am**